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НАУЧНЫЕ ПОДХОДЫ В РАЗВИТИИ ТЕОРИИ КОРПОРАТИВНОГО УПРАВЛЕНИЯ
SCIENTIFIC APPROACHES FOR DEVELOPMENT OF CORPORATE MANAGEMENT THEORY

Варламов Н.В., доктор экономических наук, профессор
Varlamov N.V., Doctor of Economic Sciences, Professor
Полянин А.В., доктор экономических наук
Polyanin A.V., Doctor of Economic Sciences
Среднерусский институт управления, Российская академия народного хозяйства и государственной службы при Президенте России, Орёл, Россия
Central Russian Management Institute, Russian Academy of National Economy and Public Administration under the President of Russia, Orel City, Russia
E-mail: varlamov.nv@yandex.ru, polyanin.andrei@yandex.ru

АННОТАЦИЯ
В статье рассматривается авторский подход в развитии теории корпоративного управления на основе воспроизводственного процесса. Развитие человеческой цивилизации строится на поступательном все возрастающем удовлетворении материальных и духовных потребностей отдельного человека и общества в целом. Материальная база формируется в сфере экономической деятельности человека, посредством создания реальных ценностей на предприятиях различных форм собственности и хозяйствования. Для существования человека, повышения качества его жизни производство необходимо постоянно возобновлять через свои этапы развития: производство, распределение, обмен и потребление.

ABSTRACT
In article author's approach in development of the theory of corporate management on the basis of reproduction process is considered. Development of a human civilization is based on forward escalating satisfaction of material and spiritual needs of the certain person and society in general. The material resources are formed in the sphere of economic activity of the person, by means of creation of actual values at the enterprises of various forms of ownership and managing. For existence of the person, improvement of quality of his life production needs to be resumed constantly through the stages of development: production, distribution, exchange and consumption.

КЛЮЧЕВЫЕ СЛОВА
Корпоративное управление, воспроизводство, баланс ресурсов, менеджмент.

KEY WORDS
Corporate management, reproduction, balance of resources, management.

Научные подходы в развитии теории управления эволюционируют вместе с социально-экономическим развитием общества. Управление воспроизводством, это процесс создания необходимых условий для развития народного хозяйства (отраслей, предприятий, корпораций). Воспроизводство на уровне предприятия, это соотношение между изготовленным продуктом и затратами, стоимостью и себестоимостью. На макроуровне - пропорции между отраслями, обобщенными показателями хозяйственной деятельности, предметами потребления и производством средств производства во всех отраслях народного хозяйства.

Для того чтобы система управления воспроизводством была устойчива (справедлива) должен соблюдаться закон соответствия производственных отношений характеру и уровню развития производительных сил. Теоретические основы управления воспроизводством следует рассматривать через объект управления, это

могут быть: 1). Производительные силы (средства производства плюс люди) в масштабах страны, на уровне отрасли или конкретного предприятия; 2). Производственные отношения (организационно-экономические и отношения собственности). Теория управленческой мысли формировалась вместе с производственными отношениями, складывающимися на том или ином этапе социально-экономического развития общества (капитализм, постиндустриальное развитие). Если рассматривать в ретроспективе теории управленческой мысли, то увидим их взаимосвязь по форме и по содержанию с развитием производственных отношений, в первую очередь, отношений собственности и общественным разделением труда.

Как было сказано выше, производственные отношения охватывают сферу производства продукта, обмена и распределения материальных благ и составляют необходимую сторону любого способа производства. Способ соединения производителя со средствами производства (т.е. форма собственности) определяет обмен и форму распределения материальных благ (прибыль, рента, заработная плата и др.) в обществе. Исходя из этого в коллективе (обществе) может быть взаимопонимание, сотрудничество, взаимовыручка или будут складываться отношения подчинения, недоверия, господства. С позиции принципа справедливости в содержании процесса производства (техника, технологии, организационная структура предприятия и др.) нет причины для дисбаланса системы управления. Содержание производства не носит классовый или асоциальный характер. Присвоение прибавочной стоимости зависит от состояния производственных отношений, формирующихся в воспроизводственном процессе.

Примитивное (натуральное) производство (воспроизводство) характеризует первобытно - общинный строй. Феодальному общественно-экономическому устройству и капиталистическому строю присуще расширенное воспроизводство. Уровень экономической (производственной) деятельности является показателем развития управления производством.

Начало разделения труда является рождением управленческой деятельности как особой формы знания воспроизводственного процесса. Это знание как наука стало формироваться только в эпоху капитализма. Капитализм как форма общественного устройства, форма организации труда наряду с технологами потребовал и профессиональных управленцев.

Начало XX в. совпадает с эпохой массового производства, где главные задачи предпринимателей были сосредоточены на разработке и усовершенствовании механизма массового и серийного производства, снижавшего издержки выпускаемой продукции. Стандартный продукт по низкой цене определял работу управляющих. Внимание менеджеров было сосредоточено на эффективной работе производственного механизма. Следует отметить, что возникновение школ и направлений теории управления всякий раз определялись новыми реалиями, с которыми сталкивались организации, работающие в сфере бизнеса. Первая четверть XX века характеризуется активной фазой развития тяжелой индустрии, что потребовало большого количества низкоквалифицированного труда. Рабочие старались подороже продать свой труд. Управляющие и собственники предприятий были заинтересованы в получении максимальной трудовой отдачи от нанятых работников.

Исходя из сложившейся ситуации, первым этапом методологии научного управления на производстве стал анализ содержания работы, а также выявление ее основных компонентов. В последующем была обоснована необходимость использования фактора стимулирования с целью заинтересованности работников предприятий в повышении производительности труда и роста объемов производства.

В этом случае, управление поведением человека сосредоточено на управлении отдельной составляющей внутренней среды организации.

Главная цель таких подходов в управлении – снижение себестоимости производства продукции. Начало 30-х годов прошлого века характеризуется

насыщенным спросом на основные потребительские товары. Управление стало ориентироваться на способах воздействия на потребителя при выборе и использовании выпускаемых ими товаров и услуг, стали продвигать продукцию на рынок с помощью организации сбыта, рекламы, и других способов воздействия на потребителей товаров.

Решение управленческих задач в новых условиях хозяйствования стало выходить за рамки организации. Это потребовало научного обоснования новых подходов к управлению в решении проблем с более высоким уровнем неопределенности. Встала необходимость управления внешней средой организации или отдельными ее составляющими элементами. Вторая половина XX в. ознаменовалась постиндустриальной эпохой, которая характеризовалась ускоренным развитием событий, менялись границы, структура и динамика предпринимательства. Сложность, разнообразие, новизна задач и темп их появления потребовал новых знаний к управлению организаций.

Девяностые годы прошлого века начало двадцать первого столетия сохранили и ускорили эти тенденции усилили нагрузку в первую очередь на высшее звено управляющих, способных уменьшить неопределенность в решении жизненно важных задач для организации.

В зарубежной науке и практике управления сложились четыре наиважнейшие концепции, которые внесли существенный вклад в развитие современной теории и практики управления. Это: теория научного управления, теория административного управления, теория управления с позиций психологии человеческих отношений, теория управления с позиций науки о поведении.

В этих теориях, в большей степени внимание уделяется внутренней среде организации ее составляющим как объекту управления (средствам производства, технологиям, человеку). Концепция научного управления получила развитие в начале XX века в США, ее основателем был Ф. Тейлор, книга которого "Принципы научного управления" положили начало признания менеджмента наукой и самостоятельной областью исследования. Было доказано, что в управлении организацией для достижения определенных целей можно эффективно пользоваться методами, применяемые в науке и технике.

Следующий подход – концепция административного управления, основывается на том, что организация - система, объект управления – человек, который рассматривается как компонента в системе организации (винтик в технологии производства).

Это знание было направлено на решение общих проблем предприятий и разработку принципов управления организацией в целом. В рамках этого учения в 20-е годы было обосновано понятие организационной структуры фирмы как сложной системы взаимосвязей, которые имеют определенную иерархию. Чтобы более эффективно достигать целей организации появилось осознание того, что организацией следует управлять на основе системного подхода. Эта концепция получила второе название - классическая школа управления.

В 30-50-е годы, в США и других странах Запада требования к рабочей силе меняются: возникает дефицит рабочих с высокой профессиональной квалификацией, выполняющих сложную работу на дорогостоящем современном оборудовании. Управление таким персоналом потребовало нового подхода, учета разнообразия ожиданий от работы, развитой системы мотивации, роста затрат на переподготовку и повышение квалификации кадров. Отзыв на эти новые вызовы потребностей бизнеса со стороны теории менеджмента выразился в появлении психологической школы управления, которая сосредоточилась на проблемах человеческого фактора в условиях производства.

Следующий этап эволюции управления связан с концепцией управления с позиции психологии и человеческих отношений.

Здесь человек выступает как внутренняя среда организации, как основа производительных сил. Где человек, его внутренний мир – объект управления (человек внутри себя).

В этом случае, данная концепция впервые определила менеджмент как обеспечение выполнения работы с помощью других людей. Исследования, проведенные ученым А. Маслоу показали, что мотивами человеческих поступков являются не только экономические интересы, но и различные другие потребности, которые не могут удовлетвориться только деньгами.

Продолжением предыдущего подхода является концепция управления с позиций науки о поведении - эта теория, получила начало своего развитие в 60 - е годы, ее основное содержание заключается в повышении эффективности организации в результате повышения эффективности ее человеческих ресурсов. Здесь исследуются различные аспекты социального взаимодействия: мотивация, характер власти и авторитет, организационные структуры, коммуникации в организациях, лидерство и другое. Основная цель данного подхода, это попытка помочь рабочему создать собственные возможности на основе применения положений поведенческих наук к построению и управлению организациями. Человек является объектом управления и в тоже время является субъектом управления, занимает активную позицию по отношению к организации.

Человек из винтика производственного процесса превращается в ответственное лицо за развитие производства, организации, общества на основе самоорганизации своего труда.

Выше представленные концепции управления поведением человека формируют и свои методы воздействия на человека и организацию в целом.

Научные подходы теории управления на начальном этапе своего развития можно охарактеризовать как управление процессами, организацией посредством поддержания баланса (соотношения) между поступающими ресурсами из вне на входе в организацию для производства продукции, переработкой их в самой организации и готовой продукцией на выходе из нее.

Сбалансированность классического управленческого треугольника: труд - капитал - управление, провозглашенная американцами Берли и Минзом в 1932 г., явилась основой эффективности управления в период индустриальной эпохи. Эпоха индустриального развития общества как правило характеризуется эффективностью производства, которая напрямую зависит от размера вложенного труда или капитала.

В период развития постиндустриальной эпохи, начала создания новых, крупных организационно - правовых форм хозяйствования в виде корпораций, основой эффективности управления становится сбалансированность бизнес-системы, которая включает в себя помимо акционеров, менеджеров, работников, еще и потребителей, поставщиков, кредиторов, государственные и муниципальные органы и прочие субъекты, с которыми имеет дело организация в процессе своего функционирования. Главная цель сбалансированности заключается в достижении многоаспектных, долгосрочных, устойчивых конкурентных преимуществ, стабильного экономического роста организаций и повышения личного благосостояния работников. Человека наделяется правами собственности на средства производства и становится в одном лице исполнителем, управленцем и сособственником предприятия (предприятий).

Сегодня, «владение предприятием» вытесняется новым, расширенным понятием, рассматривающим собственность не как отдельный ресурс, а как основу определенных комбинаций, обеспечивающую соединение всех необходимых факторов организации и ведения производства воедино. Эти сочетания включают также обмен, потребление, конкуренцию, коммерческие идеи, знания, информацию, инвестиции и др. Эффективные, научно обоснованные комбинации предполагают извлечение максимально возможного синергетического эффекта от взаимодействия всех ее составляющих компонентов и служат реализации интересов всех их владельцев: акционеров, менеджмента, работников, внешних инвесторов, потребителей, конкурентов и других заинтересованных лиц. Все участники, вкладывая определенный

ресурс в организацию желают участвовать и в распределении доходов от ее деятельности. Исходя из этой ситуации, концепция корпоративного управления, отстаивающая особое положение собственников финансового капитала, выглядит не соответствующей современным требованиям к подходам управления организацией и тем самым теряет свою актуальность.

В дальнейших исследованиях стали уделять внимание внешней среде ее влиянию на организацию и человека. Рассматриваются отношения: внешняя среда – организация - человек – общество.

Хозяйствующие субъекты в условиях жесточайшей конкуренции, быстро меняющейся ситуации на рынке должны не только концентрировать внимание на внутреннем состоянии дел в компании, но и вырабатывать свое поведение на перспективу, что позволит им поспевать за изменениями, происходящими в окружающем их мире. Если раньше многие компании могли успешно функционировать, обращая внимание в основном на ежедневную работу, на внутренние проблемы, связанные с повышением эффективности использования ресурсов в текущей деятельности, то теперь наряду с задачами рационального использования потенциала в текущей деятельности, исключительно важным становится осуществление такого управления, которое обеспечивает адаптацию организации к быстро меняющейся окружающей среде.

Все эти изменения требуют иных научных подходов развития организации и теории к принятию управленческих решений (комплексный, процессный, ситуационный, стратегический и др.).

Создание и развитие новых форм хозяйствования в том числе и корпораций невозможно без научного сопровождения их деятельности. Для этого необходимо знать и уметь пользоваться на практике существующими научными подходами к развитию теории корпоративного управления. Они основываются на ретроспективе научных школ управления и новых научных знаниях, в т. ч. воспроизводственный подход, основанных на изменениях как внутренней, так и внешней среды организации. Это в конечном итоге позволит менеджменту корпораций принимать рациональные управленческие решения, направленные на реализацию интересов всех участников корпоративных отношений и организации в целом.

Под научными основами корпоративного управления понимается система научных знаний, которую составляет общая теоретическая база практики управления, а точнее обеспечение практики менеджмента научными рекомендациями.

Начало обоснования теории корпоративного управления было положено в начале 30-х гг. прошлого века. Американскими исследователями А. Берли и Ж. Минзом в работе «Современная корпорация и частная собственность» был сформулирован один из принципов корпоративного управления – отделение контроля от собственности корпорации. Авторы показали стремление профессиональных менеджеров к установлению контроля над собственностью корпорации, в результате чего функция контроля со стороны акционеров становилась минимальной. Научное исследование было проведено в то время, когда корпорация рассматривалась как изолированная система, не контактирующая с внешней средой.

Второй этап развития теории корпоративного управления связан с работами М. Дженсена и У. Меклинга «Теория фирмы: управленческое поведение, агентские издержки и структуры собственности», в которой они заострили внимание на проблеме расхождения интересов между менеджерами и акционерами. По мнению авторов, необходимо создать механизм, обеспечивающий защиту интересов акционеров, от менеджеров, преследующих собственные цели.

Третий этап характерен тем, что исследователи в своих работах выдвигают идею о том, что корпорацию стоит рассматривать во взаимосвязи с внешней средой, интересами общества, а не только как деятельность ее внутренних элементов и групп [9]. Например, Ч. Хилл и Т. Джонс предложили теорию, согласно которой корпоративное управление должно рассматриваться как нахождение оптимального баланса между всеми финансовыми и нефинансовыми стейкхолдерами

(заинтересованными лицами) корпорации. В связи с этим заслуживает внимание исследование Рафаэля Ла Порта, изучавшего влияние внешних правовых факторов на деятельность корпорации.

В настоящее время существуют две научные концепции корпоративного управления. Первая из них основывается на узком понимании сущности корпоративного управления, связанной с установлением баланса интересов различных групп заинтересованных лиц. Эта концепция акцентирует внимание на взаимосвязях участников корпоративных отношений.

Вторая концепция определяет более обширный спектр факторов, определяющих эффективность функционирования организаций: внешние, внутренние, прямые и косвенные, экономические, организационные, социальные, правовые и др. Это направление учитывает множество юридических положений, регулирующих отношения современных корпораций. Исходя из этих представленных особенностей, определяется корпоративное управление как система управленческих отношений между взаимодействующими хозяйствующими субъектами (в том числе руководящими и подчиненными) по поводу субординации и гармонизации их интересов, обеспечения синергии, как их совместной деятельности, так и их взаимоотношений с внешними контрагентами, включая государственные органы в достижении поставленных целей организацией. [2]

Другое понятие корпоративного управления можно представить и как общественно - экономическую науку, объединяющую в себя систему знаний о закономерностях и эффективных формах, методах и средствах целенаправленного воздействия на субъекты корпоративных образований, их органы управления, финансовые системы материально-вещественные элементы, и другие компоненты, обеспечивающие эффективное функционирование механизма взаимодействия и достижение гармонии и синергетического эффекта.

Человечество на протяжении всего времени своего развития стремилось к созданию справедливого общества для всех граждан. Человек с рождения должен быть свободным, иметь равные возможности для своей самореализации в различных сферах жизнедеятельности. Это утверждение, принцип справедливости в управлении должны распространяться и на все хозяйствующие структуры и отрасли народного хозяйства.

Несправедливость заложена в той ли иной форме производственных отношений в процессе производства, в уровне доступности того или иного человека (организации) к предметам природы и средствам труда. Исходя из этого, следует помнить и не допускать такого развития событий, связанных с производством материальных благ, как конфликт интересов всех заинтересованных в его развитии лиц.

Новые формы организации бизнеса, требуя иных научных знаний развития экономики и ее управления, в т.ч. и на основе воспроизводственного процесса, позволят свести к минимуму существующую несправедливость на всех этапах удовлетворения потребностей человека, организации и общества.

Сегодня, когда бизнес оформлен в виде крупнейших корпораций в сферу влияния управления следует включать в большей мере и фазу потребления произведенного общественного продукта.

Логика выше рассмотренных рассуждений представляет корпоративное управление как управление воспроизводственным процессом. Крупная корпорация сегодня, это не только субъект хозяйственной деятельности, форма организации бизнеса, исходя из своего масштаба, направлений и видов деятельности в экономике страны, исходя из своей социальной значимости и ответственности перед государством и обществом, это важнейшая социально-экономическая система, включающая в себя все фазы воспроизводственного процесса. Где, фаза производства отвечает на вопросы что и как производить? имея ограниченные производственные возможности: технологические – величина и состав факторов производства и экономические – степень доходности от результатов деятельности. Фаза распределение, это распределение произведенного продукта между субъектами

общества в определенных пропорциях. Обмен – стадия (ступень, этап развития) общественного воспроизводства, связывающая процесс производства продукции с распределением и потреблением, это действие в результате которого происходит получение от кого-либо желаемого объекта с предложением чего-либо взамен. Его необходимость вызывается общественным разделением труда, где характер и формы определяются способом производства. Обмен, это процесс движения материальных благ от одного субъекта к другому, форма общественной связи производителей и потребителей. В фазе обмена продукт превращается в товар.

Потребление – заключительная фаза движения произведенного общественного продукта. Различают производственное потребление – использование средств производства в процессе изготовления продукции и непроизводственное – в сфере непроизводственной, включающей потребление общественное и личное. [3]

Отсюда, корпоративное управление, это целенаправленное воздействие на организованную систему, включающую в себя все фазы воспроизводственного процесса, обеспечивающее сохранение ее определенной структуры, поддержание режима и цели деятельности организации. Задачи менеджмента на всех этапах воспроизводственного процесса в хозяйствующих организациях наиболее полное удовлетворение интересов всех участников корпоративных отношений.

Подходы к управлению на базе научных школ применительно к корпорациям основываются на решении задачи №1.

Задача 1 менеджмента корпорации на основе принципа экономической целесообразности с позиции затраты – результаты (разделение труда): поддержание экономического баланса между поступающими в организацию необходимыми для производства ресурсами, самим производством внутри организации и выходом готовой продукции (услуг), в том числе ее использованием за пределами организации.

Новые, современные подходы к управлению основываются на выполнении задач №2, а также включают в себя комбинацию решения задач №1 и №2.

Вторая задача менеджмента корпорации строится на основе принципа социальной справедливости: поддержание баланса интересов между всеми участниками отношений собственности (акционерами), наемными менеджерами, другими физическими и юридическими лицами, заинтересованными в эффективном развитии организации (внутренняя и внешняя среда окружения).

Знание научных подходов в развитии теории корпоративного управления, позволяют компаниям выживать в конкурентной борьбе. Если раньше считалось, что крупные организации за счет объемов, снижения себестоимости производства продукции, доминирования на рынке имеют лучшие шансы победить в конкурентной борьбе за потребителя по сравнению с малыми формами предпринимательской деятельности, то теперь все более существенными становятся преимущества фирм более активных и быстро приспосабливающихся под ускорение изменений в окружающей среде: новые запросы потребителя, глобализация бизнеса, возрастание конкуренции за производственные ресурсы, появление новых возможностей для осуществления своего бизнеса. Все это вызывает необходимость перехода организаций на соответствующие требованиям времени новые научные подходы к управлению на базе развития информационных сетей, делающих возможным молниеносное распространение и получение информации, изменение роли человеческих ресурсов, широкой доступности современных технологий, а также появление ряда других возможностей.

Практика бизнеса показала, что не существует единого подхода в управлении. Каждая фирма, ее внутренняя и внешняя среда уникальны в своем роде, исходя из этого и процесс выработки управленческих решений для каждой организации также исключителен, уникален, он зависит от уровня, компетенции менеджмента, ее потенциала, положения фирмы на рынке, динамики ее экономического и социального развития, поведения конкурентов, характеристик производимого ею товара или оказываемых ею услуг, культурной среды и еще многого другого имеющего место как внутри, так и вне организации.

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M-ESTIMATORS FOR ASYMMETRIC PRICE TRANSMISSION MODELLING

Acquah De-Graft H., Associate Professor
Department of Agricultural Economics and Extension, University of Cape Coast,
Cape Coast, Ghana
E-mail: henrydegraftacquah@yahoo.com

ABSTRACT
This paper introduces and compares M-estimators and OLS for modelling the Granger and Lee asymmetric price transmission model when the true data generating process is known. Results of 1000 Monte Carlo simulations, indicate that for normal data, the estimates of the coefficients of the Granger and Lee asymmetric price transmission model derived from the Least squares method as well as the M- and MM-estimation methods are accurate and equivalent to their true values. For data with outliers, estimates of the coefficients of the Granger and Lee asymmetric price transmission model derived using the Least squares method were inaccurate and different from their true values. In large samples, the M-estimation method produced accurate estimates that were equivalent to their true values in the presence of outliers. The MM-estimation method produced accurate estimates that were equivalent to their true values in the presence of outliers irrespective of sample size. These results indicate that the proposed M- and MM-estimation techniques are likely to do no worse than the OLS with normal dataset and promise to do better when the dataset has outliers within the asymmetric price transmission modelling framework.

KEY WORDS
Monte Carlo Simulation, M-Estimation, MM-Estimation, Granger and Lee Asymmetry, Ordinary Least Squares Estimation, Outlier.

Granger and Lee (1989) proposed an econometric model to estimate asymmetric price transmission using the ordinary least squares (OLS) technique. Consequently, agricultural markets analysis has witnessed an explosion of the modelling of price transmission and asymmetries in agricultural commodity markets using the Granger and Lee asymmetric price transmission modelling approach and its variants.

However, the OLS technique used in estimating the Granger and Lee asymmetry has some limitations. For example, the OLS yields misleading result if its assumptions are not met. In practice, if assumptions of normality of the residuals are not met due to the presence of outliers, the OLS will produce misleading results in asymmetric price transmission analysis. Economic data (e.g. price series) used for asymmetric price analysis may contain outliers as commonly encountered in empirical research. However, the presence of outliers violate the assumption of the OLS estimation in the Granger and Lee asymmetric approach and its extensions.

In an empirical asymmetric price transmission analysis, Douglas (2010) notes that asymmetry detected is due to the presence of outliers in the data and that dropping the outliers in the data, he finds no evidence of asymmetry. The influence of outliers can be avoided by removing outliers from the database directly. However, Heckman (1979) notes that arbitrarily removal of some data from a database may lead to sample selection bias which can be considered as a specification error in linear regression. Apart from dropping the outliers in the data, influence of outliers can be reduced by transforming the data. Osborne and Overbay (2004) note that data transformation may be inappropriate for hypothesis testing and direct interpretation becomes difficult. Asymmetric price transmission researchers are concerned with obtaining the correct asymmetric adjustment parameters since they form the basis for detecting price asymmetry. But in the presence of outliers, the OLS may lead to bias estimates of the asymmetric adjustment parameters and an alternative will be to use robust regression approach such as M- and MM-estimation. Robust regression provides

robust estimation even in the presence of outliers. Chatterjee and Hadi (2006) note that robust regression mimimizes the impact of outliers by giving smaller weight for outliers in the estimation procedure. The M-estimators remain robust to the presence of outliers as discussed in Huber (1973), Yohai (1987), Andrews et al. (1972), Bunke and Bunke (1986), Hampel et al. (1986), Lecoutre and Tassi (1987), Rousseeuw and Leroy (1987), Staudte and Sheather (1990), Rieder (1994), Jureckova and Sen (1996), Dodge and Jureckova (2000) and Jureckova and Picek (2006).

Empirically, very little research has been undertaken to introduce and compare M-Estimators and OLS method for asymmetric price transmission models in the presence of outliers in the data. The purpose of this research is therefore to use Monte Carlo methods to investigate the performance of the OLS and M-estimators in estimating the Granger and Lee asymmetry using data with and without outliers.

The paper is organized as follows. The introduction is followed by the methods section which discusses the Granger and Lee Asymmetric model, Ordinary Least Squares (OLS) method and M-estimators. The results and discussion presents a practical application in which the performance of the OLS and M-Estimators in estimating true values of the Granger and Lee asymmetric data generating process is evaluated and the results of the Monte Carlo simulations are presented. Finally, the conclusion of the study is presented.

METHODS OF RESEARCH

Granger and Lee Asymmetry. Granger and Lee (1989) Error Correction Model data generating process can be specified as follows:

$$\Delta y_t = \beta_1 \Delta x_t + \beta_2 (y - x)_{t-1} + \varepsilon_{1,t\ \varepsilon_{1,t} \sim N(0,\delta^2)} \quad (1)$$

If y and x are price series integrated of the order one I (1) processes that are cointegrated, then there exists an equilibrium relationship between y and x which is defined by an error correction term. The long run equilibrium relationship captured by the error correction term are implicitly symmetric. Asymmetric adjustments can be introduced by splitting the error correction term as follows:

$$(y - x)_t^+ = \begin{bmatrix} (y - x)_t, if\ (y - x)_t > 0 \\ zero\ otherwise \end{bmatrix} \quad (2)$$

$$(y - x)_t^- = \begin{bmatrix} (y - x)_t, if\ (y - x)_t < 0 \\ zero\ otherwise \end{bmatrix} \quad (3)$$

The resulting Granger and Lee asymmetric model is specified as:

$$\Delta y_t = \beta_1 \Delta x_t + \beta_2^+ (y - x)_{t-1}^+ + \beta_2^- (y - x)_{t-1}^- + \varepsilon_{2,t}\ \varepsilon_{2,t} \sim N(0, \delta^2) \quad (4)$$

In order to incorporate asymmetry, the speed of adjustment is allowed to differ for the positive and negative components of the Error Correction Term (ECT) since the long run relationship captured by the ECT are implicitly symmetric. Symmetry in eq. (4) is tested by determining whether the coefficients (β_2^+ and β_2^-) are identical (that is $H_0 : \beta_2^+ = \beta_2^-$). The Granger and Lee Asymmetric Error correction model in eq. (4) can be represented as a standard regression model as specified below:

$$y = X\beta + \varepsilon_t \quad \varepsilon_t \sim iidN(0, \sigma^2) \quad (5),$$

where: y is a response variable and independent variables in X are defined to include asymmetric adjustment terms. Subsequently, the estimation of parameters of the Granger

and Lee Asymmetric model can be done using Ordinary Least Squares method and M-estimators and the results compared.

Ordinary Least Squares Estimation (OLS). In the ordinary least squares estimation, a matrix X, vectors Y and ϵ are defined as:

$$X = \begin{pmatrix} x_{11} & \cdots & x_{1p} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{np} \end{pmatrix} = \begin{pmatrix} x_1^T \\ \vdots \\ x_n^T \end{pmatrix}, Y = \begin{pmatrix} y_1 \\ \vdots \\ y_n \end{pmatrix} \text{ and } \in = \begin{pmatrix} \epsilon_1 \\ \vdots \\ \epsilon_n \end{pmatrix}$$

Given the classic model $Y = X\beta + \epsilon$, then it can be estimated that the least square aims to minimize:

$$\sum_{i=1}^{n} \in_1^2 = \in^T \in \qquad (6)$$

$$(Y - X\beta)^T (Y - X\beta)$$

$$Y^T Y - Y^T X\beta - \beta^T X^T Y + \beta^T X^T X\beta$$

At minimum,

$$\frac{\partial}{\partial \beta}\left(\sum_{i=1}^{n} \in_1^2\right) = \frac{\partial}{\partial \beta}(Y^T Y - Y^T X\beta - \beta^T X^T Y + \beta^T X^T X\beta)$$
$$= 0 - X^T Y - X^T Y + 2(X^T X)\beta$$

Hence, the least square estimator $\hat{\beta}$ is the solution:

$$\mathrm{X^T X\hat{\beta} = X^T Y} \qquad (7)$$

When $X^T X$ is non-singular and the minimisation is given as $\hat{\epsilon}^T \hat{\epsilon} = \sum_{i=1}^{n} r_1^2$, then the least square estimator can be evaluated directly from the data as:

$$\hat{\beta} = (X^T X)^{-1} X^T Y \qquad (8)$$

M-Estimator. Huber (1973) developed a group of maximum likelihood estimators referred to as the M-estimator. The M-estimation technique is one of the most common method of robust regression and is efficient as the OLS. M-estimator aims at minimizing a function ρ of the errors. The objective function of the M-estimate is stated as:

$$\sum_{i=1}^{n} \rho\left(\frac{e_i}{s}\right) = \sum_{i=1}^{n} \rho\left(\frac{y_i - x^T\beta}{s}\right) \qquad (9)$$

"s" in eq. (9) is an estimate of scale from a linear combination of the residuals. The function ρ in eq. (9) provides the contribution of each residual to the objective function. Alma (2011) posits that a reasonable ρ should have in it the following properties:

$$\rho(e) \geq 0$$
$$\rho(0) = 0$$
$$\rho(e) = \rho(-e)$$
$$\boldsymbol{\rho(e_i) \geq \rho(\acute{e}_i)} \text{ for } |e_i| \geq |\acute{e}_i|, \text{ and } \rho \text{ is continuous}$$

Given least square estimation, $\rho(e_t) = e_i^2$, the system of normal equations can be solve from the above function by taking partial derivatives with respect to β while setting the function to 0. Minimizing eq. (9) with respect to each of the parameters, $\beta_1, \ldots, \beta_p$, yields the following system of p equations:

$$\sum_{i=1}^{n} x_{ij}\varphi\left(\frac{e_i}{s}\right) = \sum_{i=1}^{n} x_{ij}\varphi\left(\frac{y_i - x_i^T\beta}{s}\right) = 0; j = 1,2,\dots,p \text{ and } i = 1,2,\dots,p \quad (10),$$

where: $\varphi(u) = \frac{\partial\rho}{\partial\rho}$ is the score function. A 'weight' function is then defined as:

$$\omega(u) = \frac{\varphi(u)}{u}$$

This yields $\omega_i = \omega\left(\frac{\epsilon_i}{s}\right)$ for i=1, …, n, with $\omega_i = 1$ if $\epsilon_i = 0$. Substituting it into eq. (10) yields:

$$\begin{aligned}
&\sum_{i=1}^{n} x_{ij} w_i \frac{\epsilon_i}{s} = \sum_{i=1}^{n} x_{ij} w_i \,(y_i - x_i^T\beta)\frac{1}{s} = 0\; j = 1,\dots,p \\
&\Rightarrow \sum_{i=1}^{n} x_{ij} w_i \,(y_i - x_i^T\beta) = 0\; j = 1,\dots,p \\
&\Rightarrow \sum_{i=1}^{n} x_{ij} w_i \, x_i\beta = \sum_{i=1}^{n} x_{ij} w_i \, y_i\; j = 1,\dots,p
\end{aligned} \quad (11)$$

Since $s \neq 0$, the weight matrix $W = diag(\{w_i : i = 1,\dots,n\})$ can be defined as follows:

$$W = \begin{pmatrix} w_i & \dots & 0 \\ \vdots & w_2 & \vdots \\ 0 & \dots & w_n \end{pmatrix}$$

The results in the matrix from of equation (11) yields:

$$X^T W X\beta = X^T W Y$$

$$\hat{\beta} = (X^T W X)^{-1} X^T W Y \quad (12)$$

Eq. (12) is very similar to the solution for the least square estimator only that it differs from the least square estimator with the introduction of a weight matrix. The weight matrix in eq. (12) reduces the influence of outliers.

For all M-estimators (i.e. M-and MM-estimators), when the errors are normally distributed, their asymptotic variance is given by:

$$V(\varphi, \Phi) = \hat{\sigma}^2 \frac{A(\varphi,\Phi)}{B^2(\varphi,\Phi)} \quad (13)$$

The variance-covariance matrix of the estimated regression coefficient as:

$$V\left(\hat{\beta}\right) = \hat{\sigma}^2 \frac{A(\varphi,\Phi)}{B^2(\varphi,\Phi)} (X^T X)^{-1} \quad (14)$$

Through the iteration process, $A(\varphi, \Phi) = E(\varphi^2, \Phi) and\ B^2(\varphi, \Phi) = \left(E(\varphi', \Phi)\right)^2$.

MM- estimator. The MM-estimator, according to Yohai (1987) is a special type of M-estimation which is a combination of high breakdown of estimation values and efficient estimation. Yohai (1987) describes three stages that defines MM-estimator:

1. A high breakdown estimator is used to find an initial estimate, which we denote $\bar{\beta}$. The estimator need not be efficient. Using this estimate, the residual, $r_i\left(\bar{\beta}\right) = y_i - x_i^T\bar{\beta}$ are computed.

2. Using these residuals from robust fit, an M-estimate of scale with 50% Breakdown point (BDP) is computed. This $s(r_1(\bar{\beta}), \dots, r_n(\bar{\beta}))$is denoted s_n. The objective function used in this state is labelled ρ_0.
3. The MM-estimator is now defined as an M-estimator of β using a redescending score function,$\varphi_1(u) = \frac{\partial \rho 1(u)}{\partial u}$, and the scale estimate s_n obtained from stage 2. So an MM-estimator $\hat{\beta}$ is defined as a solution to

$$\sum_{i=1}^{n} x_{ij} \varphi_1 \left(\frac{y_i - x_i^T \beta}{s_n} \right) = 0 \; j = 1, \dots, p. \qquad (15)$$

The objective function ρ_1 associated with this score function do not have to be the same as ρ_0 but it must satisfy the following conditions:

a. ρ is symmetric and continuously differentiable, and $\rho(0) = 0$;
b. There exists $a > 0$ such that ρ is strictly increasing on [0, a] and constant on $[a, \infty]$;
c. $\rho_1(u) \leq \rho_0(u)$.

A final condition that must be satisfied by the solution to equation (15) is that:

$$\sum_{i=1}^{n} x_{ij} \varphi_1 \left(\frac{y_i - x_i^T \tilde{\beta}}{s_n} \right) \leq \sum_{i=1}^{n} x_{ij} \varphi_1 \left(\frac{y_i - x_i^T \tilde{\beta}}{s_n} \right) \qquad (16)$$

It is clear from the equations that the third stage is just M-estimation with an extra condition on the solution.

RESULTS AND DISCUSSION

Comparison of M-Estimators and OLS for Granger and Lee Asymmetry. In order to compare the performance of the M-estimators with the OLS in estimation of an asymmetric price transmission model a series of Monte Carlo Simulations are conducted. The simulation is based on the asymmetric data generation process specified in eq. (4) and the data is simulated from the Granger and Lee asymmetric error correction model as follows:

$$\Delta y_t = 0.7 + 0.5 x_t - 0.25 (y_t - x_t)^+_{t-1} - 0.75 (y_t - x_t)^-_{t-1} + \varepsilon \qquad (17)$$

y_t and x_t are generated as I (1) non-stationary variables that are cointegrated. The error correction terms $((y_t - x_t)^+_{t-1}, (y_t - x_t)^-_{t-1})$ denote the positive and negative deviations from the equilibrium relationship between y_t and x_t. For the normal data, the errors are generated from a normal distribution with a mean 0 and a variance of 1 ($\varepsilon \sim N(0,1)$). In order to create outliers in the data, nine observations of the errors generated for the normal data with values generated from a normal distribution with a mean of 0 and a variance of 1, were replaced with nine observations from the normal distribution with a mean of 20 and variance of 1 ($\varepsilon \sim N(20,1)$).

Using 1000 Monte Carlo simulations, the performance of M estimators and the OLS in estimating the parameters of Granger and Lee asymmetric price transmission model (data generating process) is investigated under conditions of different sample sizes and asymmetry given by $(\beta_2^+, \beta_2^-) \in (\beta_2, \beta_3) \in (-0.25, -0.75)$ for the normal data as well as the data with outliers. This study draws from Cook et al (1999, 2000) and Acquah (2012, 2013) in assigning the asymmetric adjustment parameters (β_2^+, β_2^-).

When an estimator performs well, then the averaged value of estimates of each parameter should be close to their true values in the data generating process. As shown in Table 1, in the absence of outliers, all the three methods performed well, with the averaged

estimates all nearly equal or close to their true values of $\beta_0 = 0.7, \beta_1 = 0.5, \beta_2 = -0.25, \beta_3 = -0.75$ in the various sample size.

The results are consistent with Muthukrishnan and Radha (2010) who noted that M-estimators yields the same results as the least squares for normal data in a simple linear regression analysis. Similarly, Ryan (1997) asserts that robust methods such as M and MM estimation methods performs almost as well as the OLS when the data is free of mistakes and influential data points.

Table 1 – Normal Data (Without Outliers)

Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	0.70	0.50	-0.25	-0.75
N=50	Normal	M-Estimation	0.70	0.50	-0.25	-0.75
		MM-Estimation	0.71	0.50	-0.25	-0.74
Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	0.70	0.50	-0.25	-0.75
N=150	Normal	M-Estimation	0.70	0.50	-0.25	-0.74
		MM-Estimation	0.70	0.50	-0.25	-0.74
Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	0.70	0.50	-0.25	-0.75
N=500	Normal	M-Estimation	0.70	0.50	-0.25	-0.75
		MM-Estimation	0.71	0.50	-0.25	-0.75

Note: based on 1000 Monte Carlo Simulation.

In the presence of outliers, very different results are produced. In small and moderate samples of 50 and 150 respectively, the MM-estimator outperforms the M-estimator which in turn outperforms the OLS estimator. As shown in Table 2, OLS estimator performs poorly with its parameter estimates entirely different from the true parameter values of $\beta_0 = 0.7, \beta_1 = 0.5, \beta_2 = -0.25, \beta_3 = -0.75$ as defined in the data generating process. On the other hand, the MM-estimators perform very well in small and moderate samples with its parameter estimates close to their true values. In comparison to the OLS, the M-estimator performs reasonably well in small and moderate samples with a few estimates slightly different from their true values.

Table 2 – Data with Outliers

Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	3.00	0.52	-0.16	-1.14
N=50	With Outliers	M-Estimation	0.93	0.50	-0.25	-0.78
		MM-Estimation	0.73	0.50	-0.27	-0.73
Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	1.00	0.49	-0.44	-2.00
N=150	With Outliers	M-Estimation	0.73	0.50	-0.27	-0.85
		MM-Estimation	0.70	0.50	-0.25	-0.75
Sample Size	*Properties of Data*		Estimates			
		Method	β_0	β_1	β_2	β_3
		OLS	1.01	0.50	-0.26	-0.52
N=500	With Outliers	M-Estimation	0.72	0.50	-0.25	-0.73
		MM-Estimation	0.70	0.50	-0.25	-0.75

Note: based on 1000 Monte Carlo Simulation.

In large samples of 500 contaminated with outliers, the M-and MM-estimators perform well with their parameter estimates identical to their true values whilst the OLS performs poorly with estimates different from their true values.

From Table 1, it is clear that the results of the M-and MM-estimators are similar to the least squares and close to their true values in the data without outliers. However, in the data with outliers (Table 2), the least squares method is affected by outliers in small, moderate and large samples. The M-estimator remains robust to outliers in large samples whilst the MM-estimator yielded reasonable estimates of the asymmetric price transmission data generating process in the various sample sizes (small, moderate, large) of data with and without outliers. The results are consistent with Ryan (1997) assertion that robust methods such as M and MM estimation methods perform much better than OLS when the data has outliers. Similarly, Muthukrishnan and Radha (2010) noted that when outliers are present in the data, OLS performs poorly and does not provide useful information in a simple linear regression analysis. However, M-estimators are robust to outliers and provides useful and accurate information in a simple linear regression analysis.

CONCLUSION

The performance of M-estimators have been investigated in asymmetric price transmission regression modelling. The findings indicate that the M- and MM-estimators yield the same result as the OLS with normal data. However, when outliers are present in the data, the least squares do not provide useful information in small, moderate and large samples of data. On the other hand, the MM-estimators provide useful information and are not affected by outliers as sample size increases from small to large. The M-estimator remains robust to outliers in large samples. In summary, the results of the simulation indicate that the M-estimators can be considered in asymmetric price transmission modelling and may do better than the OLS when the data contains outliers.

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ВЛИЯНИЕ ЭКОНОМИЧЕСКИХ САНКЦИЙ НА СОСТОЯНИЕ БАНКОВСКОГО СЕКТОРА РОССИИ

THE IMPACT OF ECONOMIC SANCTIONS ON STATE OF THE RUSSIAN BANKING SECTOR

Иващенко Т.Н., кандидат экономических наук
Ivaschenko T.N., Candidate of Economic Sciences
Среднерусский институт управления, Российская академия народного хозяйства и государственной службы при Президенте России, Орёл, Россия
Central Russian Management Institute, Russian Academy of National Economy and Public Administration under the President of Russia, Orel City, Russia
E-mail: ivachenkotn@mail.ru

АННОТАЦИЯ
В статье рассмотрено состояние банковского сектора в период введения экономических санкций. Было проанализировано количество кредитных организаций, рассмотрена динамика ключевой ставки и ее влияние на средневзвешенные ставки на кредитные ресурсы.

ABSTRACT
In article the condition of the banking sector during imposition of economic sanctions is considered. The number of credit institutions was analyzed, dynamics of a key interest rate and its influence on the average rates on credit resources is considered.

КЛЮЧЕВЫЕ СЛОВА
Банковский сектор, экономические санкции, ключевая ставка, кредитные организации.

KEY WORDS
Banking sector, economic sanctions, key rate, credit institutions.

Прошедшие 2014–2015 гг. для банковского сектора России сопровождались сложной общеэкономической обстановкой и секторальными санкциями. На сегодняшний день негосударственные субъекты мировой политики играют крайне важную роль, и использование военной силы против них неадекватно ни с международно-правовой, ни с военной точек зрения. Следствием этого стала сдержанность ведущих стран мира в вопросах применения силы и интерес к использованию невоенных способов давления. Один из них - использование экономических инструментов воздействия на международное окружение. К ключевым типам внешнеэкономических инструментов воздействия относятся торговая, финансовая и макроэкономическая политика, использование санкций.

Последний официальный случай санкций был осуществлен США и странами Евросоюза против России. Санкции включали в себя как замораживание имущества отдельных лиц государства, предприятий, так и отраслевое воздействие, в частности, на нефтяную отрасль, банковский сектор России. США и страны Евросоюза ввели ограничения на доступ некоторым российским банкам к внешним финансовым рынкам, что не могло не сказаться на состоянии банковской системы России, так как зарубежные финансовые рынки были исторически источниками дешевых денег для российской банковской системы.

История введения санкций ведет свое начало еще с древнейших времен, первый известный пример применения санкций зафиксирован в Древней Греции, и представлял он собой запрет на посещение рынков и портов купцами. С течением истории происходили все новые случаи санкций, однако, все они представляли собой примитивные меры запретов на торговлю.

Наиболее активное развитие санкции получили после Второй Мировой Войны. В течение 1950-х гг. были зарегистрированы 15 случаев санкций. На сегодняшний момент условно все санкции, примененные против России с 6 марта 2014 г. можно разделить на 3 типа: санкции против физических лиц и организаций (политические, экономические, социальные); санкции в отношении экспорта/импорта в Севастополь и Крым; экономические санкции (в основном секторальные).

Суть экономических санкций заключается в том, что российским банкам был закрыт доступ к среднесрочному и долгосрочному фондированию на зарубежных рынках. У банков остается возможность привлекать или вкладывать средства на зарубежных рынках, однако, теперь они ограничены тем, что могут вкладывать только в инструменты со сроком погашения менее 30 дней. Под общие секторальные банковские санкции попали наиболее крупные российские банки, при этом в большинстве своем они являются государственными.

Однако, несмотря на это общее положение банковского сектора России по итогам 2015 г. достаточно позитивное. Банки стали более консервативными, стали лучше контролировать и следить за своими кредитными портфелями и проблемными или потенциально проблемными активами. Банк России осуществлял действия по оздоровлению банковского сектора, а именно по очищению банковского сектора от финансово неустойчивых организаций, а также банков, проводящих сомнительные операции.

Существенное влияние геополитических проблем и замедления темпов роста ВВП России привело к тому, что экономика России вошла в фазу экономического кризиса, характеризующегося отрицательным темпом роста ВВП, ослаблением курса рубля более чем в 2 раза, ростом инфляции, оттоком частного капитала из России и прочими проблемами.

Темп прироста ВВП в 2014 г. составил 0,6%, а по итогам 2015 г. оказался отрицательным, таким образом, ВВП России снизилось на 3,7%. В 2015 г. потребительская инфляция по итогам года составила 12,9%, против 11,4% в 2014 г. Реальные располагаемые денежные доходы населения по итогам 2014 г. снизились на 0,7%, а по итогам 2015 г. упали еще на 4,0%. За 2014–2015 гг. произошло ослабление курса рубля на фоне снижения цены на нефть марки Brent.

В 2014–2015 гг. сохранилась тенденция уменьшения количества кредитных организаций. К наиболее известным банкам, у которых были отобраны лицензии в 2015 г. относятся: ООО «КБ «Ренессанс», АО «Связной банк», ПАО КБ «ЕВРОКОММЕРЦ».

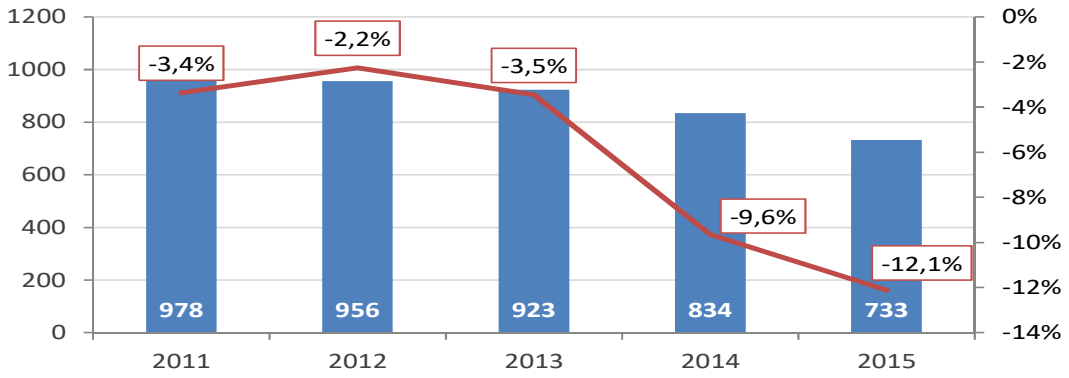

Рисунок 1 – Динамика численности кредитных организаций в России в 2011–2015 гг.

За 2014–2015 гг. также сохранилась тенденция усиления концентрации банковского сектора России вокруг крупнейших банков. Доля 200 крупнейших по величине активов кредитных организаций в совокупных активах банковского сектора в 2014 г. составила 96,5%, а в 2015 г. - 97,2%. Удельный вес 5 крупнейших по величине

активов кредитных организаций в совокупных активах банковского сектора в 2014 г. составил 53,6%, а в 2015 г. - 54,1%.

Тенденция усиления концентрации вокруг банков из топ-30 связана в большей степени с настроением населения – снижением доверия к мелким банкам и перевод средств в более безопасные крупнейшие банки. Причинами такого поведения явились как банковские санкции, так и процесс очищения банковского сектора от неблагонадежных кредитных организаций Банком России.

Структура активов и пассивов банковской системы по итогам 2014 г. и 2015 г. представлена в таблицах 1,2.

Таблица 1 – Состав и структура активов банковской системы в 2014–2015 гг.

Показатель	2014 г.		2015 г.	
	Сумма, млрд. руб.	В % к итогу	Сумма, млрд. руб.	В % к итогу
Денежные средства	2754,2	3,5	1898,3	2,3
Счета в Банке России	3297,8	4,2	2464,4	3,0
Корреспондентские счета в кредитных организациях	2675,2	3,4	2536,3	3,1
Ценные бумаги	9724,0	12,5	11777,4	14,2
Производные финансовые инструменты	2298,6	3,0	1261,0	1,5
Кредиты и прочие средства	52115,7	67,1	57511,4	69,3
Просроченная задолженность	1978,0	2,5	3046,6	3,7
ОС, НМА и материальные запасы	1222,3	1,6	1277,6	1,5
Использование прибыли	177,0	0,2	125,5	0,2
Прочие активы	3388,1	4,4	4147,8	5,0
ВСЕГО АКТИВЫ	77653,0	100,0	82999,7	100,0

Ключевыми изменения в структуре активов и пассивов стали следующие изменения:

- Снижение в активах средств на счетах в Банке России. В 2014 г. объем средств на счетах в Банке России вырос на почти на 1 млрд. руб. по сравнению с 2013 г., однако к 2015 г. объем средств почти вернулся на уровень 2013 г. Рост денежных средств на счетах в Банке России в 2014 г. был связан с большим количеством операций между Банком России и коммерческими банками и необходимостью осуществлять расчеты по этим сделкам;

- Объем выданных кредитов коммерческими банками вырос в 2015 г. Более чем на 5 млрд. руб., при этом доля в общей структуре активов, приходящаяся на данную статью составила по итогам 2015 г. более 69%. За 2015 г. произошло увеличение суммы просроченной задолженности по кредитам более чем на 1 млрд. руб. или на 54%. При этом просроченная задолженность по кредитам в иностранной валюте выросла на 102%, составив 2,5% в общем объеме выданных кредитов в иностранной валюте (ранее объем просроченной задолженности составлял 1,7%). Рост просроченной задолженности связан с общим ухудшением экономической обстановки в России;

- Рост активов банковской системы России составил 6,9%, таким образом, наблюдается рост банковского сектора на фоне экономического кризиса;

- В пассивах в балансах банков произошло существенное снижение объема кредитов, депозитов и прочих средств, полученных от Банка России с 9287 млрд. руб. до 5363 млрд. руб. или на 42,3%;

- Статья средства клиентов выросла в основном за счет увеличения объема депозитов физических лиц, выросших за 2015 г. на 25,2%. Структура средств клиентов в основном поровну состоит из средств, вложенных в рублях и в иностранной валюте (52/48). Средства физических лиц на 43,5% состоят из депозитов со сроком свыше 1 года, на депозиты со сроком от 31 дня до года приходится 39,9% всех полученных депозитов.

Таблица 2 – Состав и структура пассивов банковской системы в 2014–2015 гг.

Показатель	2014 г.		2015 г.	
	Сумма, млрд. руб.	В % к итогу	Сумма, млрд. руб.	В % к итогу
Фонды и прибыль кредитных организаций	6921,9	8,9	7551,7	9,1
Кредиты, депозиты и прочие средства, полученные от Банка России	9287,0	12,0	5363,3	6,5
Счета кредитных организаций (КО)	964,8	1,2	801,0	1,0
Кредиты, депозиты и прочие средства, полученные от других КО	6594,2	8,5	7091,0	8,5
Средства клиентов	43814,0	56,4	51906,7	62,5
Депозиты юридических лиц	17007,9	21,9	19018,2	22,9
Депозиты физических лиц	18552,7	23,9	23219,1	28,0
Облигации	1357,5	1,7	1266,5	1,5
Векселя и банковские акцепты	868,1	1,1	696,2	0,8
Производные финансовые инструменты	1953,3	2,5	880,7	1,1
Прочие пассивы	5892,1	7,6	7442,7	9,0

Кроме всего вышеперечисленного, в структуре активов-пассивов банков произошло увеличение дефицита ликвидного покрытия (отношения превышения обязательств со сроком погашения свыше 30 дней над ликвидными активами аналогичной срочности к величине краткосрочных обязательств) с 8,6% по итогу 2013 г. до 16,5% в 2015 г. - более чем в 2 раза. Рост дефицита ликвидного покрытия был обеспечен за счет снижения доли ликвидных активов от суммы всех ликвидных активов с 35,0% в 2013 г. до 31,6% в 2015 г., обязательства остались практически неизменными. Таким образом, наметилась тенденция на появление структурного дефицита ликвидности, вследствие введения санкций и ухудшения обще экономического состояния экономики России.

По данным Банка России по итогам 2015 г. прибыль банковского сектора России составила около 192 млрд. руб., что более чем в 3 раза хуже результата предыдущего года (589 млрд. руб.). Из 733 российских кредитных организаций 2015 г. с положительной прибылью закончили 553 кредитные организации или 75%, в 2014 г. 707 кредитных организаций работали с прибылью или 85%.

Одним из существенных событий 2014 г. стал рост ключевой ставки с 5,5% по состоянию на март 2014 г. до 17,0% 16 декабря 2014 г.

Таблица 3 – Динамика изменения ключевой ставки

Период	Ключевая ставка, %
13 сентября 2013 - 2 марта 2014	5,5
3 марта 2014 - 27 апреля 2014	7,0
28 апреля 2014 - 27 июля 2014	7,5
28 июля 2014 - 4 ноября 2014	8,0
5 ноября 2014 - 11 декабря 2014	9,5
12 декабря 2014 - 15 декабря 2014	10,5
16 декабря 2014 - 1 февраля 2015	17,0
2 февраля 2015 - 15 марта 2015	15,0
16 марта 2015 - 4 мая 2015	14,0
5 мая 2015 - 15 июня 2015	12,5
16 июня 2015 - 2 августа 2015	11,5
3 августа 2015 - 13 июня 2016	11,0
14 июня 2016 г. – 18 сентября 2016 г.	10,5
19 сентября 2016 г. – по настоящее время	10,0

Рост ключевой ставки оказал прямое воздействие на стоимость ресурсов для коммерческих банков, получаемых у ЦБ РФ, на ставки по кредитам коммерческих банков, а также на ставки по вкладам и депозитам. Таким образом, увеличение ключевой ставки вызвало рост стоимости денег и снижение спроса на кредитные ресурсы из-за высокой их стоимости.

Так, одновременно с ростом ключевой ставки в декабре 2014 г. - январе-феврале 2015 г. произошел рост ставок на кредиты и депозиты коммерческих банков, при этом

ставки по депозитам выросли быстрее, чем по кредитам - в декабре 2014 г. произошел рост в среднем на 5,5% для краткосрочных депозитов и на 3,9% для долгосрочных депозитов. Ставки по кредитам выросли в основном, начиная с января 2015 г., рост ставок на краткосрочные кредиты в среднем составил 3,7% и долгосрочных кредитов - 3,9%. Более быстрый рост ставок по депозитам и превышение роста краткосрочных ставок над долгосрочными был обусловлен стремлением банков сохранить клиентов, которые, стремясь за более высокими процентами по вложенным средствам, могли перейти к конкурентам. В период стремительного роста ставок по депозитам, для некоторых банков, в большей степени мелких, региональных банков, наблюдались невероятные по размерам ставки. На фоне неопределенности процентных ставок возникла тенденция недоверия населения более мелким банкам и переход клиентов к крупнейшим банкам.

Формирование дефицита ликвидности, скачки процентных ставок в банковском секторе привели к тому, что со стороны государства и Центрального Банка возникла необходимость в принятии дополнительных мер по поддержке коммерческих организаций. В виду ограничения доступа банков к традиционно недорогим источникам внешнего фондирования, Банк России принял решение по увеличению объема рефинансирования, выросшего за 2014 г. в два раза, достигнув на 01.01.2015 г. величины в 9,3 трлн руб. По итогам 2015 г. объем средств, полученных коммерческими банками от Банка России, снизился до 5,4 трлн руб., что связано, в первую очередь, с адаптацией банков к изменившимся условиями и переориентацией с внешнего рынка заимствований на внутренний.

В целом, ситуация в банковском секторе по итогам 2015 г. оценивается Банком России как стабильная. Банк России проводит регулярные стресс-тесты, их результаты говорят о том, что ключевые показатели у системообразующих банков, остаются выше регулятивного минимума. Это свидетельствует о сохранении у банковского сектора существенного буфера капитала и о его способности противостоять серьезным шокам в случае углубления кризисных явлений.

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ГОСУДАРСТВЕННОЕ СТИМУЛИРОВАНИЕ ВНЕДРЕНИЯ ИННОВАЦИЙ В СЕЛЬСКОЕ ХОЗЯЙСТВО

STATE STIMULATION FOR IMPLEMENTATION OF INNOVATIONS IN AGRICULTURE

Елсаков М.Н., аспирант
Elsakov M.N., Post-graduate student
ФГБОУ ВО Орловский ГАУ, Орел, Россия
Orel State Agrarian University, Orel City, Russia

Полухин А.А.*, **Плыгун С.А.**, **Глинушкин А.П.**, научные сотрудники
Polukhin A.A., Plygun S.A., Glinushkin A.P., Researchers
ФГБНУ ВНИИ фитопатологии, Московская область, Россия
All Russian Research Institute of Phytopathology, Moscow Region, Russia

E-mail: polukhinogac@yandex.ru

АННОТАЦИЯ
В статье дается анализ современного состояния агропромышленного комплекса Орловской области и отдельных ее районах, рассматривается отраслевая структура АПК Орловской области. В статье рассмотрены организационные, управленческие и экономические аспекты развития АПК на основе инноваций, и определены основные этапы инновационного проекта.

ABSTRACT
In article the analysis of the current state of agro-industrial complex of the Orel region and its certain areas is given, the branch structure of agrarian and industrial complex of the Orel region is considered. In article administrative and economic aspects of development of agrarian and industrial complex on the basis of innovative projects are considered, and stages of the innovative project are defined.

КЛЮЧЕВЫЕ СЛОВА
Государственная поддержка, инновация, модернизация, сельское хозяйство, научно-технический прогресс, инновационное развитие.

KEY WORDS
Government support, innovation, modernization, agriculture, scientific-technical progress, innovation development.

Концепция долгосрочного социально-экономического развития РФ на период до 2020 года направляет на поэтапный переход к инновационному пути развития [2]. Основная модернизационная задача правительства - замена сформировавшейся модели экономического роста. Вместо «нефтяного» роста нам необходимо перейти к «инновационному».

Государственная инновационная политика в АПК - это создание и помощь соответствующих механизмов и методик, которые обеспечивают продвижение в производство сверхтехнологичных ресурсосберегающих проектов и научно-технических разработок, побуждение инноваторской активности компаний.

Комплексная программа развития биотехнологий в РФ на период до 2020 года выделяет 3 главных направленности развития технологий для инновационного развития экономики России: информационные технологии, нанотехнологии и биотехнологии.

В секторах, в которых потребление товаров промышленной биотехнологии сравнительно развито, преобладают международные фирмы: импортируется около

100 процентов кормовых аминокислот для сельского хозяйства, около 80% кормовых ферментных препаратов, 100 процентов ферментов для бытовой химии, наиболее 50% кормовых и ветеринарных лекарств, 100 процентов молочной кислоты, 50-100% биопищевых ингредиентов.

Индикаторами инновационного развития АПК Российской Федерации для снабжения нужного конкурентоспособного потенциала являются ресурсосберегающие технологии и биотехнологии, какие к 2020 году на мировом рынке обязаны охватить 40-50% площади пашни РФ; технологии с использованием многооперационной сельскохозяйственной техники и оборудования, экологически безвредные технологии, органическое сельское хозяйство, методики регуляции процессов реализации потенциала большой урожайности растений и большой продуктивности животных, обязаны реализоваться в практике 25-30% всех сельскохозяйственных товаропроизводителей. Жизненно важным являются ускоренное формирование системы селекционно-генетических инноваций, для вступления в производство видов и гибридов, устойчивых к неблагоприятному климату, заболеваниям и вредителям, с тем, чтоб к 2020 г. наиболее пятидесяти процентов сельскохозяйственных товаропроизводителей могли широко их применять.

Существуют следующие формы государственной поддержки инновационной деятельности: прямое финансирование; предоставление индивидуальным изобретателям и малым внедренческим предприятиям бесплатных банковских ссуд; создание венчурных инновационных фондов, которые пользуются большими налоговыми льготами; уменьшение государственных патентных пошлин для индивидуальных изобретателей; отсрочка уплаты патентных пошлин по ресурсосберегающим проектам; реализация права на ускоренную амортизацию оборудования; создание сети технополисов, технопарков и т.п.

В Государственной программе развития сельского хозяйства и регулирования рынков сельскохозяйственной продукции, сырья и продовольствия на 2013-2020 годы выделена подпрограмма «Техническая и технологическая модернизация, инновационное развитие» [1].

Цели программы проявлены в целевых индикаторах:

- объемы реализации производителями сельскохозяйственной техники новейшей техники сельскохозяйственным товаропроизводителям (тракторы, зерноуборочные комбайны, кормоуборочные комбайны);
- численность реализованных инноваторских проектов;
- рост внедрения биосредств охраны растений и микробиологических удобрений в растениеводстве;
- удельный вес отходов сельскохозяйственного производства, которые переработаны методами биотехнологии.

Ожидаемые итоги реализации подпрограммы:

- осуществление производителями сельскохозяйственной техники сельскохозяйственным товаропроизводителям 127,9 тыс. тракторов и 52,8 тыс. комбайнов, в том числе новейших моделей(с оказанием мер государственной помощи)- 12,6 тыс. тракторов, 5,3 тыс. зерноуборочных комбайнов, 1,3 тыс. кормоуборочных комбайнов;
- повышение численности реализованных инноваторских проектов до 104;
- рост внедрения биосредств охраны растений и микробиологических удобрений в растениеводстве (к 2010 году) на 32,2 процента;
- удельный вес отходов сельскохозяйственного производства, которые переработаны методами биотехнологии, - 11,5 процента.

В настоящее время основным ориентиром политики инноваций в сельском хозяйстве является Государственная программа развития сельского хозяйства и регулирования рынков сельскохозяйственной продукции, сырья и продовольствия на 2013-2020 годы, направленная на снабжение роста экономики за счет развития инноваций. Во исполнение программы реализуются наикрупнейшие инноваторские проекты - молочно-товарные фермы, мясокомбинаты, овощехранилища,

сверхтехнологичные теплицы, системы капельного орошения и т. п. В то же время улучшается инфраструктура экспорта зерна, мяса КРС при участии фермерских хозяйств.

В соответствии со Стратегией инновационного развития агропромышленного комплекса РФ на период до 2020 года главными звеньями трансфера инноваций должны быть центры сельскохозяйственного консультирования, соединенные в комплексную систему и имеющие разветвленную сеть, близкую к сельскому товаропроизводителю.

В Стратегии предусматривается выделение средств на грантовую поддержку - 200 инноваторских центров (лабораторий) при НИИ и университетах, которые в содружестве с опытнейшеми и иными хозяйствующими коллективами сумеют создать и фактически реализовать инновации, перевести для широкомасштабного тиражирования региональным системам сельскохозяйственного консультирования.

Информационное и консультационное обеспечение сельскохозяйственных товаропроизводителей и людей сельской местности является принципиальным условием инноваторского развития сельского хозяйства на современном этапе развития.

В 2015 году сельскохозяйственным товаропроизводителям и сельскому населению оказывали услуги 67 региональных консультационных предприятий в 58 субъектах России. В таблице 1 представлена информация об интенсивности работы информационно-консультационных служб в разрезе Федеральных округов.

Таблица 1 – Сельскохозяйственное консультирование в РФ

Федеральные округа	Региональные центры, ед.	Районные центры, ед.	Количество консультантов, чел.
Центральный	16	48	766
Северо-западный	4	14	146
Уральский	0	0	0
Дальневосточный	5	9	103
Крымский ФО	0	0	0
Северо-Кавказский	5	6	105
Южный	10	10	540
Приволжский	44	178	918
Сибирский	21	23	98

Главная часть сельскохозяйственных консультационных фирм сконцентрирована в Центральном, Приволжском и Сибирском федеральных округах РФ. В разрезе направлений консультирования более важными в 2015 году остаются консультационные сервисы в области растениеводства (18%) и животноводства (17%).

3-ий год ведется учет инновационной деятельности предприятий по сельскохозяйственному консультированию. Полученный экономический результат от внедрения инноваций возрос наиболее чем в 2 раза и составил 391,9 млн. руб.

В Орловской области за последние 5 лет наблюдается значимый рост долгосрочных вложений в организациях АПК (в стоимостном выражении наиболее чем в 4 раза). Не считая этого, поменялась и структура источников финансирования инноваций, если в 2010 году наиболее 70% инвестиций приходилось на привлечённые средства (кредиты банков, займы иных организаций), то в 2014 году 65% долгосрочных инвестиций финансировались из собственного капитала предприятий. Здесь необходимо заметить, что значительно снизилась доля амортизации как источника формирования вложений в производственные фонды (с 57% в 2012 г. до 30% в 2014 г.). Амортизация, являясь экономическим средством возмещения издержек на покупку основных фондов, не сформировывает финансовую основу для их обновления. С помощью амортизации производители продукции сельского хозяйства практически возвращают затраты на покупку уже используемых основных средств, так как амортизация включена в состав выручки от реализации продукции, являясь частью себестоимости [3]. Поэтому увеличение удельного веса прибыли в собственных

источниках финансирования долгосрочных инвестиций говорит о значительной смене инвестиционной политики организаций. Вместо обычного обновления техники и оборудования, ремонта производственных цехов, средства направлены на технологическое перевооружение. Сюда следует отнести технику новейшего поколения, которая позволяет использовать нулевую и минимальную технологии обработки земли; ресурсосберегающее оснащение для содержания и питания животных; постройку комплексов по переработке сельскохозяйственной продукции и т. д. Производители продукции сельского хозяйства на модернизацию производства не считая собственных средств значительно применяют заёмные источники. За последние 5 лет объём привлеченных инвестиций в агробизнес возрос выше чем в 2 раза. Следует отметить, что увеличение инвестиционной активности свойственно для всей экономики Орловской области. Доля АПК в общем объеме долгосрочных вложений за последние 5 лет составляла около 16,5%, что является вторым показателем после обрабатывающей промышленности. Одним из главных факторов роста вложений в модернизацию материально-технической базы сельского хозяйства является значительное повышение государственной поддержки, целью которой является поднятие объёмов производства продукции и стимулирование внедрения инновационных технологий. Особую значимость эффективность господдержки получила в контексте вступления Российской Федерации в ВТО и применение санкционных мер для иностранных сельхозтоваропроизводителей. Исходя из показателей сводных годовых отчётов агропромышленных организаций Орловской области объём средств бюджета, направленный на поддержку разных направлений сельскохозяйственного производства в период с 2010-2014 г. , увеличился на 28% и составил 2,3 миллиардов рублей. При этом фактически 90% субсидирования исполняются за счёт федерального бюджета и только 10% за счёт бюджета Орловской области. Государственная поддержка отрасли животноводства в Орловской области исполняется в основном программно-целевым методом [4]. В частности, для усовершенствования экономических условий и для устойчивого развития отрасли молочного скотоводства действует областная целевая программа «Развитие молочного скотоводства и увеличение производства молока в Орловской области на 2012-2016 годы» [5]. В 2014 г. объём субсидий исходя из этой программы составил 35,9 млн. руб. Не считая экого активно стимулируется замена имеющегося в организациях поголовья крупного рогатого скота благодаря высокопродуктивному племенному скоту, который адаптирован под климат Орловской области. На эти цели за 5 лет было выделено больше 200 млн. руб.
В итоге реализации приоритетного национального проекта «Развитие АПК» в Орловской области было построено небольшое количество инновационных сверхтехнологичных комплексов для разведения и откорма свиней, так же уникальный селекционно-генетический центр, который сейчас является одним из наиболее крупных в России производителей и поставщиков генетики для свиноводства. Это практически возродило данную ветвь в регионе.

Исходя из Программы «Развитие молочного скотоводства Орловской области» за 2017-2019гг. планируется перевести всё поголовье коров в сельхозпредприятиях и больших крестьянских (фермерских) хозяйствах на доение в доильных залах и в молокопровод. Это повысит производительность труда и качество производимого молока, а также увеличит реализационную цену.

Объем производства яиц за 2015г. - 144,4 млн шт. (92,5 %), в том числе в сельхозорганизациях - 20,1 млн шт. (98,9 %).

Большое внимание уделяется развитию малых форм хозяйствования, в которых сосредотачивается большинство поголовья мелкого рогатого скота – овец и коз.

В регионе реализуются меры, направленные на развитие семейных животноводческих ферм на базе К(Ф)Х и поддержке начинающих фермеров. За 2012–2015 годы в программу входят 19 семейных животноводческих ферм, 75 К(Ф)Х начинающих фермеров.

Общий объем финансирования составил 166,3 млн рублей, в том числе на:

– развитие семейных животноводческих ферм – 61,7 млн руб.;

– поддержку начинающих фермеров – 104,6 млн руб.

В 2015 году оказана поддержка 3 К(Ф)Х на создание семейных животноводческих ферм и 17 начинающим фермерам в общем размере 36,7 млн руб. средств федерального и областного бюджетов.

Победители конкурсных отборов планируют создание 2 семейных животноводческих ферм на 50 и 375 голов дойного стада и 1 фермы по откорму крупного рогатого скота на 70 голов.

С использованием средств гранта К(Ф)Х – получатели грантов на развитие семейных животноводческих ферм ведут строительство животноводческой фермы для откорма крупного рогатого скота, приобрели 390 голов крупного рогатого скота, в том числе 230 коров, 55 нетелей.

Начинающие фермеры создадут 1 молочную ферму, 5 ферм по откорму крупного рогатого скота, 1 овцеферму, 8 хозяйств с основным видом деятельности по выращиванию зерновых культур. Существует 2 проекта по производству яблок на площади 17,4 и 10 га в Глазуновском и Кромском районах.

Получателями грантов по поддержке начинающих фермеров приобретено 5 тракторов, 1 комбайн, 25 единиц навесной и прицепной техники для обработки почвы и заготовки кормов, 2 грузовых автомобиля, 20 т удобрений, 110 голов овец, построено 1 животноводческое помещение.

На реализацию мер по устойчивому развитию сельских территорий в 2015 году выделено 68 млн рублей, в том числе из федерального бюджета 43,8 млн. руб., областного – 24,2 млн руб. Введено в эксплуатацию:

– 2919,3 кв. м жилья;

– 29,4 км сетей водоснабжения;

– 36,3 км распределительных газовых сетей;

– 1 многофункциональная спортивная площадка площадью 1509 кв. м.

Введено в эксплуатацию 8 автодорог протяженностью 27,98 км. Объем финансирования составил 203,8 млн руб. из федерального бюджета и 117,2 млн руб. из областного бюджета.

По состоянию на 1 февраля 2016 года общая площадь земель сельхозназначения региона составляет 2,032 млн га, в том числе сельхозугодий - 1,897 млн га. На пашню приходится 1,508 млн га. В настоящее время сельскохозяйственными организациями используется более 1,6 млн га земель, крестьянскими (фермерскими) хозяйствами - почти 200 тыс. га.

В 2015 году было введено в оборот около 15 тыс. га земель сельхозназначения. Ожидается, что данный показатель возрастет после внедрения Геоаналитического информационного центра Департамента сельского хозяйства Орловской области. До 2017 года предстоит освоить еще около 41 тыс. га.

Разработка Геоаналитического центра велась в 2015 году по поручению Губернатора и Председателя Правительства Орловской области В. В. Потомского для выполнения задач, обозначенных Президентом Российской Федерации В. В. Путиным.

Основная цель центра - повышение эффективности работы органов исполнительной власти и межведомственного взаимодействия по вопросам развития сельского хозяйства, создание независимого и объективного источника информации для принятия управленческих решений в Агропромышленном комплексе Орловской области. Основу новой системы составляют полученные путем обработки высокодетальных космических снимков информационно-аналитические материалы. Одной из важнейших функций центра является выявление на основе результатов космической съемки используемых и неиспользуемых земель.

Система позволяет аккумулировать в базе данных необходимые сведения и формировать тематические карты для наглядного представления результатов в графической форме. Со временем ГИЦ объединит информацию, позволяющую отслеживать динамку изменения показателей на протяжении нескольких лет.

В рамках создания Геоаналитического информационного центра проведена инвентаризация земель в разрезе каждого землепользователя, оценено качественное состояние неиспользуемой пашни.

В дальнейшем предполагается интеграция Геоаналитического центра в федеральную геоинформационную систему «Атлас земель сельскохозяйственного назначения Российской Федерации».

Геоаналитический информационный центр Департамента сельского хозяйства Орловской области был презентован в рамках проведения XVII Российской агропромышленной выставки «Золотая осень-2015» и отмечен дипломом и Золотой медалью в конкурсе «За эффективное информационное обеспечение АПК».

В качестве стратегических задач по развитию АПК региона ставится максимальная реализация конкурентных преимуществ области, а именно выгодное географическое положение (близость рынков сбыта, транспортная инфраструктура), благоприятные природно-климатические условия, развитые инфраструктуры, наличие научного и кадрового потенциала.

Несмотря на большой рост субсидий и инвестиций в основной капитал есть некоторое количество направлений, которым уделено мало внимания. В частности, субсидирование покупки удобрений и средств защиты растений. П уровню внесения удобрений на гектар Российская Федерация в 5 раз отстает от США и Индии, в 7 раз от Белоруссии, в 10 раз от Китая. Орловская область по уровню внедрения минеральных удобрений в 2,5 раза превосходит среднероссийские показатели, поэтому и урожайность зерновых в 2 раза больше. Но и в нашем регионе имеются огромные запасы для повышения урожайности. В условиях применения санкционных мер поддержки агропромышленного комплекса нужно значительно повысить доступность удобрений на российском рынке посредством частичной компенсации их покупки. С иной стороны, на системной основе государственная помощь должна реализоваться не благодаря прямым инвестициям, а стимулированием модернизации материально-технической базы во внедрение инноваций посредством повышения доступности кредитных ресурсов.

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ВНЕДРЕНИЕ ПОДСИСТЕМЫ МОНИТОРИНГА В СИСТЕМЕ РЕГУЛИРОВАНИЯ РЕГИОНАЛЬНОЙ СТРУКТУРЫ АГРОПРОДОВОЛЬСТВЕННОЙ СФЕРЫ

IMPLEMENTATION OF MONITORING SUBSYSTEM IN THE REGULATION SYSTEM OF AGRO-FOOD SECTOR ON REGIONAL LEVEL

Кузубов А.А.*, **Шашло Н.В.**, кандидаты экономических наук, доценты
Kuzubov A.A., Shashlo N.V., Candidates of Economic Sciences, Associate Professors
Владивостокский государственный университет экономики и сервиса, Владивосток, Россия
Vladivostok State University of Economics and Service, Vladivostok, Russia

*E-mail: alexceyk@gmail.com

АННОТАЦИЯ

Актуальность выбранного для исследования вопроса напрямую связан с протекающим в сегодняшние дни процессом регулирования региональной структуры агропродовольственной сферы. Выполнение системных требований – один из главных моментов в методологии проектирования и внедрения подсистемы мониторинга в системе регулирования региональной структуры агропродовольственной сферы, поскольку эти требования, оказывая существенное влияние на структуру подсистемы, во многом определяют характер выполняемых ею функций. В статье показано, что наиболее важным требованием, которое выдвигается к подсистеме мониторинга, выступает обеспечение четкой согласованности в работе всех ее структурных частей, а также методологического единства построения и функционирования подсистемы с функционально развитой системой регулирования региональной структуры агропродовольственной сферы в целом и возможной системой регулирования более высокого уровня. Отмечено, что выполнение этого требования возможно только в условиях методологической, информационной, программной, технической и организационной совместимости отдельных частей подсистемы. Анализируя, систематизируя и обобщая научные труды многих ученых – экономистов, были определены ключевые проблемы проектирования и внедрения функции мониторинга. В результате проведенного исследования был обоснован системный подход к вопросам проектирования и внедрения функции мониторинга, который предусматривает рассмотрение подсистемы мониторинга, с одной стороны, как составной части функционально развитой системы регулирования региональной структуры агропродовольственной сферы, а с другой – как единого целого, решения сначала общих проблем, учета всех элементов подсистемы и их взаимного влияния друг на друга и только после этого переход к решению отдельных частных вопросов создания подсистемы. Необходимым условием такого подхода выступает предварительное исследование функции мониторинга региональной структуры и разработка основных ее моделей.

ABSTRACT

The relevance of the issue selected for the study is directly related to the current flowing in the days of the process of regulation of the regional structure of agro-food sector. Implementation of the system requirements - one of the key moments in the methodology of design and implementation of monitoring subsystem in the system of regulation of the regional structure of agro-food sphere, as these requirements by providing a significant impact on the structure of the subsystem, largely determine the nature of its functions. The article shows that the most important requirement, which extends to the subsystem monitoring, serves to ensure close coordination in all its structural parts, as well as the methodological unity of construction and operation of the subsystem with the functional development of the system of regulation of the regional structure of agro-food industry in

general and possible system of regulation more high level. It is noted that this requirement is only possible in conditions of methodology, information, software, technical and organizational compatibility of individual parts of the subsystem. By analyzing, systematizing and generalizing scientific works of many scientists - economists have identified key design and implementation of the monitoring function problems. The study was justified systematic approach to the design and implementation of the monitoring function issues, which includes consideration of the monitoring subsystem, on the one hand, as an integral part of the functional development of the regulatory system of the regional structure of agro-food sphere, and on the other - as a whole, the decision at first common problems , taking into account all elements of the subsystems and their mutual influence on each other, and only then move to address some particular issues of creation subsystem. A prerequisite of this approach stands the preliminary study of the regional structure of the monitoring function and the development of its main models.

КЛЮЧЕВЫЕ СЛОВА
Агропродовольственная сфера, функции мониторинга, эффективность, экономический мониторинг, региональная структура, моделирование.

KEY WORDS
Agro-food sector, monitoring functions, efficiency, economic monitoring, regional structure, modeling.

Подсистема мониторинга всегда создается в условиях функционирования ранее существующей традиционной системы мониторинга, скачкообразный переход от старой формы мониторинга к новой невозможно. Создание полностью законченной подсистемы – сложный и длительный процесс, связанный с проведением экспериментальных проверок, преодолением неизбежного психологического барьера со стороны персонала регулирование и прочее. Проведя теоретические исследования научных трудов, ведущих ученых – экономистов по обозначенной проблематике, таких, как О.В. Брежнева [1], Н.А. Краснова [2], М.С. Старикова [3], К.Ю. Хватов [4], В. П. Рябоконь [5], Е.В. Конвисарова [6], В.Е. Селиверстов [7], Ю.Ю. Шувалова [8], Т.В. Кушнаренко [9], А.И. Балашов [10] и других, необходимо заметить, что указанные ученые –разработчики систем регулирования единодушны, когда речь заходит о трудностях проектирования и внедрения функции мониторинга. Сложность здесь, очевидно, в том, что в этой подсистеме, кроме стандартных правил обработки показателей, нужно использовать элементы операционного мышления, связанного с процессом переработки информации. Иначе говоря, именно в этой подсистеме принадлежит интерпретировать экономическую деятельность в целом или ее отдельное проявление, то есть подняться в пределах этой подсистемы до уровня понимания информации. Это, так сказать, максимальное требование к мониторингу в функционально развитой системе регулирования региональной структуры агропродовольственной сферы, которая сегодня реализуется очень слабо из – за сложности самой задачи. Именно это обуславливает необходимость разработки подсистемы мониторинга очередями, а внедрение ее – по этапам. Выполнение перечисленных выше требований возможно только при условии применения правильной научно обоснованной методологии проектирования и внедрения подсистемы мониторинга, основанной на системном подходе и важнейших принципах создания функционально развитых систем регулирования специального назначения, сформулированных в трудах ведущих специалистов в области кибернетики, системотехники, экономико – математических методов – профессоров Н. Винера [11], Г. Х. Гуда, Г. Е. Макола [12], Л. Свифта, С. Пиффа [13] и других. Системный подход к вопросам проектирования и внедрения функции мониторинга в региональной структуре предусматривает рассмотрение подсистемы мониторинга, с одной стороны, как составной части функционально развитой системы регулирования региональной структуры агропродовольственной сферы, а с другой – как единого целого, решения

сначала общих проблем, учета всех элементов подсистемы и их взаимного влияния друг на друга и только после этого переход к решению отдельных частных вопросов создания подсистемы. Необходимое условие такого подхода – предварительное исследование функции экономического мониторинга на региональной структуре и разработка основных ее моделей.

Накопленный в агропродовольственной сфере и ряде других отраслей, опыт дает возможность определить основные принципиальные элементы методологического подхода к проектированию и внедрению на региональных структурах подсистемы мониторинга в функционально развитых системах регулирования региональной структуры агропродовольственной сферы: создание необходимых для разработки проектных решений по подсистеме, разработка функциональной структуры подсистемы, выбор средств и методов реализации подсистемы, определение направлений развития и этапов реализации подсистемы.

Разработка подсистемы экономического мониторинга, как и функционально развитой системы регулирования региональной структуры агропродовольственной сферы вообще, требует наличия достаточно большого перечня соответствующих технических, материальных, организационных и других предпосылок. Так современная практика показывает, что для проектирования подсистемы экономического мониторинга на региональных структурах, как минимум, должны быть в наличии: во – первых, комплекс технических средств, которые позволяют в принципе осуществлять полную обработку экономико – аналитических информационных данных; во – вторых, квалифицированный персонал, обладающий знаниями, как в области экономического мониторинга, так и в области всесторонней обработки информации; в – третьих, методология мониторинга как основа для формирования перечня экономико – аналитических задач, подлежащих формированию и внедрению и другое.

Более широкий подход к этой проблеме предполагает рассмотрение в качестве предпосылок, необходимых для создания подсистемы экономического мониторинга, основания подразделений по эксплуатации подсистемы, создание начальной информационной базы на различных носителях, наличие пакетов прикладных программ.

Разработка функциональной структуры подсистемы мониторинга относится к числу наиболее важных вопросов, требующих предварительного решения и предшествуют решению других частных вопросов. Выбранная функциональная структура подсистемы мониторинга позволяет синтезировать отдельные ее внутренние компоненты, определить характер их взаимодействия в процессе достижения доставленных целей и критериев.

Функциональная структура подсистемы мониторинга разрабатывается на основе определения: «ключевых точек» системы регулирования региональной структуры агропродовольственной сферы – точек принятия решения; целей (критериев) подсистемы в целом и ее составляющих; важнейших компонентов функции мониторинга; информационного потока; обратных связей и др.

Отработка «ключевых точек» системы регулирования предполагает исследование структуры применяемых на различных уровнях регулирования региональной структуры агропродовольственной сферы решений, поскольку именно в точках принятия решений находятся потребители мониторинговой информации. При исследовании устанавливается: наименование решения, частота принятия решения, факторы принятия решения, правила принятия решения, варианты решения, источник информации для решения, форма представления информации для принятия решения. Выполнение этой работы позволяет определить содержание и направленность исходной информации подсистемы мониторинга.

Отработка целей сводится к построению дерева целей подсистемы мониторинга. Эта работа необходима для функциональной связи внутренних компонентов подсистемы, проверки их соответствия назначению подсистемы и системы регулирования в целом. Дерево целей выступает как звено, которое связывает воедино функциональные характеристики подсистемы экономического мониторинга со

структурой принятых в функционально развитой системе регулирования региональной структуры агропродовольственной сферы решений.

Отработка важнейших компонентов подсистемы экономического мониторинга заключается в формировании на основе дерева целей соответствующих блоков и комплексов экономико – аналитических задач функции. В совокупности с отработкой информационного потока и обратных связей эта работа позволяет нам построить концептуальную модель функциональной структуры подсистемы мониторинга и другое.

Концептуальная модель представляет блок – схему или понятийную форму описания структуры и функций (процедур) подсистемы в целом и ее внутренних компонентов, которые качественно (логично) связывают исследуемые характеристики (параметры) подсистемы и ее структурные компоненты с воздействиями (параметрами) внешней среды в процессе выполнения подсистемой целевого назначения.

В дальнейшем на основе концептуальной модели должна быть создана нормативная алгоритмическая модель функциональной структуры подсистемы мониторинга как набор формализованных правил, приемов, вычислительных процедур, последовательное применение которых позволяет реализовать причиненные подсистеме цели, критерии.

Построение концептуальной и нормативной алгоритмических моделей служит базисной основой для определения в подсистеме состав алгоритмов преобразования входных сообщений в выходные, а также их взаимной увязки, что играет важную роль в определении правильных направлений развития и этапности работ по проектированию и внедрению подсистемы экономического мониторинга.

Сложность проблемы проектирования и внедрения в функционально развитой системе регулирования региональной структуры агропродовольственной сферы функции экономического мониторинга, уникальный характер работ, необходимость максимального сокращения времени разработок – все это настоятельно требует поиска более эффективных средств и методов реализации выбранного построения подсистемы мониторинга. В частности, сказанное диктует необходимость дальнейшего развития и углубления системного подхода к проектированию и внедрению функции мониторинга, а именно – применение программно – целевого метода проектирования и внедрения подсистемы мониторинга для разных уровней регулирования (региональная структура и территориальная организация) и тому подобное.

Формой осуществления программно – целевого метода в создании подсистемы мониторинга в системе регулирования региональной структуры агропродовольственной сферы должно быть построение программной рабочей группы высококвалифицированных специалистов различного профиля. Только интегрированный фонд знаний специалистов различного профиля, коллективу которых доверена разработка подсистемы мониторинга, даст возможность правильно сориентироваться в выборе соответствующих средств и методов, а, следовательно, может обеспечить создание подсистемы, практическое воплощение которой позволит всесторонне спроектировать и внедрить важнейшую функцию в развитой системе регулирования региональной структуры агропродовольственной сферы – экономический мониторинг и тому подобное.

В этой связи огромные возможности для научного познания мониторинга как функции регулирования открывает кибернетика. Однако было бы неправильно считать, что организация в системе регулирования региональной структуры агропродовольственной сферы функционально развитого экономического мониторинга может быть осуществлена исключительно средствами кибернетики и только в пределах этой науки. Это объясняется тем, что кибернетика затрагивает только приложения принципов теории регулирования систем в производственно – хозяйственных процессов. Особенности функции мониторинга требуют специального научного исследования, опирающийся, кроме того, в теории систем, системный анализ, теорию информации, политическую экономию, теорию управления, региональную экономику, развитие производительных сил, экономике

промышленности, организации и планирования производства, анализ, прикладную математику, инженерные науки, социологию, право.

Ведущую роль среди обеспечительных элементов в подсистеме мониторинга все же играет методологическое обеспечение, которое определяет порядок осуществления функции экономического мониторинга в развитой системе регулирования региональной структуры агропродовольственной сферы. В этой связи методологические материалы должны отвечать следующим требованиям: отражать специфику экономики и организации производственно –хозяйственной деятельности конкретной региональной структуры и территориальной организации; обеспечивать возможность всестороннего освещения деятельности региональной структуры и территориальной организации, так и изучению отдельных ее сторон; обеспечивать выявление отклонений от плана; выявлять резервы повышения эффективности производственно-хозяйственной деятельности по группам факторов воздействия, в том числе за счет факторов научно-технического прогресса; обеспечивать возможность прогнозирования и прочее. Для разработки таких методологических материалов необходимы знания: региональной экономики; развития производительных сил; отраслевой экономики; особенностей планирования и организации производственно – хозяйственной деятельности; отраслевых особенностей организации мониторинга; организации мониторинга; математических методов анализа; особенностей современной обработки информации.

Не менее важным элементом подсистемы экономического мониторинга выступает информационное обеспечение. К структуре и содержанию информационного обеспечения мониторинга предъявляются требования, которые вытекают из алгоритмической модели функционирования подсистемы. Разработка информационных аспектов подсистемы экономического мониторинга требует знаний: методологии мониторинга, системотехники, теории информации, организации банков данных в функционально развитых системах регулирования региональной структуры агропродовольственной сферы, информационных возможностей, способов обработки и получения информации и прочее. Например, для определения исходной информации подсистемы экономического мониторинга необходимые исследования экономико – аналитической информации с точки зрения ее ценности для различных потребителей. Кроме того, для интеграции обработки данных, функционирование банка данных и организации совместной работы потребителей и машин электронных цифровых в режиме диалога необходимые исследования экономико – аналитической информации в семантическом аспекте. В этом случае при создании информационного обеспечения подсистемы экономического мониторинга является нужным точное и полное описание содержания экономико-аналитических информационных данных, установление взаимосвязи между понятиями и терминами, введение системы унифицированных терминов и правил построения из них осмысленных фраз.

Важные функции в подсистеме экономического мониторинга выполняются математическим обеспечением, содержащий комплекс языковых и программных средств, совокупность которых должна обеспечивать достаточную и экономически эффективную реализацию алгоритмов решения экономико-аналитических задач на основе простых методов расчета каждого варианта алгоритма. Эффективное математическое обеспечение подсистемы экономического мониторинга может быть создано на базе знаний: применяемых методик мониторинга; математических методов; способов получения, обработки и вывода информации; стандартного математического обеспечения соответствующих технических средств; языков программирования; моделирование и др.

Существенное влияние на функционирование подсистемы мониторинга оказывает техническое обеспечение, основу которого составляет комплекс технических средств. Комплекс технических средств должен обеспечивать снятие и передачу информации для мониторинга в момент и в месте ее возникновения, синхронизацию процесса экономико- аналитических расчетов с производственно-хозяйственным процессом, завершение определенных мониторинговых расчетов в

заданные моменты времени. Для правильного выбора комплекса технических средств необходимо знать: эксплуатационные характеристики электронной и другой вычислительной техники; теорию обработки информации; организацию подсистемы экономического мониторинга в функционально развитой системе регулирования региональной структуры агропродовольственной сферы; используемые языки программирования и прочее.

Формирования и внедрения функции мониторинга в функционально развитой системе регулирования региональной структуры агропродовольственной сферы требует решения и соответствующих организационных вопросов. Организационное обеспечение подсистемы мониторинга состоит из взаимосвязанных структурных подразделений, для персонала которых четко определены функции и задачи по приему, обработке и передачи экономико – аналитической информации на все уровни регулирования. Создание эффективного организационного обеспечения подсистемы диктует необходимость знания: системотехники; организации регулирования в конкретной региональной структуре; методики проведения мониторинга; особенностей используемой в региональной структуре вычислительной техники; современных способов получения, обработки и передачи информационных данных в условиях функционально развитых систем регулирования региональной структуры агропродовольственной сферы; научной организации труда и развития производительных сил и региональной экономики; социологии; психологии.

Экономический эффект, который могут получить региональные структуры от применения электронно – вычислительной техники в мониторинге, решающим образом зависит от того, насколько эффективно будут использованы в процессе проектирования и внедрения этой функции регулирования региональной структурой достижения всех взаимно переплетенных областей знаний. Но и эти знания приведут к желаемым результатам только в том случае, когда руководители всех уровней регулировки производственно – хозяйственной деятельностью осознают в полной мере важность создания в каждой системе регулирования региональной структуры агропродовольственной сферы функционально развитой функции мониторинга.

Новизна, сложность, научно – исследовательский характер работ по созданию подсистемы экономического мониторинга, а также зависимость от ее информационной базы системы регулирования региональной структуры агропродовольственной сферы в целом делает весьма актуальной проблему определения направлений развития и этапов проектирования и внедрения подсистемы.

Состав, содержание, порядок выполнения и оформления работ по созданию подсистемы мониторинга идентичны работам по проектированию функционально развитой системы регулирования региональной структуры агропродовольственной сферы вообще. Но наряду с наличием общих моментов, содержание работ на отдельных стадиях создания подсистемы экономического мониторинга имеет и свои специфические особенности. Накопленный в агропродовольственной сфере и других областях нашей страны опыт по внедрению расчетов позволяет, в частности, определить перечень основных вопросов, которые должны быть решены в процессе проектирования.

На предпроектной стадии решают следующие вопросы: определяют объекты, для которых необходимо спроектировать подсистему мониторинга; исследуют систему регулирования на выбранных объектах с точки зрения структуры принимаемых решений; исследуют подсистему организации мониторинга на выбранных объектах с целью определения возможностей ее совершенствования; оценивают возможность применения при создании подсистемы имеющихся универсальных проектных решений; обосновывают количество и содержание очередей разработки и внедрения подсистемы; рассчитывают затраты на создание подсистемы и предварительный экономический эффект и эффективность; разрабатывают мероприятия по изменению процессов мониторинга и регулирования, исходя из требований функционально развитых систем регулирования региональной структуры агропродовольственной

сферы; определяют организации (учреждения), которые необходимо привлечь к разработке подсистемы мониторинга.

К числу наиболее ответственных работ, выполняемых на предпроектной стадии, предстоит исследование структуры принятых в системе регулирования региональной структуры агропродовольственной сферы управленческих решений. Цель этой работы – установить для каждого уровня руководителей перечень решений, для принятия которых требуется мониторинговая информация; оценить целесообразность распределения прав принятия решений по уровням регулирования; выявить дублирование и полномочных руководителей по принятию решений. Информация для оценки содержания и направленности решений членами исследовательской группы может быть получена: из протоколов оперативных совещаний, текстов приказов и распоряжений, фотографий и рабочего времени, должностных инструкций.

Исследование существующей в системе регулирования региональной структуры агропродовольственной сферы подсистемы организации экономического мониторинга осуществляется во взаимосвязи и на основе работ по изучению структуры управленческих решений. Для каждого уровня руководителей определяют реальную обеспеченность мониторинговой информацией, уточняют форму и сроки представления информации, определяют избыточную информацию или ее недостаток, устанавливают направления развития и совершенствования информационных данных.

По результатам выполнения работ предпроектной стадии составляют два документа: технико – экономическое обоснование и техническое задание. В технико – экономическом обосновании фиксируют производственно –хозяйственную необходимость и экономическую эффективность, и эффект создание подсистемы мониторинга. Техническое задание после утверждения соответствующими вышестоящими организациями является документом, который предоставляет юридическое право на начало разработок по подсистеме и др.

На стадии технического проектирования решают следующие вопросы: создают методологическое обеспечение подсистемы мониторинга; определяют (уточняют) программу выпуска подсистемы, то есть устанавливают перечень экономико – аналитической информации, необходимой для принятия на различных уровнях оптимальных управленческих решений; строят концептуальную модель функциональной структуры подсистемы, устанавливают ее внутренние и внешние связи; определяют способы решения экономико – аналитических задач; осуществляют построение нормативной алгоритмической модели подсистемы и ее оптимизацию; формируют требования к параллельных функциональных подсистем функционально развитых систем регулирования региональной структуры агропродовольственной сферы и системам регулирования верхнего и нижнего уровней; осуществляют привязку к комплексу технических средств; создают информационное обеспечение подсистемы; вырабатывают рекомендации по созданию организационного обеспечения подсистемы; определяют состав задач мониторинга первой очереди внедрения и состав задач, внедряемых в последующих очередях; разрабатывают постановки задач подсистемы первой очереди внедрения, содержащие процедуры обработки информации с описанием алгоритмов и используемых средств программного обеспечения; рассчитывают экономический эффект и эффективность от внедрения блока задач первой очереди и тому подобное.

Особое внимание на стадии технического проектирования должна быть обращена на создание методологического обеспечения подсистемы экономического мониторинга. Практический опыт свидетельствует, что для успешного проектирования и развития в функционально развитых системах регулирования региональной структуры агропродовольственной сферы этой подсистемы работы по созданию теоретико – методологического обеспечения необходимо вести опережающими темпами по сравнению с разработкой других видов обеспечения.

Весьма принципиальным на стадии технического проекта выступает вопрос выбора задач подсистемы мониторинга, внедрение которых должно быть осуществлено в составе первой очереди. При определении первоочередных задач

мониторинга приходится учитывать целый ряд обстоятельств: эти задачи должны быть информационно связаны с задачами других подсистем функционально развитых систем регулирования региональной структуры агропродовольственной сферы, такие задачи должны быть базовыми для решения других задач подсистемы (то есть исходная информация первоочередных задач должна быть входным, если возможно, для большего круга других задач); эти задачи должны обладать определенной экономической эффективностью. На практике приходится учитывать значительно большее число факторов воздействия. Например, наличие готовых разработок, возможность использования пакетов прикладных программ для решения задач такого класса, необходимость передачи результатов решения задач на верхний уровень, универсальность задач для различных региональных структур и отраслей, социальная значимость задач и прочее. Естественно, что при выборе экономико – аналитических задач первой очереди следует исходить из реального наличия трудовых, материальных, финансовых ресурсов и прочее.

Выполнены разработки в области проектирования и внедрения мониторинговых расчетов позволяют сделать вывод о целесообразности привлечения в состав первой очереди внедрения подсистемы экономического мониторинга комплексов задач по мониторингу труда и заработной платы, по мониторингу использования производственных запасов, по мониторингу использования основных средств и мониторинга производства.

Результаты работ, выполненных на стадии технического проекта, оформляются в виде объяснительной записки – «Технический проект подсистемы экономического мониторинга», которая после утверждения высшими органами выступает основным документом, определяющим создание подсистемы и ее развитие на перспективу.

На стадии проектирования решаются также вопросы: разрабатывается программное обеспечение задач подсистемы мониторинга, входящих в состав первой очереди внедрения, а также других очередей; разрабатывается программное обеспечение и соответствующая рабочая документация по организации банка данных подсистемы, вместе с генерацией, наладкой и сдачей рабочих программ банка данных; осуществляется стыковка рабочих программ задач мониторинга с программами задач других подсистем функционально развитых систем регулирования региональной структуры агропродовольственной сферы; завершается разработка организационного обеспечения подсистемы – формирование новых структурных подразделений, обучение персонала.

Цель рабочего проектирования заключается в подготовке документации, необходимой для отладки и внедрения комплекса задач подсистемы экономического мониторинга, проведение приемо – сдаточных испытаний, а также обеспечении в дальнейшем вполне нормального функционирования подсистемы экономического мониторинга.

Завершающая стадия создания подсистемы экономического мониторинга – ввод в эксплуатацию. Круг вопросов, решаемых на этой стадии, содержит: проведение опытной эксплуатации отдельных задач и комплексов задач подсистемы экономического мониторинга; проведение приемо – сдаточных испытаний; приемка задач подсистемы экономического мониторинга в промышленную эксплуатацию.

Ввод в промышленную эксплуатацию задач подсистемы мониторинга означает переход от традиционных методов и форм организации экономического мониторинга в системе регулирования региональной структуры агропродовольственной сферы в новые, построенных на прогрессивных экономико – математических методах и современной электронно –вычислительной техники.

Выполненные в системе регулирования региональной структуры агропродовольственной сферы научные исследования позволяют ориентировочно определить трудоемкость работ по созданию подсистемы экономического мониторинга для уровня региональных структур

На основании приведенных данных становится очевидным, что для выполнения работ по созданию и внедрению подсистемы мониторинга в системе регулирования

региональной структуры агропродовольственной сферы будут нужны сравнительно длительные сроки. В этой связи особое значение приобретает концентрация трудовых ресурсов, а также кооперация многих организаций и научно – исследовательских институтов. Только в этом случае можно рассчитывать на успех. Среди перспектив дальнейших исследований в этом направлении особой актуальностью отличается вопрос связан с определением универсальных методов формирования функционально развитых систем регулирования региональной структуры агропродовольственной сферы и их использование при проектировании и внедрении подсистемы мониторинга.

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THE ROLES OF LOCAL GOVERNMENT IN MODERATING THE CORRELATION BETWEEN INNOVATION SPEED AND AND THE COMPETITIVENESS OF FOOD SMALL AND MEDIUM-SIZED ENTERPRISES (SMES) IN MALANG, INDONESIA

Taneo Stefanus Yufra M.[1]*
Faculty of Economics and Business, Universitas Ma Chung, Indonesia

Hadiwidjojo Djumilah, **Sunaryo**, **Sudjatno**
Faculty of Economics and Business, Universitas Brawijaya, Indonesia

*E-mail: stefanus.yufra@machung.ac.id

ABSTRACT
Most research on innovation has given more emphasis on the kinds of innovation but has not revealed the innovation speed and the roles of local government. This study is aimed at analyzing te roles of local government in moderating the correlation between innovation speed and the competitiveness of food small and medium-sized enterprises (SMEs). The data were obtained from 161 food SMEs in Malang and then analyzed using Structural Equation Modeling via WarpPLS program. The findings proved that innovation speed positively correlated to the competitiveness of food SMEs. Food SMEs that were successful in realizing their ideas quickly primarily though the process, product, and business innovation gained higher profitability and productivity. The roles of local government significantly strengthened the correlation between innovation speed and the competitiveness of food SMEs. The roles of local government were most strongly reflected on the promotion, marketing, and training. One-stop service via the Integrated Business Service Center (also known as PLUT) played a big role in providing information related to credit, business licensing, promotion, marketing, and training and in giving guidance on technical skills in food processing and packaging, as well as business management. This integrated service has been effective in increasing the competitiveness of food SMEs. The results of the study have implications for the optimization of the local government's roles in mobilizing resources to enhance the competitiveness of SMEs.

KEY WORDS
Innovation speed, competitiveness, small and medium-sized enterprises, Malang, local government, facilitation.

Food Small and Medium-sized Enterprises (SMEs) plays a major role in Indonesia's economy both in employment and the contribution to gross domestic product (Ministry of Cooperatives and SMEs, 2013) but the competitiveness is considered low seen from the growth of food imports. In 2006-2010, the value of food imports grew at an average 20 percent per year, even in the period of January-September 2011 food imports increased 59.2 percent from the previous year (Bernando et al, 2012). One of the factors causing the low competitiveness of food SMEs in Indonesia is the low innovation of the enterpreneurs (Kushadiani, 2006; USAID, 2013; ERIA SME Research Working Group, 2014). Up to now, research on innovation has been focused on the types such as radical and incremental innovation (for instance Kushadiani et al., 2006; Xien et al., 2008), process and product innovation (Cainelli et al., 2006), and business and organizational innovation (Dixit and Nanda, 2011; Cakar and Ertruk, 2010; Laforet, 2013). The results of those studies found positive correlation between the types of innovation with business performance and the enterprise competitiveness. Unfortunately, the previous research has not revealed the innovation speed, which is the time passed or spent between the discovery of the innovation ideas and the introduction of the products either in the forms of goods or services in the

market (Kessler & Cakrabarti, 1996). Innovation will have economic values when it manages to get into the market (Susman, 2007). Meanwhile, innovation speed shortens the product life cycle (Kessler et al., 2007) so that it requires new product development in order to remain competitive. Thus, the ability to develop and launch innovative new products to the market faster than their competitors will enhance the enterprise competitiveness (Allocca and Kessler, 2006).

Competitiveness can be achieved through the followings: (1) doing something better than the others, (2) doing something that is difficult to be imitated by others, (3) doing something valuable for the customers, (4) doing something that is hard to replace, and (5) doing something that has greater profit margin than that of the competitors (Black and Porter, 2000). One determinant of competitiveness is the roles of the government in mobilizing resources to generate competitiveness (Cho and Moon (2002) and improve the market outcome (Mankiw, 2007). This means that the roles of government are to streghten or moderate the SMEs in accelerating innovation to enhance competitiveness. Some previous studies have analyzed the roles of government related to SME innovation in general but there are very limited studies on food SMEs. Najib et al. (2011) found that the government has moderated the improvement of SME competitiveness through cluster policy. The opposite results were found by Arifin et al. (2012), which stated that mushroom SMEs in Malang have done product and process innovation but faced some obstacles in their marketing and there were no supports from the local government. The same thing was revealed by Subekti et al. (2010), i.e. the implementation of advisory strategies for SMEs in Malang has not gone well. A study by ERIA SME Research Working Group (2014) on the policies for SME development and the implementation of action programs by the governments in ASEAN countries revealed that Indonesian government has not proved to be instrumental in improving the SME competitiveness.

The results of the studies above show that the roles of government in Indonesia in SME advisory and development are still weak. The establishment of Directorate-General for Innovation Support by Indonesian government in the organizational structure of Ministry of Research, Technology, and Higher Education (Kemenristekdikti, 2015) indicates some acknowledgment in how weak the roles of government in innovation reinforcement in Indonesia were. The nomenclature of innovation support shows the importance of the government's roles in moderating the process of enhancing the competitiveness in Indonesia.

This study is aimed at analyzing the roles of local government in moderating the correlation between innovation speed and the competitiveness of food SMEs. The results of this study are expected to explain the government's roles in mobilizing resources to improve the competitiveness of food SMEs. The findings can also be developed to explain the *triple helix* concept, namely ABG (Academic, Business, and Government) in innovation speed and the enhancement of SME competitiveness. Academics act as the source of innovation, business sectors as users, and the government as the facilitator.

LITERATURE REVIEW

The Correlation between Innovation Speed Development and SME Competitiveness. Two theories underlying the correlation between innovation speed and competitiveness are resource-based theory by Barney (1991; 2001) and Barney and Clark (2007) and the theory of competitiveness "Porter's Diamond" (Porter, 1982). The two theories have been developed by some scientists and researchers in their respective fields. The Porter's Diamond Theory (1982) is considered more suitable for developed countries so that Cho and Moon (2002) added five factors, which made it nine factors suitable for developing countries; one of the factors was that enterpreneurs as the creator of innovation. The Porter's Diamond Theory (1982) was about national competitiveness, but Porter admitted that a nation could compete only when its companies could, too.

Competitiveness can be treated as a dependent variable or independent variable, depending on the following perspectives or approaches (Ambastha and Momaya, 2012). The first is competitiveness as a threefold framework: competitive performance, competitive potential, and management processes (World Competitiveness Yearbook, 2002; Momaya, 2000). The second is competitiveness as the combination of assets and processes that transform assets to achieve economic benefits within the framework of the asset-process-performance concept (Mamoya, 2000). In this framework, the performance is measured by profitability, prices or costs, variation or range, productivity, development of new products, market share, customer satisfaction and value creation. Thirdly, competitiveness is measured by resource-based approach (Barney, 2001; Barney and Clark, 2007). Competitiveness in this approach is viewed from the internal factors of the company such as strategy, structure, competence, innovation capability, and the tangible and intangible resources to compete.

Based on the explanation above, the competitiveness in this study is measured by the performance, competence, and capability of the companies that are affected by innovation. The innovation can be in the forms of new products, new production methods, new sources of supply, the exploitations of new markets, and new ways in organizing business (Innovation Resource, 2013), which can be grouped into radical and incremental innovations (Forsman and Temel, 2011). In a highly competitive environment with rapid technological change, the product life cycle becomes shorter (Kessler et al., 2007), and thus the ability to develop and launch innovative new products to the market faster than the competitors becomes the key to gaining a competitive advantage (Alloca and Kessler, 2006).

Innovation speed consists of two interrelated fields of study, namely economy and organization. Economic studies focus on macro issues, while the organizational studies focus on micro issues such as the influence of structures, processes, and humans on product development (Damapour, 1991). This study is more in line with organizational studies since it focuses on the innovation speed of food SMEs.

Innovation speed is the time passed between the discovery of innovation ideas and the launch of the results of innovation into the market (Alloca and Kessler, 2006). Environments with shorter product life cycle will force companies to innovate more effectively and efficiently (Ali et al., 1995). If a product is introduced to the market faster than its competitors, the company will gain some potential benefits such as more customers, more market shares and increased profit margins, longer sale periods, and becoming stronger in competitive positions (Smith and Reinertsen, 1995). In other words, products that are introduced to the market faster will have greater competitiveness than their competitors. The companies that can quickly create innovations can thus improve the product quality as well as reduce the cost of product development, and be free in determining prices and economic scales (Smith and Reinertsen, 1992). The fundamental way for SMEs to survive the dynamic competitiveness is by continuously introducing innovative new products that the customers value (Kessler et al., 2007).

Based on the explanation above, some hypotheses can be formulated as follows:

H_1: Innovation speed positively correlates with the competitiveness of food SMEs.

The Roles of the Government in Improving the Competitiveness of SMEs. The Nine-Factor Theory by Cho and Moon (2002) states that government is one of the factors that affect the competitiveness of a nation or a company. The government's role is to mobilize resources through market mechanisms. The government plays an important role in intervening in the market to give optimal results, in line with one of the economic principles, which is "The government can increase market outcome" (Mankiw, 2007). The government's roles in improving the competitiveness of SMEs is by empowerment (Act No. 20 of 2008). The empowerment of innovation-based SMEs is conducted using top-down and bottom-up approaches (KIN, 2012). There are four dimentions of the government's policy on top-down approach. The first is innovation basis with favorable climate, namely macroeconomic stability, competition policy, education and training policy, physical infrastructures and information technology, trade policy, and policy on science and technology. The second is

the creation of opportunities through the provision of public policies and regulations. The third is enablers through an effective system of intellectual property rights, assessment system, and standardization. The fourth is the support for business that can be implemented through best practices programs, support for the development of new technologies, access to financial aids, credits, and research and development tax. Meanwhile, bottom-up approach is done in various forms, such as legislative regulations that encourage innovation research and development activities, incentives, initiatives, policies, etc.

Some results of empirical studies found that the roles of government are significant in improving the competitiveness of SMEs through various forms. Wonglimpiyarat (2011) found that the government plays an important role in providing institutional rules and funding programs that support the transfer process from R&D to commercialization. The government has also supported the financing of projects that directly or indirectly affect innovation from internal R&D stimulation and cooperation in both upstream and downstream sectors (Kang and Park, 2012). Doh and Kim (2014) found positive correlation between the support for technology development by Korean government and the acquisitions of patents and registrations for SMEs new designs. A study by Najib et al. (2011) that used market orientation, innovation, and business performance as a proxy for the competitiveness of SMEs found that the implementation of the government policies through SME clusters improved the competitiveness of SMEs in West Java. The research cooperation between SMEs, universities, and the government gives positive impacts on innovation speed in China (Zhang and Yin, 2012; and Xie, 2012). Jiao et al. (2015) also found that the roles of government in a company positively moderated the correlation between local legal environment and technological innovation.

Government facilitation in business processes is especially needed in times of economic turbulence. Economic turbulence can occur because there are externality factors that caused the market to be unable to allocate resources efficiently (Pyndick and Rubenfeld, 2005; Mankiw, 2007). Escribano et al. (2009) found that the environmental turbulence enhanced the moderating roles of absorption power of the correlation between the search for external knowledge and the companies' innovative performance. Other findings by Hung and Chou (2013) stated that economic and technological turbulence positively moderated the effects of the acquisition of external technologies (i.e. open innovations) on the company performance. The findings of this study indicated that external factors including the roles of local governments increased innovation and company performance in the dynamic industry.

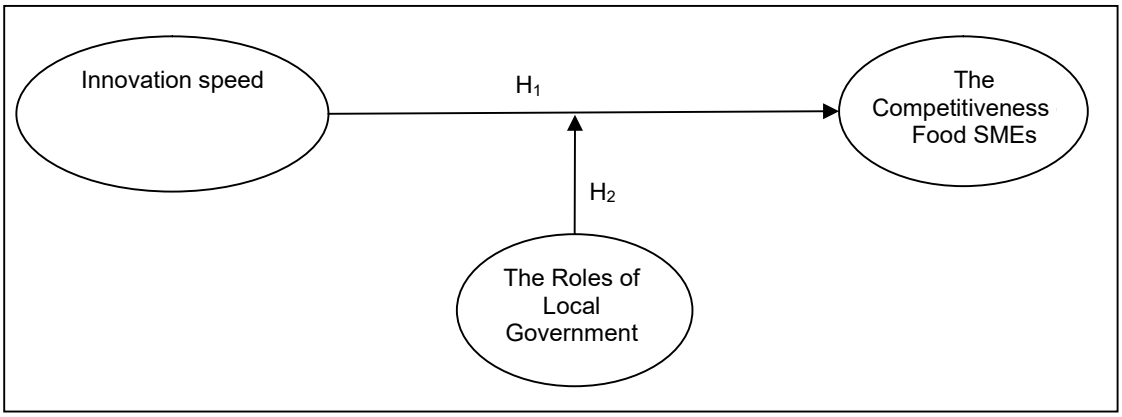


Figure 1 – Conceptual Framework

The dynamics of environmental technologies is the level and the unexpected technical changes or the volatily in the corporate environment (Hung dan Chou, 2013). Meanwhile, the dynamics of technological environment negatively moderates the impacts of the expansion of the search for external innovations on the company performance (Cruz-Conzales et al.,

2015). That is, the dynamics of technological environment weakens the impacts of the expansion of the search for external innovations on the company performance. On the contrary, the dynamics of technological environment positively moderates or strengthens the impacts of the depth of the search for external innovation on the company performance. One of the indicators used by Cruz-Conzales et al. (2015) was the roles of the government. Hence, it can be said that if the local government intensively creates empowerment programs and policies to accelerate SME innovations, the competitiveness of SMEs will improve.

Based on the explanation above, a hypothesis can be formulated as follows:

H_2: The roles of local government are to moderate the correlation between innovation speed and the competitivess of food SMEs.

RESEARCH METHODS

This study was conducted on food SMEs in Malang, Indonesia, which included Malang City, Malang Regency, and Batu City. These areas were selected for the following considerations. First, the previous research by Arifin et al. (2012) from Indonesian Institute of Sciences (also known as LIPI) and by Subekti et al. (2010) stated that food SMEs had the potentials in local economic development through process and product innovations; however, it has not revealed any information about innovation speed and competitiveness in addition to the fact that the government did not take part in addressing the marketing problems faced by SMEs. Second, food SMEs play an important role in Malang's economy based on the employment and their contribution to the local revenue. Third, the local governments in Malang have explicitly stated ther visions related to the development of innovation and the competitiveness of food SMEs.

The population in this study are all food SMEs registered in the Department of Cooperatives and SMEs in Malang. The limitation of SMEs refers to the Central Bureau of Statistics (also known as BPS), in which Small Businesses refer to businesses with a workforce of 5-19 people and Medium-sized Enterprises with 20-99 workers. The food SMEs registered were 171 units, all of which were used as samples. The respondents were the owners or the managers of food SMEs that were considered to understand the condition of the company. The data were collected using questionnaires comprising statements of indicators and items of research variables measured using Likert Scale with the scores ranging from 1 (strongly disagree) to 5 (strongly agree). The complete data to be analyzed were 161 business units. All items/indicators were valid ($p < 0.01$) and reliable (the value of Cronbach's alpha > 0.80).

The analysis tool used was Warp Partial Least Square-Structural Equation Modeling (WarpPLS-SEM or PLS-SEM) for the following considerations (Vinzi et al., 2010; Sholihin and Ratmono, 2013; Hair et al., 2014). First, WarpPLS-SEM is efficient for small samples with complex model and practical as well since it does not require data normality. Second, WarpPLS-SEM can provide an output value of the indirect effect and total effect along with *p-value, standard error*, and *effect size*. Third, WarpPLS-SEM can give the coefficient and p-value results directly for models with a moderating variable.

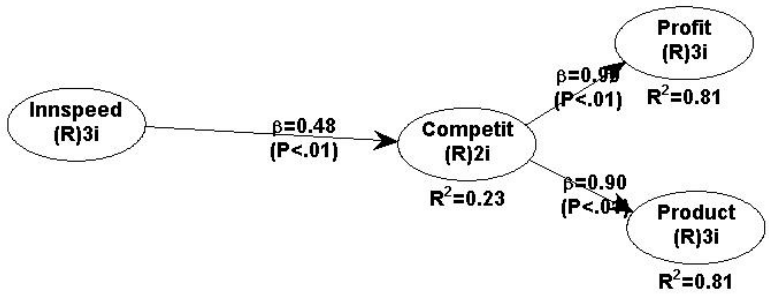
RESULTS OF STUDY

Table 1 shows that PLS model suits the statistic qualifications so that it can be used to test the research hypotheses.

Innovation Speed (also known as KPI) was significantly and positively correlated with the competitiveness of food SMEs ($p<0.01$) with coefficient 0.48. The competitiveness of food SMEs was also significantly reflected in the profitability (profit) and productivity/product ($p<0.01$).

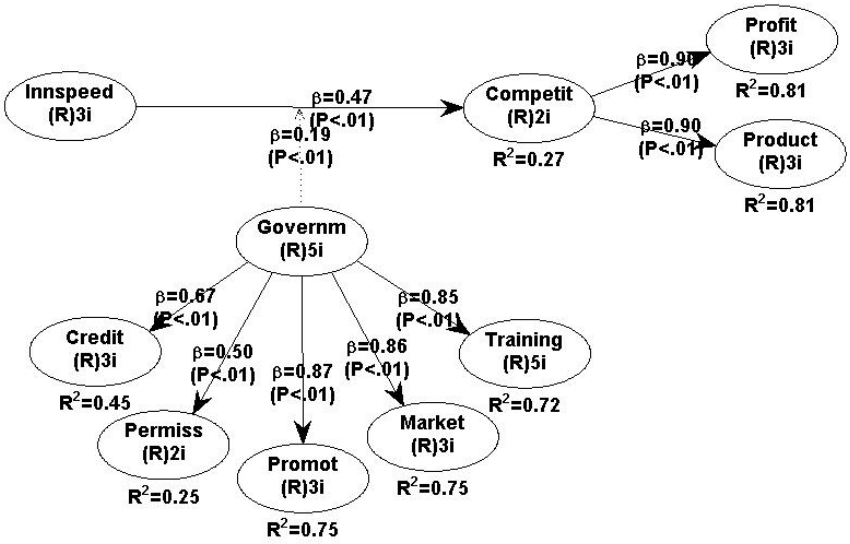
Table 1 – The Goodness-of-Fit Indices for PLS Model

Goodness of Fit	Value (p-value)	Cut-off	Notes
Average Path Coefficient (APC)	0.690 (0.001)	0.05	Significant (Good)
Average R-Squared(ARS)	0.602 (0.001)	0.05	Significant (Good)
Average Adjusted R-squared (AARS)	0.599 (0.001)	0.05	Significant (Good)
Average Block VIF (AVIF)	1.008	≤ 5: acceptable ≤ 3.3: ideal	Ideal
Average full collinearity VIF (AFVIF)	2997487083,536	≤ 5: acceptable ≤ 3.3: ideal	Because the correlation between all latent variables is significant.
Tenenhaus GoF (GoF)	0.660	≥ 0.1: Small ≥ 0.25: Medium ≥ 0.36: Big	Big
Sympson's paradox ratio (SPR)	1.000	≥ 0.7: acceptable 1: ideal	Ideal
R-squared contribution ratio (RSCR)	1.000	≥ 0.9: acceptable 1: ideal	Ideal
Statistical suppression ratio (SSR)	1.000	≥ 0.7: acceptable	Acceptable
Nonlinear bivariate causality direction ratio (NLBCDR)	1.000	≥ 0.7: acceptable	Acceptable



Notes: Innspeed = Innovation speed; Competit = Competitiveness of SMEs; Profit = Profitability; Product = Productivity.

Figure 2 – The Results of Statistical Analysis on Research Model using WarpPLS Software



Notes: Innspeed = Innovation speed; Competit = Competitiveness of SMEs; Profit = Profitability; Product = Productivity; Governm = the roles of local government; credit = credit provision; Permiss = Legal permission to start a business; promot = promotion; market = marketing; training = training.

Figure 3 – The Results of Statistical Analysis on Research Model using WarpPLS Software

The second hypothesis stating that “The roles of local government are to moderate the correlation between innovation speed and the competitiveness of food SMEs” was accepted ($p = 0.02 < \alpha = 0.05$). The roles of local government were significantly reflected in all indicators as all p-values < 0.05. The three biggest indicators reflecting the roles of local government were promotion (Promot), marketing (Market), and training (Training), each with respective coefficient of determination (R^2) 0.76, 0.74, and 0.72.

DISCUSSION OF RESULTS

The Correlation between Innovation Speed and the Competitiveness of SMEs. The results of the study show that innovation speed significantly and positively correlates with the competitiveness of food SMEs in Malang. The positive correlation indicates that the faster the innovation is realized from the ideas and enters the market, the more the competitiveness of food SMEs will improve. The companies that introduce their new products to the market more quickly will gain more benefits such as more customers, greater market shares, high profit margin, longer sale periods, safer competitive positions, and the freedom in determining prices or their reputation as an innovator (Cooper, 1984; Smith and Reinertsen, 1995; Smith and Renertsen, 1995; Kessler et al., 2007).

The findings of this study confirm that the companies that are faster in developing innovation through either one or the combination of realizing innovation ideas more quickly than planned, launching new products to the market as planned, and innovating faster than before, within the last three years, will gain greater profit or productivity. The indicator that is dominant in determining the innovation speed of food SMEs is launching new products to the market as planned, but it has not been optimized by food SMEs yet. The competitiveness of food SMEs will still improve if SMEs prioritize launching new products to the market so that it increases the gap with similar enterprises or new entrants in food industry.

The results of this study support the theory of competitiveness "Diamond Porter" (Porter, 1982), which has been developed into Nine-Factor Model of Competitiveness by Cho and Moon (2002), in which one of the determinants of national competitiveness is an entrepreneur who is an innovation creator.The competitiveness of food SMEs in this study is seen from the operational performance with two indicators namely profitability and productivity and thus supports the theory of company capabilities by Krajewski and Ritzman (2005) in relation to time, which is the speed of innovation. In this context, which Krajewski et al. (2013) call time-based competition, business managers should give priority to several things altogether. In food SMEs, for instance, good cooperation between the functions of raw material procurement, equipment procurement (fryer or oven), food processing, and packaging is crucial in supporting the speed of product development.

These findings support the latest theory, the theory of resources, developed by Barney dan Clark (2007). This theory states that, among other things, in order to achieve a sustainable competitive advantage, a company must have four characteristics: namely (1) worthy/valuable, i.e. the resources make use of the opportunities and/or neutralize threats in the corporate environment, (2) rare among the current competition as well as potential competition, (3) not fully imitable or hard to imitate, and (4) utilizable or can be utilized in the company/organizational process. In the context of food SMEs, SMEs that release new products with certain tastes and with the colors like those of the original fruit to the market faster are considered rare and cannot be fully imitated. For instance, jackfruit chips with yellow color like that of the original jackfruit are considered rare and not easy to imitate.

The competitiveness theory by Barney and Clark (2007) lies on the implications of competitiveness and economic performance, with the goal of sustainable competitiveness. Jackfruit chips, for example, were rare at the beginning of their release to the market so that they could be sold with higher prices because the pricing was value-based instead of cost-based. This could happen because the products exist in the monopolistic competition market structure. Hunt (2001) affirms that superior economic performance can be achieved not only in the imperfectly competitive markets but also in the perfectly competitive markets. Hunt’s

(2001) argumentation is that innovation becomes the key component to create a dynamic imbalance in the perfectly competitive factor market (resources). The market for jackfruit chip products can shift from monopolistic competition market structure to perfectly competitive market when many SMEs can produce products with the same color as the original color of jackfruit. However, process innovation can save production costs so that SMEs can compete with cheaper selling prices.

The results about the correlation between innovation speed and the competitiveness of food SMEs cannot be compared to those of the previous research. First, the previous studies (Alloca and Kessler, 1996; Kessler et al., 2007; Markman et al., 2005) placed innovation speed as dependent variable, while in this study innovation speed became independent variable. Second, innovation speed as independent variable can be dependent variable but in different contexts (Markman et al., 2005; Chen et al. (2012), such as license reception (Markman *et al*., 2005), the success of product development (Chen et al., 2012), but not the competitiveness of food SMEs. Third, the previous studies were conducted to manufacturing industries or SMEs with high technology in developed countries such as United States of America (Alloca and Kessler, 1996; Kessler et al., 2007) and South Korea. Despite in the same developing countries like Indonesia, SMEs in manufacturing industries have different characteristics from those of food SMEs. Fourth, the results of the previous studies in the field of food industry had different topics of discussion such as SME clusters (Najib et al., 2011), organizational innovation (Baregheh et al., 2012a), and using qualitative approach (Baregheh et al., 2012b).

The Roles of Government in Moderating the Correlation between Innovation Speed and the Competitiveness of food SMEs. The findings reveal that the roles of local government are significant in moderating the correlation between innovation speed and the competitiveness of food SMEs in Malang. This shows that the local government's efforts to improve innovation speed can increase profitability and productivity of food SMEs. The roles of local government in this study are measured by 5 indicators, namely (1) credit facilities including access to raw materials, (2) business licensing, (3) promotion, (4) marketing, and (5) training for the owners or the managers of food SMEs.

One of the credit facilities provided by the government is Credit for Public Enterprise, also known as *Kredit Usaha Rakyat*/*KUR* (Presidential Instruction No. 6 of 2007). *Kredit Usaha Rakyat* can be said successful in terms of the development of the number of the distributed credits and the number of the recipients. In 2007, the number of KUR users was only 3,623 units, while in June 2016 it increased to 16,115,658 units (Tambunan, 2016), i.e. there was 44.5 % increase per year. KUR was also successful in the banking sides as, nationally, the Non-Performing Loan (NPL) of KUR was between 3-4 percent, which was lower than the maximum level of 5 percent set by Bank Indonesia (Tambunan, 2016). In 2015, BRI Malang distributed KUR as much as IDR 1,5 trillion with 0 percent NPL, and in 2016, the number of KUR distribution was targeted to be the same as that in 2015 (Tempo.co., 2016). Nevertheless, the distribution of KUR faced 5 (five) problems (Pratomo, 2014). The first was the high interest rate (22 percent per year) while the benchmark interest rate from Bank Indonesia was 7.5 percent. Second, the distribution was not even between economic sectors and regions. Third, the socialization was not maximum so that not so many SMEs knew about the program. Fourth, KUR was used as a means of political campaign. Fifth, the fund for KUR distribution was limited and has not reached all areas in Indonesia. A study by Damayanti and Adam (2015) revealed that the realization of KUR distribution grew faster than its distribution target. In the periods of 2010–September 2014, the distribution realization grew by an average of 30.7 percent per year, while the target has only grown by an average of 16.6 percent per year.

This study found that the process of obtaining a business license is not easy and the fee is not cheap for food SMEs. The process of obtaining a trading business license (also known as SIUP) in Malang requires 12 documents. One of the requirements is a nuisance ordinance (*hinder ordonantie*/HO). To obtain HO, the entrepreneur must fulfill 9 kinds of qualifications (Regional Regulations of Malang No. 8 of 2013). The licensing procedure is

considered difficult to fulfill by the SME enterpreneurs in Malang so that thousands of enterpreneurs have not got the license (Sofia, 2014). The local government of Malang has addressed this matter in two ways. First, micro business license is delegated by the mayor, in this case the Head of Integrated Licensing and Services Board, to the sub-district (Malang Mayor Regulation No. 50 of 2015) in hope that the process becomes faster and more efficient. Second, the local government of Malang plans to simplify the requirements so that enterpreneurs can obtain the license more easily (Sofia, 2014). In addition, the cheapest licensing fee is IDR 250,000 if taken care by the SME entrepreneur himself, while the most expensive fee is IDR 850,000 if using a service bureau/agent.

The results of analysis show that involving food SMEs in the promotion activities is the most significant indicator of the roles of local government but in practice it is still low. The promotion of food SME products that are facilitated by the local governments in Malang is the direct sales through exhibitions and events both in Malang and outside Malang. Promotions in Malang are generally carried out on the Anniversary (HUT) of Cooperatives, HUT of Malang city (in April), Batu city (in October), or Malang regency (in November). The results of interview with the Head of SME Development Section in Malang affirm that in the last three years the local governments have taken SMEs into international promotions in Japan, China, and Malaysia. The government provides promotional spots such as showrooms in the office of Department of Cooperatives and SMEs as well as exhibition venues in PLUT (Integrated Business Service Center). The local governments provide information to SME enterpreneurs about promotional activities, pay for renting space or venues, and pay for the accommodation and transportation support for promotional activities outside Malang.

The government's role in marketing is observed from the provision of market information, physical instruments of marketing, and marketing network through cooperation with such companies as *Carrefour*, Indomaret, and Cooperatives. Market information through Integrated Business Service Center (PLUT) is known better by SME enterpreneurs. Since its establishment in 2014, PLUT in Malang has held various technical guidance activities. The government has also provided marketing instruments regularly through open markets on Saturdays and Sundays for SMEs. The challenge faced by food SMEs in entering modern market such as *Carrefour* and Indomaret is the nutritional information since it requires nutritional testing, halal certification, and the barcode (Interview with the Head of Forestry and Agricultural Product Industry, Department of Trade and Industry of Malang Regency, April 2016). To improve the competitiveness of food SMEs, it is very important for SMEs to meet the Indonesian National Standard (also known as SNI) for every food product that they produce. In addition, SMEs should take care of Intellectual Property Rights (also known as HKI) such as trademarks, copyrights, and trade secrets. Nutritional testing and halal certification have started to be carried out by food SMEs in Malang with the government's facilitation, while the fulfillment of SNI and HKI has not been executed. The main challenge is its cost and the capacity of human resources.

Training is one of the indicators that determine the roles of local government in improving the competitiveness of food SMEs. Training or technical guidance includes product development, production processes, business management, financial management, and packaging. Technical guidance is also given by the local government on how to do credit application and fulfill the required qualifications. These efforts have been fruitful compared to four to six years ago, as found by Arifin et al. (2012), in which SMEs did not get any support from the local government in facing the marketing problems and the implementation of development strategies for SMEs in Malang did not go well (Subekti et al., 2010). Indeed, the local government's policies related to labor training become one supporting factor that enables SMEs to improve their competitiveness (Kurniati and Yuliando, 2015).

CONCLUSION

This research finds that innovation speed positively correlates with the competitiveness of food SMEs in Malang and thus the proposed hypothesis is accepted. Food SMEs that can realize their ideas quickly through process, product, organization, and business gain higher profitability and productivity. This allows SMEs to compete with similar enterprises in its industry. Thus, innovation speed is very important in the conditions where the business competitiveness is high and the product life cycle becomes shorter.

The roles of local government prove to enhance the correlation between innovation speed and the competitiveness of food SMEs in Malang. The roles of government are reflected through credit facilities, business licensing, promotion, marketing, and training, which have been done by the local government and brought broad impacts in improving innovation speed to increase the competitiveness of food SMEs. In addition, one-stop service through Integrated Business Service Center related to credit information, business licensing, promotion, and marketing as well as training on technical skills in food processing and packaging as well as business management has proven effective in improving the competitiveness of food SMEs.

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THE EFFECT OF ORGANIZATIONAL COMMITMENT TOWARD TURNOVER INTENTION AT NARADA SCHOOL, INDONESIA

Pawirosumarto Suharno*, **Setiawan Ketut**, **Setyadi**, **Elmi Farida**
University of Mercu Buana, Indonesia

*E-mail: suharno70@yahoo.com

ABSTRACT
This study aims to identify and analyze the influence of Organizational Commitment (Affective Commitment, Continuance Commitment, and Normative Commitment) against Turnover Intention. Being a quantitative research, the population and sample in this study are teachers at Narada School in Jakarta, Indonesia. The data are collected by survey method using a questionnaire distributed to all teachers in kindergarten, elementary, secondary, and high schools with a total of 100 samples. The data are analyzed to test the validity, reliability, and linear regression. The results show that Affective Commitment on the dimension of Identification has the most dominant influence on Turnover Intention at Narada School. There is a significant effect simultaneously of Affective Commitment, Continuance Commitment, and Normative Commitment to Turnover Intention at Narada School. This study is worth valued as Narada School is a Buddhism-based school which puts forward the spirit of service to God. Thus, we will see whether this Buddhism value is still embraced by the school's staffs or has been replaced with other (usually financial) motives.

KEY WORDS
Organizational commitment, affective commitment, continuance commitment, normative commitment, turnover intention.

Elementary and Secondary Education both play an important role in the series of formal learning. Schools as a formal education unit need to organize and provide procedures and rules in accordance with the needs of education. This is in accordance with the 1945 Constitution Article 31 Paragraph 1 confirming that every child is entitled to the same education as mandated.

Narada School is one of formal education institutions in Jakarta. It provides elementary to secondary level of education. Established in 2005, Narada School has undergone vicissitudes. Narada School opens up its education gradually, starting from kindergarten, elementary, then junior and senior high school after the first batch of their primary school students graduated. Education available at Narada School is kindergarten 1-6 years old, primary school 6-12 years old, junior high school 12-16 years old and senior high school 16-20 years.

Admission of new students at Narada School in general has increased from 2004 to 2015 as shown by Figure 1. It shows that the admission of new students at Narada School from 2005 to 2015 increased. Increasing number of students at Narada School then requires management to increase the number of human resources (HR) including teachers and educators (back office).

The increasing number of students is one indicator of successes; however, there are problems that occur with the increasing level of turnover in Narada School. Narada School turnover rate in the average is 25% since 2013 to 2015.

To learn more about the problem due to high rate of turnover, we conducted a pre-research. This was conducted on 15 employees (educators) as follows: three people from Pre-School, three people from Elementary School, three people from Junior High School, three people from Senior High School, and three people from Back Office. The results of pre-research are presented in Table 1.

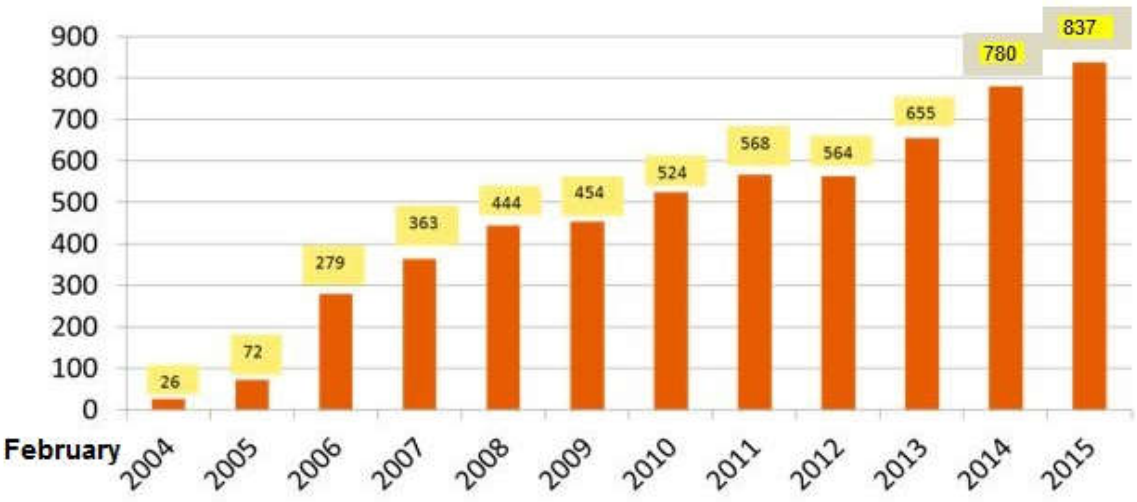

Figure 1 – Admission of new students at Narada School
(Source: Academic Division of Narada School, 2016)

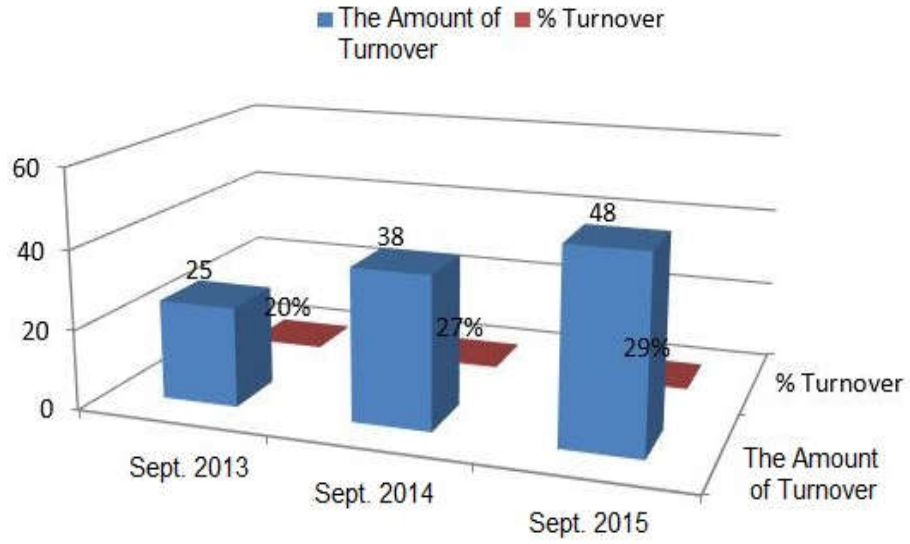

Figure 2 – Turnover at Narada School (Source: HRD Division at Narada School, 2016)

Table 1 show that the problem often arises based on the pre-research is related to organizational commitment as much as 53%. The problems associated with organizational commitment are Affective Commitment, Continuance Commitment, and Normative Commitment of employees at Narada School. This is the reason for our study on Turnover Intention at Narada School.

Table 1 – The Results of Pre-research at Narada School (Source: Setiawan, 2016)

Variable	Number of People	Percentage
Leadership style	3	20
Organizational culture	2	13
Organizational commitment Affective commitment Continuance commitment Normative commitment	8	53
Job satisfaction	1	6,7
Motivation	1	6,7

LITERATURE REVIEW

Turnover Intention. Turnover Intention by some management experts including Culpepper (2011) is the best predictor to identify the behavior of turnover among employees of an organization. Harrison *et al.* (2006) state "… presently defined is an employee's preference is to quit his or her job. Real turnover has been looked to be especially likely the result of intentions to withdraw…" and Robbins (2007) states that one's withdrawal of an organization (turnover) can be voluntary turnover or involuntary turnover.

According to Novliadi (2007), factors that influence the occurrence of turnover intention are quite complex and interrelated one to another. These factors include age, length of employment, education level, and attachment to the company. Simamora (2006) explains Turnover Intention is a movement over the limit of membership of an organization that is distinguished in two dimensions: Avoidable Voluntary Turnover and Unavoidable Voluntary Turnover. Mowday (1982) in Alimohammadi *et al*. (2013) states "Organizational commitment refers to accordance between the goals of the individual and the organization whereby the individual identifies with and extends attempt on representing the general goals of the organization", meaning that organizational commitments refers to individual and organizational goals, where people recognize and seek to present the objectives of an organization.

Organizational Commitment. Organizational Commitment is a situation where an employee favoring a particular organization and its goals, and they are willing to maintain membership in the organization (Robbins and Judge, 2008). Commitment starts with building relationships between individuals, which raises the concern that good preparation will foster understanding and positive perceptions so that people feel able to accept (Parameswari, 2014). Luthan (2006) defines organizational commitment in three stages as follows: 1) a strong desire to remain as a member of a particular organization; 2) the desire to strive according to desire of the organization; and 3) a certain belief and acceptance of the values and goals of the organization. There are three-dimensional components of organizational commitment according to Mayer and Allen (1990) in Luthan (2007), as follows: Affective Commitment, Continuance Commitment, and Normative Commitment.

Affective Commitment. Affective Commitment according to Allen & Mayer 1997 in Luthan (2007) is a commitment based on the emotional feelings of employees, employee identification, and employee involvement to the organization. Krikwood (2006) explains that Affective Commitment is the result of an agreement between the values and goals of individuals and organizations. They are committed to the organization; they also feel competent to do the job as well as satisfied with their role in the organization. Chu and Li (2010) find Affective Commitment as a strong emotional bond resulting from an individual's ability to identify its relationship with the organization, and then they will feel closeness to the organization. When people feel the psychological closeness to the organization, then Continuance Commitment will appear. English *et al.* (2009) find that Affective Commitment is a reinforcing factor for employees with long tenure, although psychologically appears less positive for those employees. According to Allen & Mayer (1997) in Luthan (2007), Affective Commitment is classified into three dimensions: Emotional Attachment, Identification, and Involvement to the Organization.

Continuance Commitment. Continuance Commitment by Allen & Mayer (1997) in Luthan (2007) is defined as a component based on employee perceptions about the losses that will be faced, if they leave the organization. Mowday in Sopiah (2008) finds Continuance Commitment as a commitment based on the rational needs. This commitment is formed based on profit and loss, considered on what must be sacrificed to settle on an organization. The key to this commitment is a necessity for survival (need to). Chu and Li (2010) in their study explains that continuance commitment refers to the price to be paid to employees who leave the organization and the commitment of those staying in the organization. Gonzales and Guillen (2007) say there are two dimensions in Continuance Commitment: High Sacrifice and Low Alternative.

Normative Commitment. Normative Commitment by Allan & Mayer (1977) in Luthan (2007) is defined as a commitment of employees arising from their sense of obligation to settle in the company or organization. Gonzales and Guillen (2007) add that the Normative Commitment is based on the feeling of obligation to remain a member of an organization based on morality. Mowday in Sopiah (2008) also argues that Normative Commitment is commitment to the organization based on the norms that exist within the employees; their individual beliefs would be the responsibility of the organization. Employees feel that they have to stay because of loyalty. The key to this commitment is the obligation to stay in an organization (ought to).

Chu and Li (2010) have other ideas. Normative Commitment refers to organizational commitment that occurs when employees fully believe in the organization - also called as moral commitment. Albdour and Altarauwneh (2014) explain that Normative Commitment is a commitment based on a sense of obligation to the organization. Employees with a strong normative commitment survive because they think they must do so. Normative Commitment in research conducted by Gonzales & Guillen (2007) consists of two dimensions: Feeling Obligation and Moral Commitment.

RESEARCH FRAMEWORK

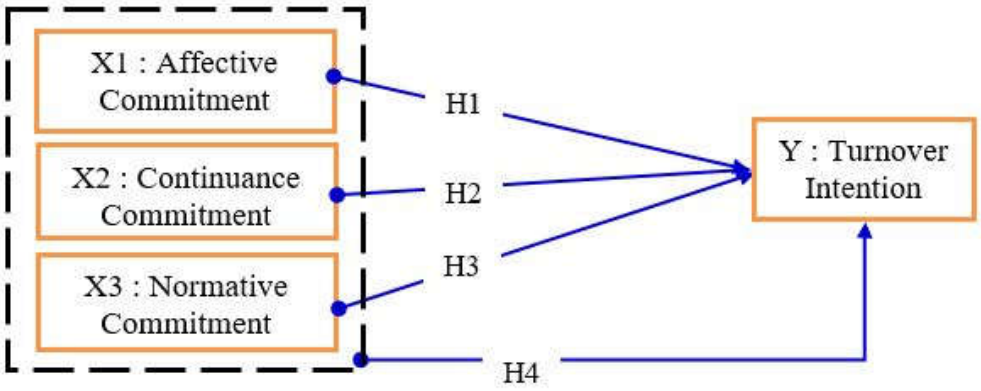

Figure 3 – Research Framework

In this study, there are three independent variables namely Affective Commitment (X1), Continuance Commitment (X2), and Normative Commitment (X3) and the dependent variable of Turnover Intention (Y). We use multiple linear regression analysis to find out, analyze, and explain the effect of the independent variables on the dependent variable either partially or simultaneously as the framework above.

Research Hypothesis. Based on the framework, the hypothesis as a temporary answer to the problems that exist at Narada School will empirically verifiable as below:

H1: supposedly there are significant positive effect of Affective Commitment On Turnover Intention.

H2: supposedly there are significant positive effect of Continuance Commitment on Turnover Intention.

H3: supposedly there are significant positive effect of Normative Commitment on Turnover Intention.

H4: supposedly there are significant positive effects simultaneously of Affective Commitment, Continuance Commitment, and Normative Commitment on Turnover Intention.

METHODS OF RESEARCH

The approach in this study was quantitative as the data were concrete, objective, measurable, rational, and systematic. Another name of this quantitative method is the traditional method, positivistic methods (based on positivistic philosophy), and the method of

discovery (finding a new science and technology). This method is called quantitative research because the data in the form of figures and statistical analysis are used.

Research variables can be defined as an attribute or the nature or value of a person, object, or activity which may have certain variations defined by the researchers to learn and then to draw conclusions (Sugiyono, 2008). Variables in the research could be distinguished as follows:

- *Independent variable*. This variable is often referred to as the stimulus variables, predictors, or antecedent. The independent variables in this study were the affective commitment (X1), continuance commitment (X2), and normative commitment (X3).
- *Dependent variable*. This variable is often referred to as the output variable, criteria, or consequence. The dependent variable is affected by the independent variables. The dependent variable in this study was turnover intention (Y).

Measurement of Variable. Measurement of variables was carried out as seen from Table 2.

Table 2 – Dimension of Variable

Variable	Dimension
Affective Commitment	Emotional Attachment
	Identification With
	Involvement to the organization
Continuance Cmmitment	High Sacrifice
	Low Alternative
Normative Commitment	Feeling obligation
	Moral Commitment
Turnover Intention	Avoidable Voluntary Turnover
	Unavoidable Voluntary Turnover

Population and Sample. The population in this study were all teachers, up to 100 people, at Narada School divided into four divisions, consisting of 24 kindergarten teachers, 37 elementary school teachers, and 39 junior and senior high school teachers. The total population was relatively small and relatively easy to reach. The method used was census. Samples were expected to be more likely to approach the real value and are expected to minimize errors or deviations from the population value (Usman and Akbar, 2008).

Data Collection. Data collection was done by means of interviews, questionnaire, observation, and a combination of all three. This study used a combination of data collection techniques through questionnaire, whose answers to the items have been provided by the researchers, and the respondents simply chose the answer. Weighting was done by using a five-point Likert scale, namely Strongly Agree (SA) with a value of 5, Agree (A) with a value of 4, Undecided (U) with a value of 3, Disagree (D) with a value of 2, and Strongly Disagree (SD) with a value of 1, for every answer respondents gave in each of the variables studied.

Data Analysis. There were five stages of analysis performed in this study, namely descriptive statistics, quality test on the instrument (validity and reliability test), the classic assumption test (multicollinearity, heteroscedasticity test, normality test, linearity test), data analysis test (multiple regression analysis, F-test, t-test, R^2 test), and the correlation between dimensions. Overall activity of data processing and analysis was conducted with the help of a computer using SPSS (Statistical Product for Service Solution) version 22.0.

RESULTS AND DISCUSSION

Characteristics of Respondents. Questionnaire was distributed between June 1-6, 2016 to all teachers at Narada School. The results of respondents from 100 respondents can be seen from Table 3.

Based on Table 3, of the 100 teachers at Narada School who became the object of study, the majority were women (58%). Teachers aged less than 30 years dominated the respondents (52%). It can be said that teachers at Narada School are in their productive age.

The majority of respondents at Narada School had been working of less than 3 years - there were many new teachers. It was uncommon for teachers to stay there more than 5 years.

Table 3 – Characteristics of Respondents at Narada School 2016 (Source: Setiawan, 2016)

Characteristics		Number of Respondents	%
Sex	Male	42	42
	Female	58	58
	Total	100	100
Age	< 30	52	52
	30 - 40	37	37
	41 - 50	10	10
	> 50	1	1
	Total	100	100
Education	Senior High School	4	4
	Bachelor (S1)	86	86
	Master's (S2)	10	10
	Total	100	100
Tenure	< 2 years	33	33
	2-3 years	34	34
	4-5 years	9	9
	> 5	24	24
	Total	100	100

Validity and Reliability. The results of validity and reliability of turnover intention using SPSS version 21 can be seen in Table 4 below.

Table 4 – Validity and Reliability of Instrument (Source: Setiawan, 2016)

Variable	Pearson Corelation	r_{tabel}	Validity	Cronbach Alpha	Reliable
Turnover Intention (Y)					
Avoidable Voluntary Turnover	0.703	0.197	Valid	0.901	Reliable
Unvoidale Voluntary Turnover	0.764	-	Valid	-	Reliable
Affective Committment (X1)					
Emotional Attachment	0.735	0.197	Valid	0.891	Reliable
Identification With	0.635	-	Valid	-	Reliable
Involvment to the Organization	0.739	-	Valid	-	Reliable
Continuance Committment (X2)					
High Sacrifice	0.504	0.197	Valid	0.811	Reliable
Low Alternative	0.579	-	Valid	-	Reliable
Normative Committment (X3)					
Feeling Obligation	0.637	0.197	Valid	0.876	Reliable
Moral Commitement	0.729	-	Valid	-	Reliable

The variables affective commitment, continuance commitment, normative commitment, and turnover intention showed Pearson Correlation result, which was greater than r_{-table} 0.197, thus the dimensions of these variables can be declared as valid. For each variable, the Cronbach Alpha was greater (>) than 0.70, thus the variables of the study can be said as reliable.

Multiple Regression Analysis. Multiple regression analysis was used to determine the influence of affective commitment, continuance commitment, and normative commitment on turnover intention at Narada School. Hypothesis testing was done by testing the coefficient of determination (R Square), simultaneous significance test (F-Test Statistic), and the individual parameter significance test (t-Test Statistic). The results of the study are summarized in Table 5.

The coefficient of determination (R2) aims to measure the ability of the model to explain variations in the dependent variable explained by the independent variables. The coefficient of determination ranged from 0 to 1. The value of R2 is small or close to 0 indicates that the ability of the dependent variable cannot be explained by the independent variables. R2 value close to 1 indicates that the variation of the dependent variables simultaneously can be explained by variations in the independent variables.

R-square value generated in this study was 0.454, meaning that 45.4% of the variable turnover intention can be caused by the variable of affective commitment, continuance commitment, and normative commitment. The remaining 54.6% is caused by other variables not examined in this study. This indicates that factors beyond the Affective Commitment (X1), Continuance Commitment (X2), and Normative Commitment (X3) can be expected to have a greater contribution to the employee's decision to leave Narada School.

F test is a test of the significance of the equations used to determine how much influence the independent variable has, namely Affective Commitment (X1), Continuance Commitment (X2), and Normative Commitment (X3) simultaneously to the dependent variable (Y) that is Turnover Intention. F-test is required to test the hypothesis proposed in this study.

Table 5 – Regression of Variable X1, X2 and X3 toward Y (Source: Setiawan, 2016)

Variable	Coefficients/ R Square	t	Sig.
(Constant)	3.879	7.724	.000
Affective Commitment	-.395	-4.351	.000
Continuance Commitment	-.319	-2.964	.004
Normative Commitment	.496	4.511	.000
R^2	0.454	-	-
F_{-Count}	-	26.559	0.000

Based on the table above, it can be seen that the significant value is 0.000 > 0.05. That is the result of research conducted at Narada School proved that commitment of the teachers (respresented through affective commitment, continuance commitment, and normative commitment) has a significant effect on turnover intention at Narada School. Hypotheses can be said to be acceptable because significance of the study results do not cross the predetermined standards. This means that in partial affective commitment possessed by teachers significantly influence turnover intention at Narada School.

Data on significance value of Continuance Commitment is 0.004 < 0.05. Results of research conducted at Narada School are smaller than the prescribed limit. This means, in partial, Continuance Commitment of teachers also has significant effect on Turnover Intention at Narada School. Normative Commitment results in Table 4 shows a significance value 0.000 < 0.05. The results of this study meet the predetermined value, which is not more than 0.05. It can be expressed in partial that Normative Commitment possessed by teachers significantly influence Turnover Intention at Narada School.

Correlation Analysis across Dimensions. In this last part of the discussion, the analysis of the correlation between the dimensions of the research conducted at Narada School will be explained.

Table 6 – Correlation Analysis across Dimensions of Organizational Commitment toward Turnover Intention (Source: Setiawan, 2016)

Variable	Dimension	Turnover Intention	
		Avoidable (YI)	Unavoidable (Y2)
Affective Commitment	Emotional Attachment	-.368**	-.441**
		.000	.000
	Identification with	-.448**	-.453**
		.000	.000
	Involvement to the Organization	-.265**	-.414**
		.008	.000
Continuance Commitment	High Sacrifice	-.512**	-.572**
		.000	.000
	Low Alternative	-.285**	-.055
		.004	.586
Normative Commitment	Feeling Obligation	.396**	.121
		.000	.231
	Morality	.269**	.409**
		.007	.000

All the variables and dimensions studied at Narada School are set forth in the table. The teachers as respondents answered questions and their answers were processed in SPSS version 21. The results of the questionnaire is presented in Table 6.

Based on the data in Table 6 on correlation across dimensions of Affective Commitment on Turnover Intention, that is the dimension of Emotional Attachment, Identification (0.000), and Involvement to the Organization (0.008), the significance value is smaller or < 0.05 meaning that there is a significant correlation. If among the dimensions of Emotional Attachment, Identification, and Involvement to the Organization and the dimensions of the dependent variable, Avoidable and Unavoidable Turnover, has significance value less than or < 0.05, thus it means that there is a significant correlation.

The value of Person Correlation between each dimension of Emotional Attachment, Identification, and Involvement to the Organization of the Avoidable and Unavoidable Turnover Intention has an asterisk; this means that there is a significant correlation between the dimensions connected. Identification is a dimension that has a high influence on Turnover Intention at Narada School. This means that identification in the variable of Affective Commitment needs to be improved in order to reduce Turnover Intention.

Correlation across the dimensions of Continuance Commitment with Turnover Intention in Table 5 shows that High Sacrifice and Low Alternative has a significance value of 0.000 < 0.05, which means to have a significant correlation. Furthermore, the dimension of High Sacrifice and Low Alternatives toward the dimensions of Avoidable and Unavoidable Turnover Intention has a significance value of 0.000 < 0.05, which means there is a significant correlation.

The dimension Low Alternative has a significance value 0.586 greater than or > 0.05 meaning the relationship is not so significant on the dimension toward the Unavoidable Turnover Intention. The value of Pearson Correlation for Low Alternative dimension is also not very high correlation, of only 0.055, which means less significant correlation between the dimensions connected. In this variable, the most influence on Turnover Intention at Narada School is High Sacrifice.

Based on the data in Table 5 for correlation across the dimensions of Normative Commitment to Turnover Intention, that is the dimension of Obligation Feeling and Morality, the significance value is 0.000 < 0.05, which means which means a significant correlation. Furthermore, between Feeling Obligation and Morality to the dimension of dependent variable Avoidable and Unavoidable Turnover Intention, it has a significance value 0.000 < 0.05, which means there is a significant correlation.

Based on the output value in Table 6, the value of Person Correlation between Feeling Obligation and Morality against Avoidable and Unavoidable Turnover Intention has an asterisk, this means that there is a significant correlation between the dimensions connected. Feeling Obligation has not so high Pearson Correlation value (no asterisk); thus, it can be concluded that the less significant correlation between Feeling Obligation to Unavoidable Turnover Intention. Normative Commitment shows a is a positive Pearson Correlation result; which means that the increase in Normative Commitment of teachers is also followed by Turnover Intention at Narada School. The highest value is at Morality dimension to Unavoidable Turnover Intention (0.409 **), that was greater than Feeling Obligation toward the two dimensions of Turnover Intention at Narada School.

DISCUSSION OF RESULTS

Based on the statistical analysis afore-mentioned, the study has resulted in several findings.

The Effect of Affective Commitment toward Turnover Intention. Affective Commitment partially has a significant negative effect on Turnover Intention. These results are consistent with the research conducted by Lew Yew in 2010 in Malaysia published in the journal International Conference on Business and Economics Research vol.1 whose results are low Affective Commitment will lead to increased intention to quit the organization or company.

Management at Narada School needs to pay more attention on Affective Commitment as low Affective Commitment will affect Turnover Intention. It can be seen from the value of Person Correlation connected between Affective Commitment and Turnover Intention with two asterisks (**), this means that there is a significant correlation between the dimensions of the Turnover Intention both Avoidable Turnover Intention and Unavoidable Turnover Intention. If no action is taken to solve the problem, it will cause an increase in the number Turnover at Narada School.

Affective Commitment also has a low correlation on the dimension of Identification toward the dimension of Avoidable and Unavoidable Turnover Intention. Identification is a commitment arising because the status or the presence of teachers and employees at Narada School is still so low that affect the desire to move in or out of the Narada School either avoidable or unavoidable.

Narada School Management needs to pay attention and improve Affective Commitment, especially on the dimensions of Identification as the dimension increases the desire to leave Narada School. The higher the Affective Commitment in particular on the dimension of Identification, the lower the Turnover Intention will be. It would be advantageous for Narada School.

The Effect of Continuance Commitment toward Performance. Continuance commitment has a significant negative effect on Turnover Intention at Narada School. This is consistent with previous studies conducted by Jaros and Culpepper (2014) in the Journal of Management & Organization Volume 20. Their studies concluded that employees remain or stay with the organization because they have no alternative employment.

The Pearson Correlation value for the dimension of High Sacrifice toward Avoidable and Unavoidable Turnover Intention is in the average value of 0.542 and a sign of (**) which can be interpreted that this dimension has a significant correlation to Turnover Intention at Narada School.

Continuance commitment based on High Sacrifice is a commitment that is better than the employees who survive because of Low Alternative Low to move. Commitment is what is expected by all organizations. Narada School should be able to understand this and retain employees (teachers) who work at Narada School. Normative commitment also means the big losses employee may receive when choosing to move from an organization. Research conducted at Narada School reveales a fact that Normative Commitment of teachers is high enough to affect Turnover Intention at Narada School.

Narada School Management and Foundation need to pay attention and improve Normative Commitment, especially on the dimension of High Sacrifice. If management or foundation can maintain good relations, then Turnover Intention will decrease and will certainly reduce Turnover - if not, employees will leave Narada School because they have plenty of opportunity to join with other schools or organizations.

The Effect of Normative Commitment toward Turnover Intention. Normative Commitment has positive and significant effect on Turnover Intention. This means that at Narada School, high Normative Commitment also simultaneously results in high Turnover Intention. This is in contrast with previous studies conducted by Sow *et al.* (2016). The study confirmed that the relationship between Normative Commitment with Turnover Intention was negative and significant.

Normative Commitment in general results in negative correlation, but that does not mean no one has found a positive result. Yasmin and Marzuki (2015) find positive study results as their study found that Affective Commitment and Normative Commitment provided a considerable impact on Turnover Intention in Pakistan. This happens because of internal and external factors that exist in the country, as nurses in Pakistan leave their work because there is somewhere else more promising.

This is in line with research conducted by Faloye (2014) which generated positive results of Normative Commitment on Turnover Intention in Nigeria. In the study, it was also said that in spite of the commitment of employees, they were likely to leave the organization for better career.

The results in the present study confirm that teachers at Narada School have high Normative Commitment, yet this cannot reduce Turnover Intention - it is even linear. High Turnover Intention can be seen from the age of Narada School teachers that are relatively young (52%). This may imply either presence or the absence of Normative Commitment does not guarantee teachers to stay. They tend to try new and better opportunities because their opportunities are wide open in outside Narada School.

Normative Commitment on the dimension of Morality Commitment gives dominant influence toward Unavoidable Turnover Intention at Narada School. This means that when teachers have higher moral value, their desire to leave is also higher, and eventually they leave Narada School. Normative Commitment should not be ignored because it will affect Turnover at Narada School.

In general, employees who have Normative Commitment are those who have the least possibility to leave the company (school). The different results in this study in which high Normative Commitment is also followed by high Turnover Intention at Narada School. Management and foundations should be aware of this, when most employees are young age, the turnover will be high, and therefore there should be changes to the system.

The Effect of Affective, Continuance, and Normative Commitment toward Turnover Intention. The results of the study show that Affective Commitment, Continuance Commitment, and Normative Commitment have a simultaneous significant effect toward Turnover Intention. This is evidenced from the value of F_{count} > 26.599 F_{table} that is greater than 2.85 and the significant value gained is 0.000 less than 0.05.

This finding is consistent with results of previous studies conducted by Mardiana *et al.* (2012) in which the study concluded that the increased Affective Commitment, Continuance Commitment, and Normative Commitment would make Turnover Intention to decline and the vice versa.

Research conducted at Narada School shows that the two variables studied have a negative correlation, one variable is positive and significant. This means that Narada School management must understand that there is a problem on commitment, be it Affective Commitment, Continuance Commitment, and Normative Commitment or all of them simultaneously toward Turnover Intention. In accordance with the results of the R-square calculation, the influence of Commitment on Turnover Intention is 45.4%.

Culpepper (2011) mentions Turnover Intention is the best predictor for detecting behavior of turnover. This study proves that 45.4% of turnover issue that occurs at Narada School has been caused by commitment. The other problems beyond commitment that affect Turnover Intention is even more, as much as 54.6%. However, commitment is the most fundamental problem in the organization - if this is solved, then so is the rest 54.6%.

Low R square value does not mean bad research results (Gujarati *et al.* in Zega, 2013). Therefore, further research needs to be done to support the results of this study and to find other variables that may affect Turnover Intention at Narada School. The previous study supporting the results of present study is Zega (2013) to the employees of PT. Bahana Achievement. Zega examines the influence of organizational culture, job satisfaction, and organizational commitment toward Turnover Intention resulting in a value of R-square of 24.3%.

The other study has been conducted by Pratiwi (2013) which examines the relationship of personality types on Turnover Intention in loan sales employee at PT. Bank Mandiri (Persero), Tbk. Bandung. From the study, R-square value on the influence of personality types toward Turnover Intention is only 8.37% and the remaining 91.63% is influenced by other personality factors not studied.

Foundation and Narada School management needs to set the strategy to improve or grow the commitment of all employees at Narada School. Commitment is the most fundamental perspective within each organization. The organization will work properly if all of its members are committed to achieving the vision and mission determined by the organization.

This section presents the results of research and discussion. The results of the research are the findings from the research conducted, including the results of statistical

tests for quantitative research using hypothesis. Discussion covers findings of research associated with the theory that has been described in literature review as well as the differences or similarities with previous studies. The implications of both theoretical and practical should be presented here.

CONCLUSION

Based on the results of the current research, the following conclusions can be drawn:

Affective Commitment has a significant influence on Turnover Intention. Negative results in this study show an inverse relationship between the independent and the dependent variables. This means, the higher the Affective Commitment of Narada School teachers then it could trigger to lower Turnover Intention, and the vice versa. Dimension with dominant influence in the variable is Identification. Improved Identification will further reduce Turnover Intention.

Continuance Commitment has a significant influence on Turnover Intention. Negative results in this study show an inverse relationship between the independent and the dependent variables. This means, the higher the Continuance Commitment of Narada School teachers then it could trigger to increase Turnover Intention, and the vice versa. Dimension with dominant influence in the variable is High Sacrifice. More attention to High Sacrifice dimension will further reduce Turnover Intention.

Normative Commitment has a significant influence on Turnover Intention. Positive results in this study show a direct relationship between the independent and the dependent variables. Normative Commitment of teachers is in line with the high Turnover Intention at Narada School. In some previous research, Normative Commitment is not so dominant in influencing Turnover Intention, yet different result is found at Narada School. Normative Commitment is proportional to the increase in Turnover Intention.

The three independent variables of Affective, Continuance, and Normative Commitment have a significant effect on Turnover Intention at Narada School. Negative results in this study show an inverse relationship between the independent and the dependent variables. This means that these three variables simultaneously can also trigger the employee intention to leave the school (Turnover Intention).

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ОСОБЕННОСТИ РАЗВИТИЯ ВИРТУАЛЬНЫХ ОФИСОВ В ПРЕДПРИНИМАТЕЛЬСКОМ СЕКТОРЕ ЭКОНОМИКИ РОССИИ

FEATURES FOR THE DEVELOPMENT OF VIRTUAL OFFICES IN ENTERPRISE SECTOR OF THE RUSSIAN ECONOMY

Власова М.А.*, доктор экономических наук
Vlasova M.A., Doctor of Economic Sciences
Власов Ю.И., аспирант
Vlasov Y.I., Post-graduate student
Орловский государственный университет имени И.С. Тургенева, Орел, Россия
Orel State University named after I.S. Turgenev, Orel City, Russia

*E-mail: docent-ostu@yandex.ru

АННОТАЦИЯ
В данной статье раскрывается понятие виртуального офиса, его основные преимущества и недостатки, характеризуются особенности развития подобного рода бизнеса в предпринимательском секторе экономики, а также предлагается стратегия развития виртуального офиса с учетом специфики российской действительности. Конкурентная бизнес-среда, имеющая место в современной российской действительности, подталкивает все больше и больше фирм в сфере предпринимательства к созданию офисов, отражающих деловой имидж компании и профессионализм ее сотрудников, а также обеспечению полного спектра технологических решений в установленных деловых сферах. Сочетание данных предпосылок неизбежно повлечет за собой крупные накладные расходы и немалый начальный стартовый взнос для оснащения офиса и удовлетворения технологических нужд.

ABSTRACT
This article reveals the concept of a virtual office, its main advantages and disadvantages, is characterized by the concept of the development strategy of this kind of business in the entrepreneurial sector of the economy, and proposes a development strategy of a virtual office, taking into account the specifics of Russian reality. The competitive business environment, which takes place in the modern Russian reality, is pushing more and more companies in the field of entrepreneurship to create offices, reflecting the company's business image and professionalism of its employees, as well as providing a full range of technological solutions in the established business areas. The combination of these prerequisites will inevitably lead to a large overhead and considerable initial entry fee for the office and meet the technological needs.

КЛЮЧЕВЫЕ СЛОВА
Виртуальный офис, малый бизнес, предпринимательство, автоматизация офиса.

KEY WORDS
Virtual office, small business, entrepreneurship, automation of office.

В мировой теории и практике управления определение «виртуальный» стало ключевым. Все чаще говорят о виртуальных продажах, банковских операциях, фондах, фабриках и организациях. В принципе виртуальная инфраструктура обладает теми же возможностями и потенциалом, что и традиционная организация. Но в то же время виртуальная инфраструктура является принципиально новой концепцией организационной структуры для интеграции деятельности конца 20 начала 21 века [1].

Виртуальный офис представляет собой инновационную форму организации труда компании или индивидуального предпринимателя, востребованная в тех сферах деятельности, которые не требуют от сотрудников непременного постоянного нахождения в одном отдельно взятом реальном офисе [2].

Виртуальный офис позволяет недорого и быстро связываться с клиентами компании в местах их проживания, вне зависимости от того, где расположена штаб-квартира компании. Это благотворно сказывается на ее репутации, тем более, если адреса и номера указывают на расположение офисного помещения в центре города. При этом реальный офис может находиться в гораздо более дешёвом районе, либо вовсе в другой стране.

Успех каждого бизнеса зависит от хорошей координации бизнес-процессов, системы мониторинга работы и общения сотрудников. Такой офис будет обеспечивать все вышеперечисленное, охватывать полный спектр услуг в отношении поддержания связи внутри организации и за ее пределами. Виртуальные офисы обычно используют телефонные услуги VoIP (Voice over IP – система связи, обеспечивающая передачу речевого сигнала по сети Интернет или по другим IP- сетям) вместо традиционной телефонной связи, чтобы избежать платных международных вызовов пропущенных звонков и потерянных контактов, а также сбоев в работе при переходе от одного географического расположения в другое.

Основными преимуществами такой организации ведения бизнеса являются:

- улучшение организации работы персонала;
- возможность подключения любой полезной службы;
- неограниченное количество учетных записей;
- номера для бесплатного общения внутри офиса;
- приемлемые затраты на монтаж;
- создание виртуального офиса в любом месте по желанию предпринимателя;
- управление своим бизнесом и возможность проверить его эффективность с любого компьютера 24/7/365;
- в режиме реального времени доступ к клиентам и информации;
- дешёвые услуги секретаря;
- улучшение репутации компании.

Однако виртуальный офис имеет и свои недостатки. К ним можно отнести то, что зачастую на один и тот же адрес регистрируется несколько компаний, ненадёжные услуги провайдеров в силу недостатка правового регулирования, а также развитие мошенничества в данной сфере [3].

Большинство обязанностей в виртуальном офисе исполняет виртуальный секретарь – это ответственный сотрудник, который действует строго в соответствии с указаниями директора, и согласует с ним по телефону важные моменты, связанные с организационной деятельностью.

Таким образом, руководитель компании может находиться в любой стране и получать исчерпывающие сведения обо всех событиях, представляющих для него важность. Кроме того, во время отсутствия руководителя могут возникнуть нестандартные ситуации, которые требуют немедленного разрешения. Так, например, необходимо быстро отреагировать на срочный запрос налоговой службы или отправить коммерческие предложения по нужным адресам.

Всю текущую работу, которую зачастую выполняет коллектив сотрудников в обычном учреждении, поддерживает виртуальный офис, причем с минимальными затратами и большей эффективностью. Воспользовавшись этой услугой, предприниматель получает доступ к использованию удобных и недорогих сервисов [4].

На сегодняшний день главным отличием российских виртуальных офисов от европейских является предоставление стандартного набора услуг. В отличие от западных, где упор делается на индивидуальный подход к каждому клиенту, на основе которого вырабатывается оптимальный порядок работы виртуального офиса. Например, в Лондоне функционируют бизнес-центры, специфика которых заключается

исключительно в предоставлении услуг виртуальных офисов. В свою очередь, реальные офисы в таких бизнес-центрах не располагаются.

Кроме того, при оказании услуг виртуального офиса западные организации используют комплекс специальных компьютерных программ, которые позволяют произвести оптимизацию технических процессов и повысить качественные характеристики виртуального обслуживания бизнеса. В России данные программы практически не представлены.

В настоящее время существует несколько вариантов виртуального офиса:

1) секретарская служба, которая осуществляет перевод звонков на нужного сотрудника, принятие факсового или электронного предложения, принятие и передача информации, отсечение лишних звонков;

2) служба приема заказов, которая предоставляет информацию о товаре или услуге, ориентирует клиента по стоимости, принимает заказ, переправляет его ответственному сотруднику и контролирует его исполнение, при необходимости;

3) служба технической поддержки – это служба, которая в случае неполадок в предоставлении услуг компании заказчика фиксирует данную ситуацию, отправляет ответственному штатному сотруднику для принятия мер, либо ситуацию разрешает оператор в соответствии с утвержденным алгоритмом действий;

4) служба по работе с клиентами – это служба на уровне менеджеров пассивных продаж, которая работает по утвержденному с заказчиком алгоритму в соответствии со спецификой продукта заказчика;

5) служба приема заказов по каталогам отвечает на интересующие клиента вопросы, подтверждает наличие на складе товаров, уточняет сроки доставки, принимает заказ и передает его в центральный офис [5].

В зависимости от того, какой тип виртуального офиса выбирает компания, ей необходимо разрабатывать определенную стратегию развития офиса с учетом всей специфики деятельности.

По своей сути стратегия представляет собой комплекс приоритетных задач развития предприятия и перспективных программ действий, в рамках которого планируется достижение конкретной цели. Выработка стратегии позволит компании укрепить свои позиции на рынке, снизить стоимость предоставляемых услуг, а также расширить имеющуюся долю рынка.

В связи с этим необходимо постоянное совершенствование виртуального офиса компании, позволяющее снизить издержки на аренду помещения, оплату труда сотрудникам (за счет небольшого штата), привлечь новых клиентов.

В процессе формирования стратегии развития виртуального офиса необходимо тщательно подойти к вопросу созданию так называемой сети взаимосвязанных отношений. Эти отношения требуют от компании гораздо большей зависимости контактирующих сторон друг от друга, чем при использовании традиционной формы организации и ведения бизнеса, так как они предполагают беспрецедентный уровень доверия. Эти новые отношения между фирмами обязывает организации использовать инновационные практики управления.

Виртуальные команды являются частью структуры виртуальной организации. На практике под виртуальной командой понимают группу людей, которые взаимодействуют посредством взаимозависимых задач, руководствуясь общей целью. Однако, в отличие от обычных команд, виртуальная команда выполняет работу через пространство, время и организационные границы, осуществляя связь посредством интерактивных коммуникационных технологий. В виртуальные команды могут входить работники, руководство, заказчики и поставщики, осуществляющие совместную деятельность для достижения общих целей. Довольно часто эти команды связаны в единой рабочей группе только для выполнения эпизодических задач. Они могут работать совместно над новым проектом, но когда продукт разработан и запущен в производство, проект завершается, а виртуальная команда распускается.

Зарубежный опыт функционирования виртуальных офисов, который может быть применен к российской действительности, предполагает обязательное соответствие

трем основным критериям для формирования успешной виртуальной команды. Одним из них является выбор членов команды с необходимыми навыками и знаниями для решения поставленных задач; второй – четкая постановка цели, что позволит эффективно управлять группой; и третий – обеспечение эффективных каналов связи, взаимодействий и отношений между членами команды.

Важно то, что члены виртуальной команды обязаны освоить новый набор навыков. В их число входит:

- умение эффективно взаимодействовать друг с другом, несмотря на редкое или полное отсутствие очного контакта;
- способность быстро и эффективно адаптироваться в новой команде;
- умение эффективно справляться с разнообразием требуемых компьютерных технологий;
- межкультурные навыки, чтобы эффективно работать в многонациональной организации.

Для развития любого виртуального офиса, применительно к российской действительности, необходимо совершенствование программного обеспечения с целью более быстрого и эффективного осуществления основной деятельности компании, а также более качественного взаимодействия с клиентами.

Внедрение и развитие виртуального офиса в компании позволяет:

- способствовать децентрализации деловых операций и приблизить исполнителей к клиентам;
- сокращать штат предприятия и уменьшать стоимость недвижимости;
- выполнять сотрудникам свои обязанности в любое время суток.

В последнее время большое значения приобретает модель виртуального офиса, получившая название «малый офис» или «домашний офис». Тенденция развития этой модели виртуального офиса стимулируется различными факторами, а именно: факторы демографического характера, отражающимися на структуре трудовых ресурсов, появление новых технологий. В результате быстро расширяется категория сотрудников, которые работают на дому.

Кроме того, децентрализация, возникающая с внедрением виртуального офиса, позволяет уменьшить накладные расходы и потенциально обеспечивает более высокую производительность, особенно в больших городах, где непродуктивное время на перемещение от дома до рабочего места и обратно достигает до двух часов в день.

В связи с этим данную модель виртуального офиса можно использовать с целью его развития и совершенствования деятельности. Кроме того, для ускорения деятельности в виртуальном офисе можно произвести его полную автоматизацию, типовая система которой офиса включает в себя до 16 рабочих мест сотрудников фирмы и простейшую систему обеспечения безопасности.

Система строится на базе цифро-аналоговой офисной АТС и вычислительной сети Ethernet. Рабочие места объединяются в рабочую группу в составе одноранговой сети (без использования выделенного сервера).

Данная структура позволяет максимально упростить администрирование и функционирование группы в случае отсутствия в штате системного программиста. Информационная безопасность обеспечивается на уровне стандартных средств операционных систем. Внешняя связь организуется на базе стандартных телефонных каналов общего пользования.

Как правило применяется одиночная видеокамера наружного наблюдения, совмещенная с домофоном и устройством дистанционной блокировки входных дверей. Имеется возможность автоматического распознавания факсимильных сигналов, что позволяет сэкономить одну внешнюю (соединительную) линию АТС. Инсталляция приложений и разработка баз данных производится под конкретные пожелания клиента [5].

На рисунке 1 представлена данная типовая структура системы автоматизации малого офиса.

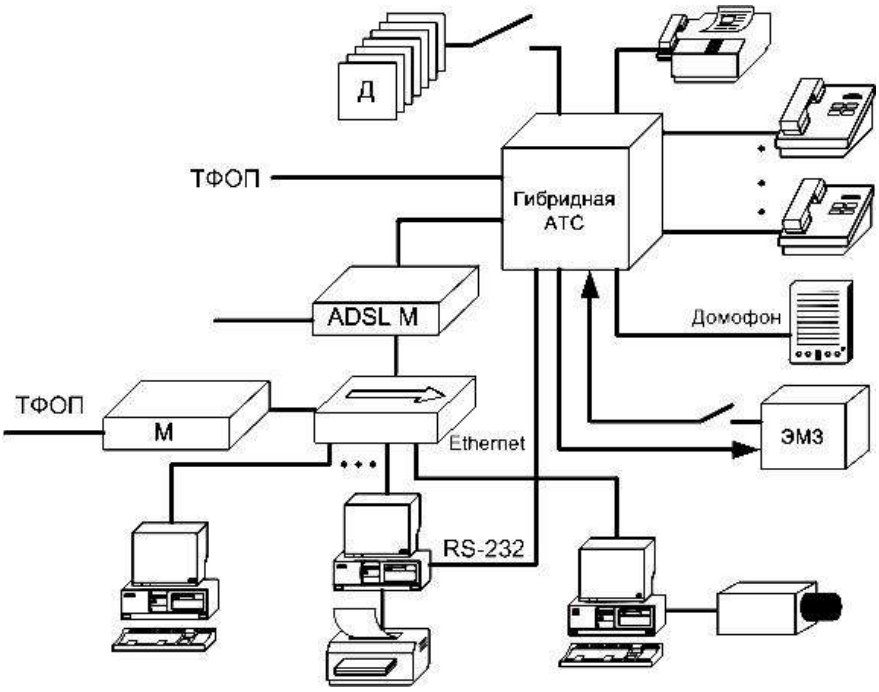

Рисунок 1 - Типовая структура системы автоматизации малого офиса

Данная модель позволяет не только снизить расходы на оплату труда сотрудникам, но и увеличить производительность труда за счет практически полной автоматизации рабочего процесса.

На основе вышеизложенного можно сделать вывод, что виртуальный офис, являясь инновационной формой организации труда в предпринимательском секторе экономики России, позволяет компании снизить свои расходы на оплату труда, аренду помещения. Однако, как форма бизнеса, он нуждается в постоянном совершенствовании. Для этого требуется периодическое обновление программного обеспечения, при необходимости преобразование виртуального офиса в малый офис с учетом его автоматизации, которая позволит увеличить производительность труда работников.

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К ВОПРОСУ ФОРМИРОВАНИЯ СОБСТВЕННОГО КАПИТАЛА ДЛЯ РАЗВИТИЯ ПРЕДПРИНИМАТЕЛЬСКОЙ ДЕЯТЕЛЬНОСТИ

TO THE QUESTION OF EQUITY CAPITAL FORMATION FOR BUSINESS DEVELOPMENT

Графов А.В.*, **Графова Г.Ф.**, **Аврашков Л.Я.**, доктора экономических наук
Grafov A.V., Grafova G.F., Avrashkov L.Y., Doctors of Economic Sciences
Российская академия народного хозяйства и государственной службы при Президенте России, Москва, Россия
Russian Academy of National Economy and Public Administration under the President of Russia, Moscow, Russia

*E-mail: grafav@mail.ru

АННОТАЦИЯ
В рыночной экономике финансовая стабильность предприятия является одним из важнейших факторов жизнедеятельности предприятия и развития предпринимательской деятельности. Положительное финансовое состояние определяет конкурентоспособность фирмы на рынке. Поэтому цель любого предприятия – сохранять стабильное, устойчивое финансовое состояние и достижение прибыли. Наиболее важным для развития предприятия является формирование и наращивание собственного капитала.

ABSTRACT
In market economy the financial stability is one of the most important factors of activity of the entity and development of business. The positive financial condition determines competitiveness of firm in the market. Therefore the purpose of any entity – to keep a stable, steady financial condition and achievement arrived. The most important for development of the entity is forming and building-up of equity.

КЛЮЧЕВЫЕ СЛОВА
Прибыль, собственный капитал, активы, амортизация.

KEY WORDS
Profit, equity, assets, depreciation.

На сегодняшний день достаточно большое количество предприятий находятся в сложном финансовом положении, в силу того, что внимание органов государственной власти в ходе экономических реформ было сосредоточено в большей мере на проведении рыночной макроэкономической политики. Однако, в современных экономических условиях сложилась такая тенденция, что каждый экономический субъект является частью рыночных отношений, которые заинтересованны в бесперебойной работе данного субъекта. Поэтому каждое предприятие должно следить и правильно организовывать свою предпринимательскую деятельность. В связи с этим необходимо контролировать ведение финансово-хозяйственной деятельности.

При проведении анализа финансово-хозяйственной деятельности нет системного подхода и глубины исследования. Данный анализ необходимо осуществлять с пониманием объекта, который исследуется специалистом. Исследуемый объект (предприятие, организация) должна рассматриваться как некая сложная система, которая имеет свою сложную структуру и элементы, а не просто проведены расчеты базовых показателей, которые будут не взаимосвязаны между собой. Только тогда можно говорить о полном анализе финансово-хозяйственной деятельности, который повысит экономическую безопасность предприятия.

Из системного подхода вытекает еще одна проблема, которая связана с плановостью. Многие руководители предприятия не считают важным планировать свою деятельность. Однако план является основой экономической безопасности предприятия. Любая финансово-хозяйственная деятельность должна проводится систематически и иметь четкий план действия. Планируя финансово-хозяйственную деятельность предприятия, организация предупреждает неблагоприятный исход нежелательных ситуаций (форс мажоров).

Часто специалисты сталкиваются с распространенной проблемой, как недостаточностью информации. Это может быть связано с неквалифицированными специалистами, которые сталкиваются с незнанием теоретического материала, в связи с чем не понимают важность процесса ведения финансово - хозяйственной деятельности. Так же недостаточность информации может быть обусловлена неполнотой или не точностью заполнения бухгалтерской (финансовой) отчетности.

Если первая проблема не квалифицированных специалистов решается просто, то неправильность бухгалтерской (финансовой) отчетности является важной и трудно решаемой задачей. Часто фирмы занижают показания прибыли и увеличивают свои расходы, чтобы избежать уплаты высоких налогов. Существует обратная сторона, когда предприятие завышает показатели, чтобы показать сверхприбыль, высокую рентабельность или ликвидность. В связи с этим, часто при анализе финансово-хозяйственной деятельности выявляется несопоставимость некоторых показателей.

Экономической целью предпринимательской деятельности является получение прибыли, предприятие является центром привлечения и аккумуляции капитала, обеспечивая его прирост.

Формирование прибыли представляет собой процесс, который является по сути производственно-хозяйственной деятельностью предприятия, основанной на использовании различных факторов производства, к которым относят основные фонды, оборотные фонды, трудовые ресурсы.

В процессе ведения хозяйственной деятельности возникают ситуации, когда предприятие не получает прибыли, используя оборотные активы безрезультатно, или даже производит убытки. Но для стабильно функционирующего предприятия такие ситуации носят временный, эпизодический характер, которые не меняют главного предназначения предприятия – формирование массы прибыли.

Производя прибыль, предприятие наращивает капитал, повышает уровень капитализации, рационально размещает финансы, что дает теоретическую возможность исполнить свои финансовые обязательства. Но зачастую могут возникать варианты, когда финансовые средства нельзя быстро или без экономических потерь привлечь для обеспечения расчетов обязательствам, например, когда финансы размещены нерационально.

Следовательно, проблема неисполнения финансовых обязательств в значительной мере связана с размещением и использованием ресурсов (капитала). Рассмотрим основные этапы происхождения и размещения капитала:

1. Первым условием образования и функционирования предприятия является наличие первоначального собственного капитала.

2. При недостаточной величине собственного капитала предприятие берет на себя определенные обязательства в виде банковских кредитов, займов третьих лиц, кредиторской задолженности. Общая сумма всех взятых обязательств образует заемные средства, находящиеся в распоряжении предприятия.

3. Собственный средства (капитал) и заемные средства (обязательства) представляют собой совокупный капитал или пассивы (по бухгалтерской терминологии). Если средства были переданы предприятию на безвозмездной основе, то они относятся на собственный капитал предприятия получило.

За счет собственного капитала приобретается имущества предприятия или, если обратиться к бухгалтерской терминологии, формируются актив баланса.

Актив формируют внеоборотные и оборотные активы.

Внеоборотные активы состоят из основных средств, нематериальных активов, финансовых вложений сроком свыше одного года, прочих внеоборотных активов.

К оборотным активам относятся:

– запасы – сырье и материалы, незавершенное производство, готовая продукция на складе (которая еще не реализована и, следовательно, не принесла прибыли) и др.;

– средства в расчетах – продукция и услуги, которые отгружены или оказаны, но расчет по которым еще не произведен, т.е. средства, которые предприятие предоставило в долг другим организациям, своим дебиторам. Сюда также относятся выданные авансы, ссуды работникам предприятия, краткосрочные финансовые вложения, средства в банке на расчетном и валютном счетах и в кассе предприятия.

Размещение капитала, т.е. состояние финансов предприятия фиксируется на определенную дату. Такая одновременное отражение активов и пассивов представляет собой бухгалтерский баланс предприятия на определенную дату, при этом сумма активов всегда равна сумме пассивов.

Величина собственного оборотного капитала формируется разностью между суммой собственного капитала предприятия и стоимостью внеоборотных активов.

Зачастую наблюдается ситуация, как отсутствие у предприятия собственного оборотного капитала, что свидетельствует о том, что оборотные средства предприятия полностью формируются за счет заемных источников. Очевидно, что набольшую устойчивость с позиций платежеспособности будет иметь предприятие, у которого доля собственного оборотного капитала в общей сумме оборотных средств высока.

В процессе производственного цикла капитал находится в движении.

При этом:

– происходит износ и обновление основных производственных фондов (обновление основных средств относится к разряду долгосрочных финансовых вложений);

– формирование прибыли осуществляется за счет оборотных средств в той их части, которая находится в производстве;

– средства в расчетах – это та часть оборотных средств, которая систематически отвлекается на текущее обслуживание производства или на осуществление иных финансовых вложений;

– цикл от вложений капитала в производство в виде запасов до реализации продукции формирует оборот предприятия.

В результате оборота у предприятия образуется выручка, которая включает следующие компоненты:

– компенсация произведенных затрат на производство, также включается и погашение обязательств;

– учтенные при формировании цены косвенные налоги и обязательные платежи в бюджет и внебюджетные фонды;

– норма прибыли.

Следовательно, прибыль формируется разностью выручки от продаж (реализации) продукции (работ, услуг), прочих доходов от операционной и внереализационной прибыли и всеми видами затрат и убытков. Это прибыль до налогообложения, из которой в дальнейшем осуществляется уплата налога на прибыль и других обязательных платежей.

Остаток прибыли после вычета налога на прибыль составляет свободную для экономического маневра чистую прибыль предприятия.

Чистая прибыль представляет собой основную потенциальную возможность увеличения собственного капитала (прибыль на накопление).

В современных экономических реалиях эта возможность реализуется лишь частично, так как за счет прибыли осуществляются безвозвратные расходы – выплата дивидендов, формирование фондов материального поощрения, фонды социального назначения и т.д. (направление прибыли на потребление). Нераспределенная прибыль формируется как разница между чистой прибылью и безвозвратными расходами.

Соответственно увеличение (прирост) собственного капитала предприятия возможно о осуществить счет той части чистой прибыли, которая расходуется на накопление (нераспределенная прибыль), т.е. пополняет основные и оборотные средства.

Такая позиция формирования собственного капитала и его увеличения находит место в бухгалтерском учете, также в специальной экономической литературе. Однако, при изучении различных подходов к определению конечного результата финансово-хозяйственной деятельности предприятия, по мнению авторов, подобная трактовка вызывает серьезные возражения.

Если к конечному финансовому результату отнести только показатель чистой прибыли, то общепризнанная теория формирования собственного капитала в бухгалтерском учете находит свое подтверждение.

Однако в реальной финансово-хозяйственной деятельности предприятия в качестве итогового конечного финансового результата выступает не «чистая прибыль», а показатель – «чистый доход».

Принципиальные отличия в формировании этих показателей проявляются в нижеследующем. Основным источником информации о результатах финансово-хозяйственной деятельности предприятия является Отчет о финансовых результатах (форма № 2), входящий в состав бухгалтерской отчетности и утвержденный Приказом Минфина России от 02.07.2010г. № 66н (ред. от 06.04.2015г.) «О формах бухгалтерской отчетности организаций».

Конечный финансовый результат – чистая прибыль – формируется как итог четырех разделов Отчета о финансовых результатах, представляющих различные источники (виды деятельности) образования прибыли:

$$П_ч = (П_р + П_о + П_{вд} - Н_п) + П_{чо} \qquad (1),$$

где: $П_ч$ – чистая прибыль; $П_р$ – прибыль от реализации товаров, продукции, работ, услуг; $П_о$ – прибыль от операционной деятельности; $П_{вд}$ – прибыль от внереализационной деятельности; $Н_п$ – налог на прибыль и иные аналогичные обязательные платежи; $П_{чо}$ – прибыль по чрезвычайным обстоятельствам.

Как правило, получение прибыли от чрезвычайных обстоятельств это нетипичная ситуация для российских предприятий, поэтому обычно величина чистой прибыли формируется прибылью от основной и иных видов деятельности и определяется как разность между суммой всех видов прибыли и налогом на прибыль и отчислениями в качестве обязательных платежей. В свою очередь, каждый из вышеобозначенных видов прибыли определяется как разность соответствующих видов доходов (Д) и расходов (Р).

Следовательно, основным источником формирования прибыли является деятельность по производству и реализации продукции, работ, услуг, которая рассчитывается следующим образом:

$$П_р = В - С \qquad (2)$$

где: В – выручка (нетто) от реализации товаров, продукции, работ, услуг (за вычетом НДС, акцизов и т. п.); С – себестоимость реализованных товаров, продукции, работ, услуг, с учетом коммерческих и управленческих расходов.

При этом возникают сомнения в объективности оценки полученных результатов финансово-хозяйственной деятельности предприятия.

По мнению авторов, при оценке эффективности производственно-хозяйственной деятельности предприятия следует ориентироваться на сальдо денежного потока (потока реальных денег) за отчетный или плановый период.

В зарубежной практике при анализе финансово-хозяйственной деятельности показатель «чистый доход» является одним из главных критериев для принятия решения о финансировании инвестиционного проекта. В российской практике данный

критерий применяется при расчетах согласно «Методических рекомендаций по оценке эффективности инвестиционных проектов», утвержденных Минэкономики РФ, Минфином РФ, Госстроем РФ 21.06.1999г. № ВК 477.

Чистый доход или сальдо потока реальных денег согласно вышеуказанным методическим рекомендациям определяется как разность между притоком, равным размеру денежных поступлений (результатов в стоимостном выражении), и оттоком, т. е. платежами отчетного периода.

Размер денежных поступлений (приток) главным образом формируется выручкой (нетто) от реализации продукции, товаров, работ, услуг (без НДС и акцизов).

Как правило, приток от иных видов деятельности незначителен.

В структуре расходов наиболее значимы материальные затраты, к которым относятся:

– расходы на оплату приобретенных и использованных в производственном цикле материальных ресурсов различных видов;

– расходы, связанные с содержанием персонала (заработная плата и отчисления во внебюджетные фонды);

– уплата налогов, процентов по кредитам и займам и др.

Кроме того, в состав платежей отчетного периода (оттока денежных средств) входят расходы по внереализационной деятельности и чрезвычайные расходы.

Можно выявить отличие показателя «чистый доход» (сальдо потока реальных денег) от показателя «чистая прибыль», которое заключается в различных подходах к формированию прибыли от реализации продукции, которые находят отражение в отчете о финансовых результатах. Рассмотрим эту ситуацию более подробно.

Прибыль от реализации продукции определяется по формуле:

$$П_р = В – МЗ – ЗП – А \qquad (3)$$

где: МЗ – сумма всех материальных затрат за вычетом возвратных отходов; ЗП – величина заработной платы с учетом отчислений во внебюджетные фонды; А – сумма амортизационных отчислений.

Сальдо денежного потока от реализации продукции может быть рассчитано по формуле:

$$СДП_р = В – (МЗ + ЗП) = П_р + А \qquad (4)$$

Принимая в расчет прибыль (убыток) от операционной и внереализацион- ной деятельности, а также при наличии прибыли (убытка) по чрезвычайным обстоятельствам, можно сформулировать параметры расчета сальдо денежного потока от производственного-хозяйственной деятельности в целом (чистый доход):

$$ЧД = П_ч + А \qquad (5)$$

Таким образом, к наиболее объективным критерием оценки финансового результата хозяйствующего субъекта следует отнести чистый доход, который формируется суммой чистой прибыли и амортизационных отчислений.

Несмотря на то, что амортизационные отчисления являются одним из элементов экономической составляющей себестоимости продукции, они не включаются в состав денежного оттока, не являются объектом налогообложения и предприятие может использовать их в полном объеме.

Целевое назначение амортизационных отчислений – финансирование воспроизводства основных фондов, за счет чего осуществляется:

– текущий и капитальный ремонт основных производственных фондов;

– реновация основных производственных фондов;

– инновационная деятельность предприятия, направленная на приобретение новых видов нематериальных активов.

Эти направления использования амортизационных отчислений наиболее актуальны в условиях стабильно развивающейся экономики, поскольку для успешного развития промышленного предприятия и обеспечения устойчивого финансового состояния необходимо своевременно модернизировать основные производственные фонды.

В нынешних кризисных условиях многие предприятия убыточны или низкорентабельны, поэтому вынуждены направлять амортизационные отчисления на другие цели, в первую очередь, на пополнение собственных оборотных средств.

Таким образом, по мнению авторов, более объективной представляется включение в формирование собственного капитала статьи «Нераспределенный чистый доход», в которую следует включить нераспределенную прибыль (фонд накопления) и амортизацию.

Принципиальное отличие данной классификации собственного капитала от традиционной это замена экономической категории «чистая прибыль» на категорию «чистый доход», что предполагает увеличение массы собственного капитала, высокий темп прироста за счет включения в собственный капитал суммы амортизационных отчислений. Также это является положительным фактор при оценке финансово-хозяйственной деятельности, поскольку снижает порог неплатежеспособности и финансовой зависимости предприятия.

При этом если нераспределенная прибыль нулевая или предприятие имеет убытки, то и в этом случае будет иметь место реальное увеличение собственного капитала в случае превышения амортизационных отчислений над суммой убытков.

Таким образом, основным источником исполнения обязательств предприятия является выручка, которая содержит:

– сумму ранее произведенных затрат;

– резерв в виде нераспределенного дохода предприятия.

Необходимо принятие управленческих решений для возможности использования выручки частично или в полном объеме на погашение обязательств предприятия. В связи с этим необходимо совершенствовать методологию и практическое применение планирования выручки от реализации, ее распределения, т.е. прогнозирование денежных потоков под строгим квалифицированным контролем финансового менеджмента предприятия, поскольку большинство предприятий в реальных экономических условиях расходую выручку нерационально, руководствуясь сиюминутными потребностями, что во многих случаях является первопричиной неплатежеспособности предприятий.

Общая стратегия прогнозирования денежных потоков должна включать следующие позиции:

1. Прогнозирование выручки от основной деятельности.

2. Мобилизация внутренних резервов и за их счет прогнозирование прироста дополнительной выручки (прирост).

3. Лимитирование текущих издержек предприятия.

4. Принятие новых обязательств на предприятие в размерах пропорционально прогнозируемой величине выручки.

4. Согласование прогнозируемого объема выручки с объемом текущих обязательств.

5. Распределение выручки, с учетом погашения обязательств, предусмотрев возможность формирования некоторых резервов.

Сформируем перечень возможных мобилизованных резервов из активов предприятия, которые могут дать существенный прирост источника расчетов по обязательствам: продажа основных фондов, которые не используются в производстве, но требуют текущих расходов на свое содержание; проведение анализа эффективности долгосрочных и краткосрочных финансовых вложений, которые имеют смысл, если один рубль таких вложений приносит больше дохода, чем один рубль, потраченный на получение чистой прибыли; анализ объемов готовой продукции на складе и их оптимизация; анализ и реализация невостребованных в производственном

цикле материальных запасов и товаров; жесткий контроль сроков дебиторской задолженности. Представляется очевидным, что неплатежеспособность прямо пропорциональна объему обязательств.

Традиционно абсолютно платежеспособным является предприятие, у которого отсутствуют обязательства и финансово-хозяйственная деятельность ведется за счет собственных средств. Но, обязательства у предприятия есть всегда, например, по налогам или платежам во внебюджетные фонды, следовательно, их отсутствие говорит об исполнении обязательств авансом, и в этом случае вопрос о том, платежеспособно ли предприятие, не возникает.

Есть и противоположная ситуация: предприятие имеет собственный капитал в размере минимально установленного законодательством уставного фонда и работает за счет заемных средств, но, вместе с тем, остается платежеспособным, т.е. многое решает выручка от продаж (объем реализации).

Таким образом, неплатежеспособность обратно пропорциональна выручке, т.е. чем меньше выручка от продаж, тем выше уровень неплатежеспособности (при наличии обязательств).

Если за анализируемый период темп роста выручки отстает от темпа роста обязательств, то у предприятия есть предпосылки к неплатежеспособности.

Следовательно, для стабильного ведения хозяйственной деятельности и экономической безопасности предприятия очень важно правильно организовывать финансово-хозяйственную деятельность организации в части формирования собственного капитала, прогнозирования и рационального использования выручки от реализации. Проблемы, возникшие при организации финансово-хозяйственной деятельности часто связаны с недостаточно развитой системой финансового менеджмента, которая не требуют больших финансовых вложений, а лишь внимательности и серьезного подхода к ведению бизнеса.

Благодаря правильному ведению финансово-хозяйственной деятельности предприятия и вовремя проведенного анализа, предприятие может предвидеть спланировать кризисные ситуации, тем самым избежать банкротства, либо потери части активов, что наиболее важно для поддержания экономической безопасности предприятия. Поэтому, необходимо уметь правильно и качественно прогнозировать и организовывать финансово-хозяйственную деятельность предприятия, ведь от вовремя проведенного качественного финансово-хозяйственного анализа зависит процветание и развитие бизнеса.

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NATURAL RESOURCES EFFECTIVE MANAGEMENT AS SPHERE OF SOCIO-ECONOMIC DEVELOPMENT AND RESEARCH AREA

Prilukov A.N.*, Candidate of Sociological Sciences, Associate Professor
Sekisov G.V., Doctor of Technical Sciences, Professor
Litvintsev V.S., Doctor of Technical Sciences, Associate Professor
Mining Institute of Russian Academy of Sciences, Khabarovsk, Russia
*E-mail: a_prilukov@mail.ru

ABSTRACT
In the article some peculiarities and crucial turning points in natural resources exploration, harnessing, and deployment are overviewed. Alongside with agricultural production, minerals mining and utilization provide humankind with vital material means of its existence. Both productive spheres develop much in parallel and are serving as akin subjects for socio-economic sciences. Progress and some outcomes of scientific and practical developments that took place within these spheres, particularly concerning mineral resources management, are traced from the first quarter of twentieth century up to our days.

KEY WORDS
Natural resources, economics of exhaustible resources, effective mineral resources management, universal and institutional mineral husbandry conceptions.

Exploration, mining, processing, marketing, and industrial application of mineral resources (MRs), along with agriculture related similar activities, represent essential parts of the World and many national economies. In the article they are viewed as congeneric and interconnected economic spheres, based on natural resources industrial acquirement and productive utilization, generally called *natural resources management (NRM)* [1].

Specifically, modern development direction of the World's industrial mining sector is overviewed, which consists in the sector's economic, technological, commercial, and informational processes management upgrading, thus enhancing the sector's overall functioning. Emergence and onward movement of this theoretic and applied direction, methodologically based on above mentioned processes combined and systematized handling, are traced from the time of Great Depression, which engulfed many countries and severely hampered both industrial and agricultural production. At that time the so called *Economics of Exhaustible Resources* research movement popped-up, aimed at counteracting and mitigating the economic crisis burdens and chores. Several decades later the notion of *Mineral Resources Management (MRM)* has emerged. In the article it is dealt with as multi-component complex of closely interconnected processes, engaged in geologic exploration, mining, processing, marketing, and eventual industrial application of mineral raw as well as profoundly processed materials.

These MRM characteristics are illustrated by examples of widely spread activities, aimed at designing and implementing of high-tech *Effective Mineral Resources Management (EMRM)* systems that are being created to fulfill the tasks of diverse information gathering, its processing, formalized and essential analyses conducting, predictions formulating, administrative decisions adopting, automated control and management performing with respect to technologic and other processes and risks. Particular scholars' and countries' roles are briefly overviewed with respect to EMRM ideas development and appropriate scientific-and-applied conception varieties creation.

Particular attention is devoted to Poland and Russia. Poland's role is illustrated mostly by its popular *Gospodarka Surowcami Mineralnymi* journal's enduring publication, while Russia's achievements are specified by two Mineral Husbandry Conceptions – the Universal and Institutional ones, – which were at appropriate moment put forward, are persistently being developed, and in due time undergo upgrading.

Historic benchmarks. Industrial and commercial activities, involved in geologic exploration, mining, and large scale utilization of MRs, as well as research efforts, engulfing nowadays most MR-endowed countries and directed toward efficiency enhancement of interconnected processes, which in their complex entirety comprise these activities, are now most often referred to as Mineral Resources Management (MRM). According to our approximate estimations, in English speaking countries this term appeared in the XX century's third quarter. In any case, as early as in 1976 the state of MRM activity in developing countries has been discussed at the Sidney geologic symposium [2].

One of the precursors of notions, symbolized by the term MRM, is reasonably assumed to be the scientific direction labeled as *Economics of Exhaustible Resources*. It is worth to note that exhaustible happen to be not only minerals but also major agrarian resources, such as arable land, water sources, fertilizers etc. Widely esteemed forefather of this research direction considered to have been US economist, and also specialist in mathematical statistics and functional analysis Harold Hotelling, which published article of the same title [3] that has not yet lost its former popularity. In this research direction Robert Solow, Joseph Stiglitz, Robert Pindyck, Jon Conrad, Thomas Teisberg, and other well-known authors took part.

Research in this direction now goes on, engulfing in its rows new adherents. According to tradition its successors concentrate their attention on problems of raising the economic effectiveness and commercial output that characterize operations connected with acquiring and marketing of nonrenewable resources, including MRs. However, the participants of the prolonged research, anxious with its low analytical and prognostic effectiveness, lastly are frequently casting their glances also at political-and-economic, social, and ecologic aspects of minerals mining and utilization, at the same time preserving intact traditional adherence to mathematical-statistical and functional analyses.

Approximately in 3rd quarter of previous century in the world industrial-economic and entrepreneurial communities awareness sprung up of the fact that besides nonrenewability the MRs also possess some other characteristics, making them unique kind of industrial, commercial, and consumer assets. Firstly, MRs mining is conducive to penetration into all Earth spheres, accessible according to modern level of technical development, and on all continents except Antarctica, where such activities are now forbidden by existing international agreements. Secondly, MRs mining, processing, and industrial consumption up to now reached such enormous and continuing to grow up amounts that they are hardly can be equally challenged by any other human activity. Thirdly, concerning their ecologic consequences, the MRs mining and processing are at least comparable and in many cases considerably overwhelm negative outcomes from other forms of activity. Lastly, mining, processing, marketing, and logistic operations with MRs, as in no other activity, in recent decades are becoming the realm of powerful and diversified transnational corporations, which merely by their presence dilute boundaries between countries and at the same time sharpen and widen competitive struggle for acquiring and disposing of mineral resources.

As a result of mineral resources isolation as objects that require particular approach in studying and management, new direction of research and industrial activity, known nowadays as Mineral Resources Management, has emerged. One of its benchmarking events was the start of publication in 1985 of novel Polish journal Gospodarka Surowcami Mineralnymi (Mineral Resources Management), which up to now remains the only worldwide periodic edition, named precisely by generally accepted term. Meaningful and perhaps nonrandom coincidence is seen also in publication at the same time in Moscow publishing house Nedra of joint Russian and Hungarian authors' monograph [4], in which for the first time in Russian scientific literature the term «mineralopol'zovaniye» (*Mineral Husbandry – MH*) was used, equivalent in its scope and many content aspects to English term *MRM*. Taking this into account, in subsequent text we will use unified set of terms, replacing Russian terms *Mineral Husbandry* and *Rational Mineral Husbandry* (*MH* and *RMH*) by their English closely related analogs *MRM* and recently adopted *Effective Mineral Resources Management* (*EMRM*).

Simultaneously with Russia's decision in early 1990th to reorient her further socio-

economic development toward market economic model, an idea has been formulated in FEB RAS Mining Institute of specific problem area allocation for scientific studies, denoted initially as *Rational Mineral Husbandry*. Based on this idea, subsequent creation of conceptions, theories, and ultimately wide scientific direction, which was supposed to incorporate great numbers of complex structured parts, were proposed. During short time this idea has been vigorously argued and persistently advertised. However, as a result of following substantive criticism it was appropriately revised and presently continues to develop in refurbished form. Besides, after critical reassessment of primarily unjustifiably abstract and methodically not irreproachable ideas, the initial research area was subdivided into two competing and at the same time mutually complementary directions.

Within initially fundamentally holistic *Universal* direction, aimed at all subject aspects ultimately wide coverage, MRM was proposed to be dealt with as planet-wide phenomenon that penetrates different social life spheres and is interacting with many areas of science, techniques, and human activities as a whole. In alternate moderately reductionist *Institutional* direction an option was chosen of research subject precise specification and its problematics restriction to MRM institutional and organizational structure, including its functioning and development regularities, characteristic to different social and economic environment.

Up to now neither of the two mentioned research directions succeeded in acquiring sufficient amounts of followers and at affirming themselves in statuses of theoretical and applied conceptions being acknowledged by the world scientific community. Significantly, this is explained by extremely rare publications occurrences, such as [5–7], covering ideas of research, its progress and results in popular foreign editions. Nevertheless, notions and ideas being substantiated in these research directions are ever more frequently receive practical confirmation and are embodied in modern studies, extensively carried out in theoretical, industrial, and commercial areas.

Geography of Effective Mineral Resources Management ideas dissemination. Recently EMRM ideas, which play systematizing and organizing role in diverse activities associated with MRs mining and utilization, dashingly gain popularity. According to information, circulating in Internet, during 2 to 3 recent years the number of term MRM occurrences in names and profile descriptions of industrial, research, and consulting firms, managing divisions of state and municipal organizations, territorial, national, and international projects, aimed at enhancing appropriate territories' natural and industrial potentials effective utilization, rose approximately ten-fold. This coincide with appearance of new divisions, laboratories, firms and with massive reorientation of existing ones, formerly engaged predominantly in mining enterprises informational servicing, to complex multy-aspect consulting, and also to appropriate projects designing and realization, aimed at functional effectiveness enhancing of MRM-objects, belonging to different organizational levels. Presently such companies and associations equally successfully function both in big economically developed as well as in small developing countries and regions of the World (Table 1).

Functioning of mentioned above as well as many other MRM companies and associations is rarely confined to places of their headquarters registration or localization and in total is spreading over vast majority of countries and regions where MRs are in industrial amounts mined and/or industrially utilized. Besides, in many countries, possessing industrially feasible reserves of natural MRs, there are public or private organizations and their divisions that perform various functions of mineral resources management at state, regional, and municipal levels.

Because of wide internationalization of MRM activities, geographic tracing of appropriate ideas is not a trivial task. In Africa, for example, according to [8] MRM-ideas are actively developing beginning from 1996. By the way, first steps in this direction were made, as well as in other World regions, by the companies based in Canada and some other developed Western countries.

Poland, former USSR, and Hungary, as indicated above, joined the improvised club of MRM-ideas followers in 1985. However, as opposed to Poland, in the former USSR and its legal successor Russia operations with MRs, according to tradition, originated as early as in

20-30th years of XX century, up to now are invariably, although not quite appropriately, remain associated with the underground space utilization, labeled as «nedropol'zovanie» – *subsoil husbandry (SH)*. On the federal level there is government agency «Rosnedra» (Russian Subsoil), upon which, together with its regional divisions, tasks are assigned concerning subsoil management on appropriate organizational levels. Research organizations and educational institutions are functioning, whose founding documents and educational programs envisage studying the SH problems, including among others MRs mining. Periodicals are published, specialized in SH problems tackling, including those of mining industry, viewed as particular part of subsoil usage.

Table 1 – Consulting, designing, and implementation companies and associations that elaborate and realize versions of EMRM conceptions

Company, association	Headquarters localization
BMG Consulting Pty Ltd	Australia: Melbourne
Continental Resource Management Pty Ltd	Australia: Belmont (WA)
Exxpleo Pty Ltd	South Africa: Pretoria, Gauteng
Gemecs Pty Ltd.	South Africa: Blackheath
Geoscience Ireland	Ireland: Dublin
Gismatix Inc	Canada: Ottawa
Global Minerals Engineering LLC	USA, Hibbing (Minnesota)
HCL Technologies	India: Noida
Implats (Impala Platinum Holdings Ltd.)	South Africa: Sandton, Gauteng
Kimopax Pty Ltd.	South Africa: Midrand, Gauteng
Mineral Resource Management Inc.	USA: Morgantown (West Virginia)
MineRP	South Africa: Centurion
MINROM	South Africa: Centurion & Windhoek
Minxcon Group	South Africa: Gauteng
Prysm Resources Pty Ltd	South Africa: Olifantsfontein
Randgold Resources.	Channel Islands: Jersey
SAP	Germany: Walldorf
SIMCO	Colombia: Bogota
SRK Consulting Australia	Australia: Brisbane
SRK Consulting	South Africa: Johannesburg
SRK Consulting (UK) Ltd.	UK: Cardiff
Terra-Tec (Barnstone Corporate Services)	South Africa: Pretoria, Centurion
Z Star Mineral Resource Consultants Pty Ltd	South Africa: Cape Town

Up to now the only Russian specialized periodical, according to its title devoted exactly to MRM problems, is «Mineral Resources of Russia. Economics & Management» journal, published by «Geoinform» publishing house. Paradoxically, but the terms MRM or its Russian equivalent MH appear on pages of this periodical only episodically, as for example in [9], whereas number of the term «subsoil husbandry» appearance cases is difficult to enumerate. Similar situation manifests itself in popular Russian periodicals «Mining Journal», «News of the Higher Institutions. Mining Journal», «Mining Informational and Analytical Bulletin», «Subsoil Husbandry – XXI Century» and some others, which publish articles on SH subject area much willingly than on MRM [10–13].

Key ideas of Mineral Resources Management and their incarnation in scientific conceptions and in practice. As was already mentioned, Russian term Mineral Husbandry (close analog of MRM) appeared first in [4]. Unfortunately, newly introduced term was not specified in this publication. Besides, its key notion *«rational utilization and protection of natural resources»*, kindred to EMRM, was allotted there with several different meanings. Presumably, because of that novel publication [4] for a long time remained almost unnoticed.

With regard to the Russian economy's market reforms, started in early 1990s, full-scale definitions of the terms MH and RMH were given in publications of Sekisov G.V., Prilukov A.N. and their co-authors. For example, in [12, p.18,24] the term MRU was formulated as the object that in its major manifestations behaves simultaneously *«as industrial system, specific system of adjacent scientific areas and mining sciences, economics, theoretical engineering, and other interacting sciences; hierarchical system of*

scientific-and-technical problems; complex of adjacent educational disciplines; social-and-economic system; ecological system; legal system». Object, denoted by the term *«Rational MH» (RMH)* was described there as *«highly complicated (according to its contents), voluminous (by its scale), and dynamic (by its functioning) system of public-and-industrial interaction of mankind with the Earth's mineral materials and various natural mineral objects»* [12, p.18].

Subsequently, above-cited definitions, which describe MRM and EMRM as essentially multi-system objects, were reappraised by their author as irrational, because that led to spreading these objects' boundaries and complicated their positioning in sciences classifications, which in its turn substantially hampered rendering these objects as real, self-reliant and developing systems [10].

In [14; 15, p.18] *«Mineral Husbandry» (MRM)* notion was rendered as terminological category that denominates the aggregate «*of processes and/or human activities, viewed in their interaction and interdependence, and pertaining to geologic search of mineral deposits, their development, raw materials extraction and processing, as well as mineral products marketing and their primary industrial utilization*». In subsequent author's publications the term's detailed definitions were formulated, which principally not differ from the cited one but contain more extensive enumerations of processes and activities, enveloped by the term.

Among major theoretic, methodological, and applied results, obtained within conceptions, which are still being developed, following may be named:

- ascertaining the objective system essence of modern MRM processes, which engulf entire economic cycle «mining of mineral resources — their commercial realization — eventual industrial utilization»;
- choice substantiating of complex methodology and multi-discipline approach to MRM processes studying and optimization;
- replenishment, concretization, and refinement of terminological thesauruses, used in new areas of knowledge and practical activities;
- designing of considerable amounts of classification schemes, which extend knowledge concerning MRM-objects by reflecting their substantial composition, aggregate state, peculiarities of localization, and variations of industrial utilization technologies;
- creation of theoretic generalized schematic models, reflecting stages of MRM technologic processes and character of tasks being realized at every industrial production stage;
- creation of formalized models, depicting institutional, organizational, and functional structures of economic MR-sectors, their reformation and restructuring processes;
- revelation of major factors and tendencies, influencing MRM processes, identification their multi-level structure and manifestation peculiarities at the world, national, and regional levels;
- upgrading and developing methodologies for strategizing and strategic targeting with respect to MRM-objects, belonging to various organizational levels;
- development and enhancement of formal-logic and mathematical methods, as well as computer software, suitable for employment in currently dealt with and adjacent research areas.

Enumerated results are reflected in dozens of authors' publications and are currently used as learning aids in educational studies of mining disciplines. One of them is proposed and being developed educational discipline «Rational Mineral Husbandry». Besides, in the course of described investigations multi-page informational, analytical, and recommendation materials were worked out and at different moments handed over to federal and regional organs of MRs management.

According to definition formulated in 2002 by A. Macfarlane «*MRM is an integrated activity which identifies, evaluates and provides an optimal extraction plan of the mineral resource, to produce a quality product which satisfies the business objectives of the company, and the requirements of the customer, in a dynamic environment. It performs an*

audit and quality assurance function to ensure compliance to the business plan, and customer satisfaction in terms of quality and quantity. Overall, effective MRM is an essential component of Operational Excellence along the value chain». [8, p.188].

Practical implementing of Macfarlane's works in some African MRM companies had shown that his proposed EMRM version as well as some competing ones encounter realization difficulties, in particular caused by companies' top managers fears with respect to innovations and their skeptic attitude to proposed MRM systems capabilities. In its turn, such negative attitude frequently happens to be justified due to lack of mechanisms to precisely and reliably evaluate economic effect obtained from MRM systems implementation.

South-African company Implats graphically demonstrates its work toward implementation of modern high-tech automated MRM system (Fig. 1). Whereas traditional organizational and technical MRM systems restrict their industrial activities to separate stages pertaining to geologic exploration, deposits development, and current MRs mining, Implats' MRM system in addition to this also comprehensively covers whole stages of deposits geological search, their thorough economic assessment, MRs refining and deep processing, products marketing and commercial realization, their dispatching and delivering, managing of company's assets, ecologic environment rehabilitation. High-tech MRM system designers especially stress that in addition to quantitatively assessable advantages it potentially facilitates such hard to evaluate positive effects as management streamlining concerning the processes of planning, modeling, activities results assessing; efficiency and informational procurement of decision making processes enhancing; collective knowledge base continuity and management enabling etc. As a result, management processes within the company are maintained at least at equivalent and often at higher than current industry level.

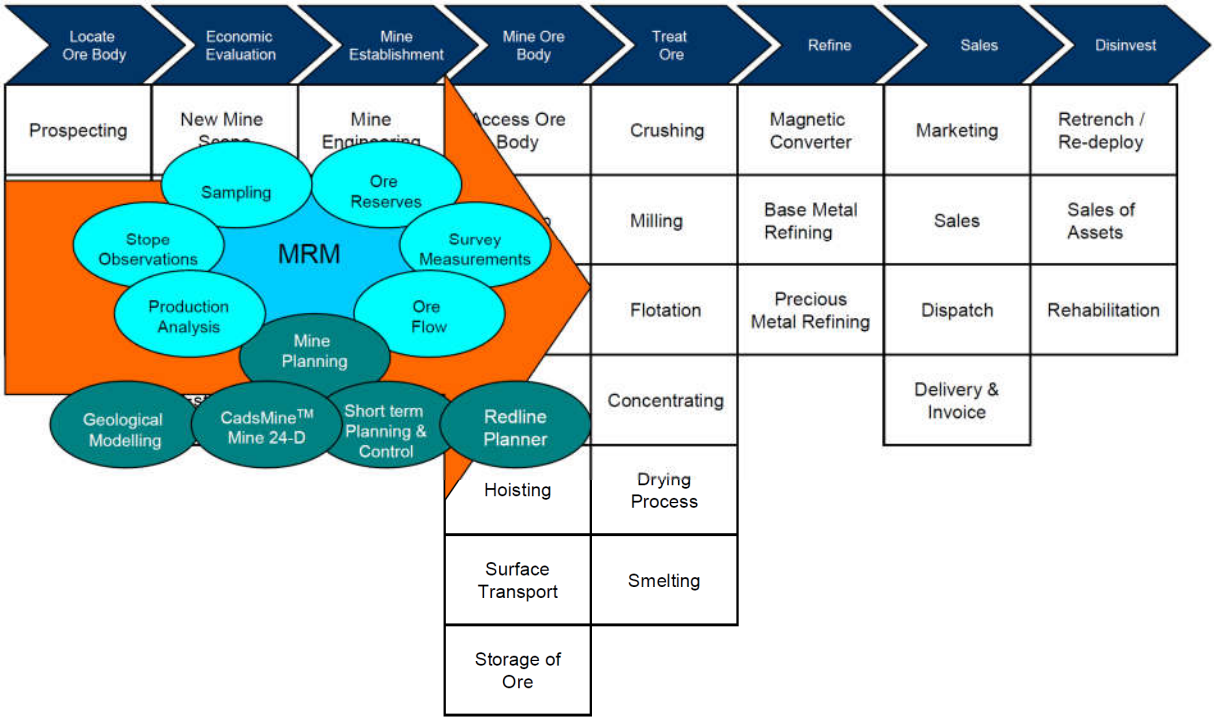

Figure 1 – Place of high-tech automated MRM-system in financially meaningful industrial and commercial operations practiced by Implats company [16]

In scientific, industrial, and advertising materials, prepared by companies or individual authors and distributed by various informational channels, beside above mentioned other definitions of MRM and corresponding activities are present. According to existing definitions and also companies' profile self-descriptions the most common MRM notion is the activities direction that provides to its subjects maximum commercial gains for themselves, expressed

as a rule in increasing corporation financial profits and diminishing operational and other expenses. According to definition of so called Mineral Resources Throughput Management (MRTM), it «*is a unique business concept based on process and functionality alignment aimed at achieving optimum throughput. The overall purpose of applying the concept and its associated disciplines is to maximize income and/or reduce costs. To reach MRTM targets, business knowledge and insight must be adjusted and it is required of the learner to view the business from a perspective different to the conventional mining approaches used in the past. This is done by using a throughput-based business analysis, identifying the main throughput drivers, (production and cost) quantifying the drivers and classifying those drivers according to the variability in physical conditions*» [17].

As BMG Consulting Pty Ltd is evidencing, its work reorganization on the basis of implemented MRTM system following results were achieved [18]: 20% plus EBIT and NPV improvements in more than 80% of cases; elevation of a mine's operating performance from below 50% of its design capacity to over 80%; reduction of operating variability to below 10% from the 20% plus generally accepted by miners.

Next meaningful aspect after commercial effectiveness, associated with MRM concept, is lately becoming reduction of ecologic damages, imposed by MRM companies' industrial activities. Popularity is also widening related to those notions, according to which existing as well as being created MRM objects are supposed to achieve goals that proceed from much wider or, vice versa, highly specialized narrow economic and social needs that at the same time play crucial roles in scientific, technical, and social progress. Among these goals, in particular, may be different risks reduction, functional stability boosting with respect to enterprises, companies, and other social institutions; maximal social affect achievement at municipal, regional, and national levels.

It's worthwhile to note that many of newly emerging aspects, associated with the MRM term contents, fully comply with its definitions formulated in [12; 14–15; 19] and other early authors' publications.

MRM-objects' theoretic and applied models. Above mentioned MRM definitions may be viewed essentially as conceptual models of objects named by this term. Along with this there are sufficient numbers of attempts to illustrate MRM objects by schematic diagrams that depict inner functional and organizational structures as well as these objects connections with environment.

One of these research direction initiators was Rideout V.C. [20] that had offered in 1980 a structural scheme of social-economic-resource system at the regional or national levels, in which MRs and other natural resources management plays key role. At the same time MRM itself has no separate representation and is essentially dispersed all over the Rideout's scheme (Fig.2).

Great numbers of classification models and schemes, depicting various aspects of MRM objects being considered as various natural systems, were presented by Sekisov G.V. For example, (Fig. 3) illustrates one of the most informative and conceptually substantive author's models. Offered in 1992 model illustrates presumed future development of MRM organizational structure at macro-regional or national levels. During model's primary discussion, at which well known specialists in geology, MRs mining and processing, state and corporation management participated, disparities were convincingly demonstrated between the proposed MRM organizational structure, which supposed to be created on strict hierarchical subordination principles, and, on the other hand, common tendencies of globalizing World and developing in market direction Russian economies. Subsequent development of both these economies fully justified critical attitude toward this prognostic model.

At the same initial research period the institutional-and-functional MRM model at corporations' and adjacent organizational levels was developed (Fig. 4). After its first generally accessible publication in [15, p.38-40] this model repeatedly appeared in subsequent authors publications and was discussed at many scientific conferences, including foreign ones. In addition to other proofs this confirms validity and scientific significance of the model.

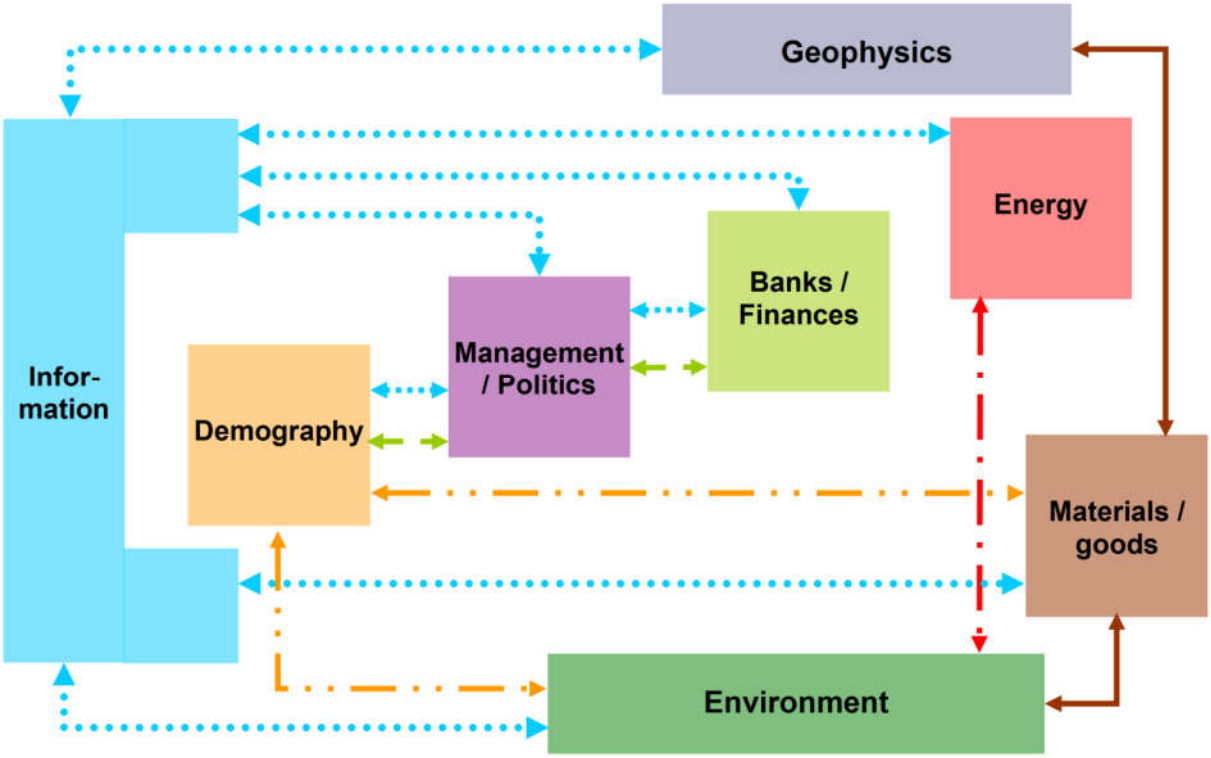

Figure 2 – Schematic diagram of a socio-economic natural resources management system at the regional or national levels [20]

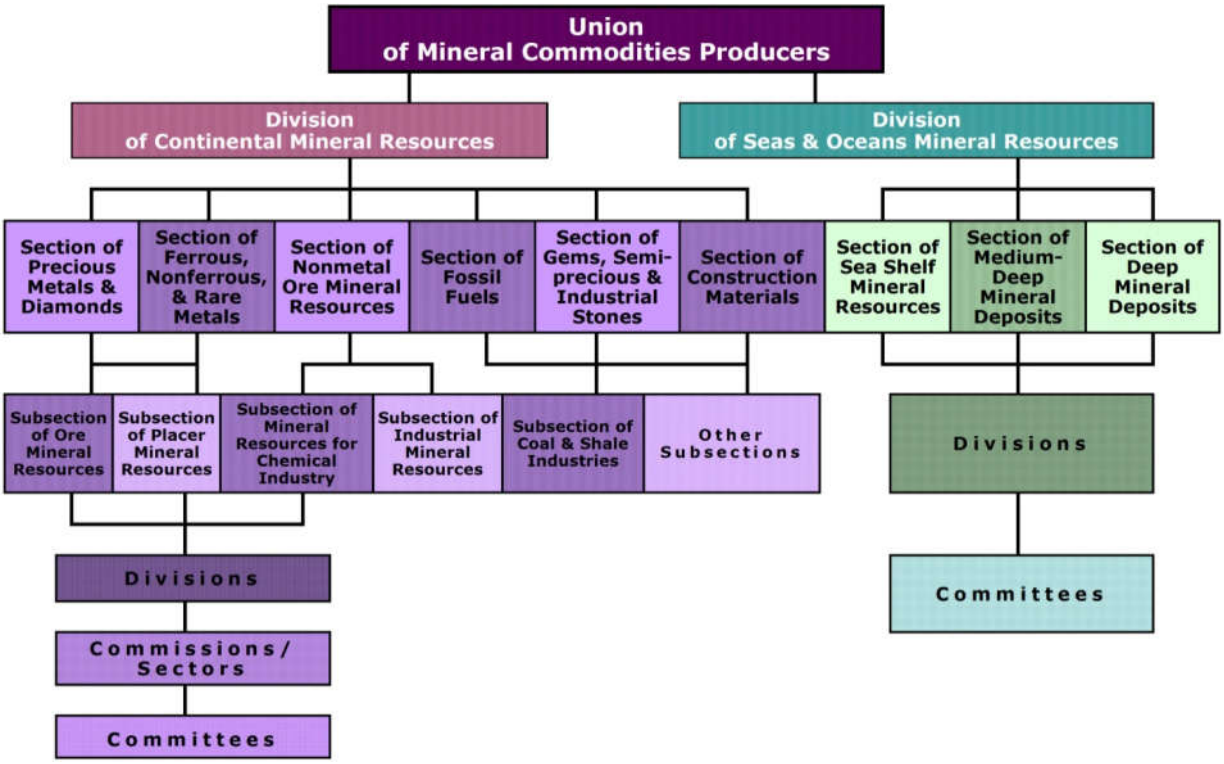

Figure 3 – Structure of the Minerals Producers' Union at macro-regional or national levels, forecast toward foreseeable future *(Fragment, cited from [15, p.36])*

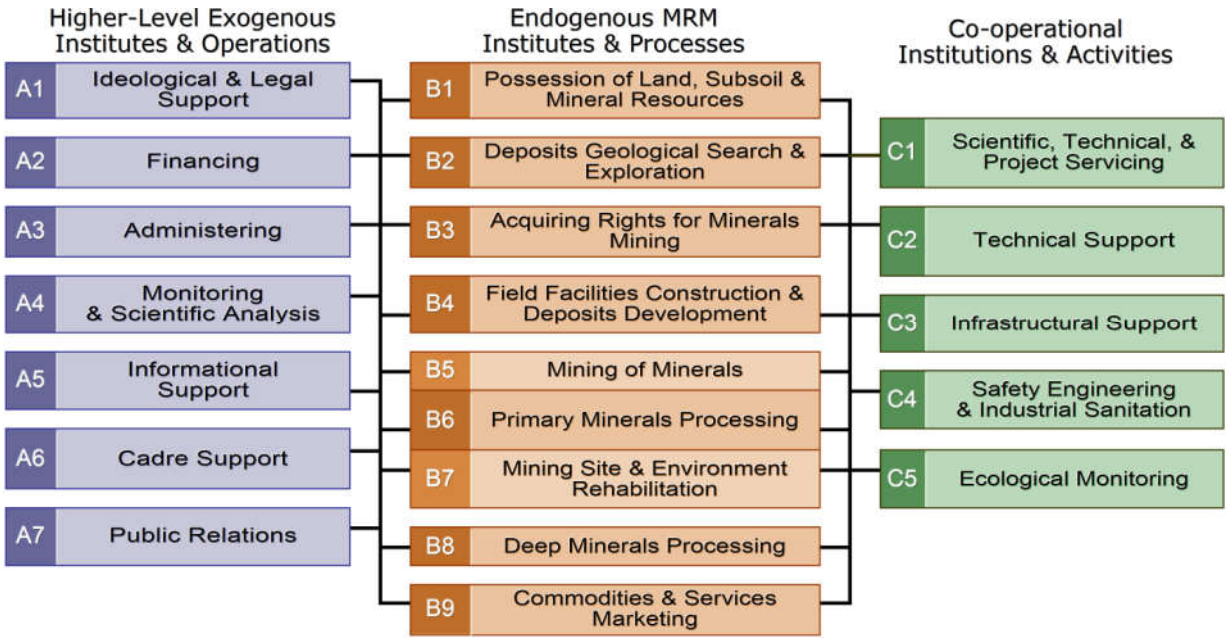

Figure 4 – Model of institutional-and-functional MRM structure at corporations' and adjacent organizational levels [15, p.38]

One of the model's virtues is its applicability both in planned and market economic conditions. In studies, carried out on this model basis, absence is demonstrated of discrete and, more than that, insurmountable boundaries between planned and market economic systems, realized in various countries engaged in MRM activities. By this a thesis was convincingly confirmed, which asserts that majority of modern national economies build themselves on hybrid models, using simultaneously plan and market management mechanisms presented in different combinations and realization forms. Accordingly, present-day countries' rigid subdivision into those having «planned» and «market» economic systems is proposed to be considered as essentially outdated. Instead of this abstract dichotomistic division, the scheme has been put forward that envisages MRM-countries classification into those adhering mostly to planned national economies management and, on the other hand, oriented predominantly at market management methods.

In addition to described above, various structural models that represent MRM objects of different sizes and hierarchical subordination, adapted to distinguished socio-economic conditions, have been offered by authors:

Russian – E. Galichanin, Yu. Dyachenko, V. Karaganov, E. Kozakov, E. Melekhin, B. Mikhailov, V. Nikitin, E. Porohnya, D. Sytenkov, V. Tararuyev, A. Shelomentsev et al.;

Foreign – U. Aswathanarayana, A. Barriskell, J. Camus, A. Macfarlane, R. Schmiermund et al.

CONCLUSION

The ongoing ideas and concepts development direction, aimed at natural resources management enhancing, rapidly widens, intensifies, and currently engulfs majority of agricultural and mineral-producing countries. Progress in this direction acts as stimulus for new Effective Natural Resources Management conceptions' varieties emergence as well as for improvement of existing ones.

Poland, Russia, other former USSR and Socialist Commonwealth successor countries are actively participating in these processes. In particular, since 1985 and up to now Poland is successfully publishing the only journal in the World, entirely devoted to Effective Mineral Resources Management problems and bearing corresponding title.

Russia, which has begun her full-scale market economic reforms in 1991, with respect

to Mineral Resources Management ideas is characterized by prevailing outdated convictions that were inherent to plan-oriented stage of national economic development. At the same time there *Universal* and *Institutional* theoretic-and-applied Minerals Husbandry Conceptions have been proposed and during quarter of a century are being persistently developed, which enhance theory and accelerate EMRM ideas advancement into Russian and other countries' practice of natural resources effective management.

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HOUSEHOLD ECONOMIC ACTIVITIES OF COASTAL RESOURCE USERS' COMMUNITY IN CENGKRONG COASTAL AREA, PRIGI BAY, TRENGGALEK DISTRICT

Purwanti Pudji*, **Susilo Edi**, **Indrayani Erlinda**
Department of Fisheries Socio-Economic, Faculty of Fisheries and Marine Sciences, University of Brawijaya, Indonesia

*E-mail: pudjipurwanti@gmail.com

ABSTRACT
In one decade, the total area of mangrove forests in Prigi Bay has been declined drastically. Since 2008, replanting or reforestation has been done in the area of mangrove forests on the Cengkrong coast. It means that the development of mangrove forest management could affect the household economic activities in Cengkrong surrounding area. Related to that, this research aims to (1) describe the resource management profile in Cengkrong coastal area (2) explain the household economic activities of the coastal resource users' community in Cengkrong which include productive activities, work outpouring, income-outcome activity as well as a surplus of each household. Replanting mangrove forests on Cengkrong coastal area makes the area of mangrove forests as an ecotourism. This certainly created a productive activity which directly related to mangrove ecotourism such as mud crab cultivation, anadara clam cultivation, mangrove seedlings development, food stalls, boat rentals, and also sanitary facility. This activity is done by a POKMASWAS (*Kelompok Masyarakat Pengawas*) or community supervisor "Kejung Samudra" and his family. Meanwhile, the productive activities which are performed by the people in the surrounding area include crab farming, fish farming, and food selling along Cengkrong Beach. The work time of POKMASWAS "Kejung Samudra" in average is by 317 workdays per year. Moreover, the income for the member of "Kejung Samudra" is retrieved from boat rentals, parking area management, and sanitary facility which in average is amounted up to IDR 100,000/day until IDR 250,000/day. Furthermore, the business activities of mud crab cultivation could give a profit by IDR 7,933,500/month with the earning ratio of 276,77%. The work outpouring of food stalls in average is 315 workdays per year with the average profit of IDR 9,246,000/year/person. On the other hand, the average work outpouring of crab farming is by 81 workdays per year in which it could generate such income by IDR 22,676,000/year. Then, the work time spent for fish farming is also in 81 workdays per year and earned about IDR 1,920,000/year. Therefore, the highest food expenditure on "Kejung Samudra" committee is by IDR 26,460,000. In addition to the activities in the field of fisheries, the coastal community also engages in the non-fisheries production activity, for example, as farmers or peasants.

KEY WORDS
Replanting mangrove forests, productive activities, the outpouring of work time, household income and expenditure.

Prigi Bay is located in Trenggalek District, East Java in which it is surrounded with southern mountains and merged with the coastal areas. The vegetation which grows in Prigi Bay is the plant that is usually flourishing in mountain areas and blend with mangrove plants in coastal and tidal areas. The area of mangrove plants in Prigi Bay up to now is spread in Damas Beach and Cengkrong Beach. Unfortunately, the area of mangroves in here began to decrease in 1999-2000 where the large-scale reduction of mangrove vegetation occurs mainly in Damas Beach. This reduction had occurred since the Social Forestry activity were implemented, this activity was known as the Collaborative Forest Management Program (PHBM) in 2003 (Susilo et al, 2008).

The replanting activity of mangrove vegetation is conducted since 2008 on both areas such as Cengkrong Beach and Damas Beach. However, the success of the rehabilitation of

mangrove forests on both coasts is in opposite directions. The condition in Damas Beach is still experiencing a reduction in its mangrove area while in contrast, Cengkrong Beach is in a more stable condition. Furthermore, mangrove forest area in Cengkrong Beach has increased from 42,557 ha to 87,557 ha in 2012. This mangrove rehabilitation is followed by the formation of Community Supervisors (*Kelompok Masyarakat Pengawas or* POKMASWAS) "Kejung Samudra". Thus, since 2012, the Department of Marine and Fisheries of Trenggalek has introduced the concept of mangrove ecotourism forests by building a bridge over the forest. POKMASWAS "Kejung Samudra" has been designated as a manager in the management of this ecotourism forests. The existence of mangrove forests that have been rehabilitated has impacted the economic activities of the surrounding community.

Good management of mangrove ecosystems will provide economic benefits to the surrounding community. Instead, the destruction of mangrove ecosystems also affected the people which live in the surrounding area. This can be seen in several studies like in Van Hue and Scott (2008), they said that as a result of mangrove destruction due to shrimp farming industry activities, shrimp farmers become poorer and have a lot of debt because their shrimp farming was not successful. The study from Saint-Paul (2006) expresses the relationship between the rural population in Caeté Bay and mangrove ecosystems. The study shows that the preservation of mangrove systems in this region is fundamental to the maintenance of the household quality. Mangroves provide subsistence products for nutrition supply, housing, fuel, as well as commercial products that are able to produce revenue. Further degradation of mangrove forests will create a significant revenue loss for the local population and increase the potential of social conflict.

The survival of communities still depends on the use of forest resources, this statement is also supported by the research of Eleanya et al (2015). Households are involved in many activities with the production of materials that are based on mangrove forests including canoe carving, basket weaving, fish card weaving, snails catching, crabs farming, traditional medicine, fishing, firewood business, and sand collecting. The mangrove forests in Akassa Nigeria island that have become the foundation for the household in its surrounding area are currently experiencing a serious threat on large exploitation.

This research aims to (1) describe the resource management profile in the Cengkrong coast (2) explain the household economic activities of the coastal resource users' community in Cengkrong coast which include production activities, work outpouring, income-outcome activity as well as a household surplus. The results of the research can be used as an evaluation and management model of mangrove forests in the study area as well as an information for the local government in construction its regulation.

MATERIALS AND METHODS OF RESEARCH

This research was conducted in Cengkrong Coast, Prigi Bay that is already rehabilitated with mangrove plants. The method in this study was adapted from a survey method to describe a systematic and factual account of the current state (Nasir, 2003). The research material used was the mangrove forest ecosystems in Cengkrong Coast with its management institution, community, and their economic activities. The number of respondents in this study was 19 households consisting the member of POKMASWAS "Kejung Samudra" crab farmers, fishers, and sellers along the Cengkrong Beach.

Furthermore, the data of this study were analyzed by an economic analysis of mangrove ecosystems based on direct use value that is expressed by Vo et al. (2012) where, for example, the direct use value of mangrove ecosystem is a human habitat. The existence of mangrove forests provides livelihoods for local communities and mangrove forest managers. The behavior of people around the mangrove forest was approached through an approach of economic household behavior and analyzed with productive activities that are related to mangrove resources, household revenue, working hours, household expenditures, and household surplus.

The analysis of household production was done simply with the use of short-term analysis such as venture capital, business expenses, revenue, and profits. The analysis of household time outpouring was measured by the duration or time that is devoted to the activities of management and utilization of mangrove resources, time for other productive activities as well as its leisure time and domestic activities. The analysis of basic household expenses is calculated based on the basic expenses of food and non-food staple. Then, the difference of this household income and expenditure will be calculated with the household surplus.

RESULTS AND DISCUSSION

Coastal resources management in Cengkrong beach. POKMASWAS "Kejung has active members by 12 people whose help the team leaders in managing mangrove forests daily. In this study, the mangrove species which grow in an area of 83 hectares are: (1) *Avicenna* (api-api), (2) *Sonneratia* sp (Bogem or Pidada), (3) *Burguera* sp., (4) *Ceriopstagal sp.* (5) *Lumnitcera racemose,* (6) *Rhizophora mucronate* (Tinjang Panjang), and (7) *Xyrocarpus s.* Meanwhile, the ocean's creature that lives and can be cultivated by the people are (1) Mud crab (*Scylla Serrata*), (2) Anadara clam (*Anadara* sp.), (3) clam/scallop (*Arctica Islandica*).

Initial reforestation was carried out by the Department of Marine and Fisheries in 2008. Mangroves planting was then performed either independently by POKMASWAS "Kejung Samudra" or with the help of relevant agencies in 2009, 2010, and 2011. In 2009, mangroves planting in the types of *waru* and *ketapan*g as many as 4,200 trees were established. Moreover, in the next year, the mangrove types of *tinjang* and *nyamplung* as many as 9,250 trees were also planted across the shore. Not only in 2010, replanting *nyampung* and *tinjang* mangroves by 37,500 trees were also carried out in 2011. The results of this replanting activity began to be noticed in Cengkrong coast with the sign of flourish mangrove forests. The concept of this mangrove ecotourism in Cengkrong is introduced by the Department of Fisheries and Marine of Trenggalek in 2012 with the construction of a wooden bridge over the mangrove.

Visitors in Cengkrong beach and mangrove forests keep on increasing especially during weekends and holidays. The ecotourism activities on Cengkrong beach and mangrove forests provide opportunities for forest managers which in this case is the board of POKMASWAS "Kejung Samudra" to open a kiosk as well as food and drink stalls in the entrance of the bridge as well as in the management of parking.

Household Economic Activities of Coastal Resource Users in Cengkrong Coast:

Productive activities in the mangrove ecosystem community. The resources of this ecosystem forest are utilized by the surrounding communities due to economic activity. The productive activities in Cengkrong are divided into two which are in the field of fisheries and non-fisheries. Fishery activities in this context were done by the administrators of POKMASWAS "Kejung Samudra" as well as fishermen and their wives also the surrounding community. Hence, some productive activities that are carried out by the communities in the mangrove surrounding area are as follow:

Mud crab cultivation (*Scylla Serrata*). The business of mud crab cultivation is done by POKMASWAS "Kejung Samudra" in which this crab could be found in the mangrove forest area. The business of this mud crab cultivation has begun in 2010 through the assistance of the Department of Marine and Fisheries of Trenggalek. The cultivation is also done with the help of *karamba* which is made of bamboo with an average size of 1 x 0,5 meter and then divided into several spaces that are intended for the maintenance of 20 x 20,5 cm mud crab. The seeds of the crab are taken from mud crab that is obtained from mangrove forest which its size still does not meet the size of the market consumption. Moreover, the cage installation is placed in the mangrove area that is covered by tidal water while the feed of this mud crab is taken from the left-over fish that does not have an important economic value from fishermen.

The capital investment that is used for this mud crab business is by IDR 1,545,000 which includes buckets, bamboo, scales, rakes, and tarps. Then, the amount of the depreciation expense in one year is amounted up to IDR 532,500. Furthermore, the clear cost which is used for this business in one month is IDR 1,032,500 while the uncertain costs in one month are in the value of IDR 917,000. After that is about the income of this mud crab business which reaches IDR 10,800,000 for one month with the profit of IDR 7,933,500. This means that the rentability value obtained from mud crab business is by 276,77%.

Mangrove plant germination. This germination activity has been done since 2011. Some mangrove types which are germinated in this area are *tinjang*, *Burguera*, *Sericarpus*, *Mentigi* and *Cemara Udang*. The mangrove seeds which were planted are taken from the mangroves that have been grown in the area. Firstly, the germination is done by providing the seedbed media presented in a polybag. Then, the soil is mixed with manure and placed back in the polybag. After that, the germination process takes time for about 4-6 months. In the early germination activities in 2011, there were 35,000 mangrove plants which include 23,000 *tinjang*, 6,000 *bogem,* and 1,000 *api-api*. In the following year of 2012, there were also germination activities which consist of 20,000 *tinjang*, 1,500 *Burguera*, 1,000 *Sericarpus,* and 500 *Mentigi*. These mangrove seeds are marketed outside Cengkrong coastal areas, namely Panggul sub-district, Munjungan sub-district, and Trenggalek area. This mangrove seedling is sold for IDR 3000/trunk.

Mud crab farming. Not only farmed by POKMASWAS “Kejung Samudra” in an attempt of mud crab seed cultivation, the crabs also sought by local fishermen for mud crab farming. There are three respondents who usually look for crabs in the mangrove forest. There is also an asset or tool used by the farmers which are Bubu. Bubu is made to catch crabs and it is a kind of passive fishing gear, set and placed in areas that are expected to be passed by the crabs and baited with fish. Bubu framework is made of steel with some wood webbing and the price of this tool is IDR 28,000 to IDR 30,000 per unit with a lifespan of 2 years. The farming activities are carried out 2-3 times/week in which it usually sold to the market or to a seafood stall owner.

Per day, the average farming is amounted up to 2 kg/day/persons while the average total of this activity is 52 kg/month or 624 kg/year. Meanwhile, the commodity price of mud crabs which are sold to seafood restaurant is IDR 40,000/kg. Then, the average expenditure from the total cost is by IDR 2,283,333 which consists of depreciation cost by IDR 723,333 and variable cost by IDR 1,560,000. The profit of mud crab farmers could be counted up to IDR 22,676,667 per person.

Fishermen. This fishing activity is established by a visitor or local communities to meet their daily needs or to fill their spare time on holiday. There are three respondents used in this research whose does not come from Cengkrong beach area. The calculated production assets in this activity are fishing gears as well as the calculated costs such as transportation fee and feed costs which are by IDR 12,000 per 0,25kg. The fishing activities are carried out from 10:00 am to 16:00 pm with the usual catch of *Mugil Cephalus* fish and *Lutjanus sp* fish. The fishing is calculated on an average scale by 2 kg/week/persons, thus, the total catch in one month is 16 kg or 192 kg/year with the average total cost of IDR 1,975,500/year. This includes a depreciation of fishing gear costs which amounted to IDR 103,500/year and the variable cost by IDR 1,872,000/year. With the average price at fish collectors level is IDR 10,000/kg, the total revenue of fish sales is IDR 1,920,000/year. Thus, the total income of the 3 crab farmers in mangrove area is amounted up to IDR 5,760,000 in a year.

Stalls managed by the wives of “Kejung Samudra” members. The stalls that are in mangrove tourist location are owned by five people. These people are the wives of the POKMASWAS “Kejung Samudra” members. The stalls in this area provide food, drinks, and coconut for the visitors. The production assets of this stalls include the building, refrigerator, storefront, and cool box. The price of one unit that is complete with its contents is valued for IDR 10.000.000 until IDR15,000,000 with a lifespan of 10 years. Each stall sells different types of food such as pecel, soto, and meatballs.

The effective time of this business is on Saturday, Sunday, and national holidays because visitors will be very crowded so that the sellers will receive a higher revenue. The

average revenue on Monday to Friday is IDR 200,000 up to IDR 400,000 while on Saturday and Sunday there would be IDR 500,000 to IDR 2,000,000. The production costs of this business in every month amount to IDR 500,000 which include staples such as meat for meatballs, soup, spices, and of course, coconut.

The average income of these businesses is by IDR 65,544,000/year with the average total production cost of IDR 19,314,000/year. This consists of the average cost of stalls depreciation by IDR 3,252,000/year and the average variable cost by IDR 16,062,000 /year. Thus, the average revenue from this business could be amounted up to IDR 46,230,000/year with the profit of IDR 9,246,000/year/person.

Parking management. The location of this mangrove conservation provides a 20x80 m^2 parking area. In details, one tariff for a motorcycle is IDR 5,000 while one car is IDR 10,000. The revenue that could be obtained from Monday to Friday is ranged from IDR 200,000 to IDR 400,000 while on Saturday and Sunday or holidays can be IDR 1,000,000 – IDR 2,000,000. Therefore, the sharing system of the parking lot is 10% of total revenue. The income for the workers is given by the chairman of “Kejung Samudra” once in every 2 weeks based on the duties of each board.

Boat Rental. This boat rental is operated by two members of POKMASWAS, however, the boat rental activity is adapted to the tide condition. When the water is in low-tide, the boat cannot be rented. The production assets from this boat business are boats and engines. The price of one unit of a boat is set in IDR 15,000,000 with a lifespan of 10 years while the price of the machine is IDR 5,000,000 also with a lifespan of 10 years. The type of machine that is used is a 2-stroke engine. Furthermore, the operational cost which is used in this business is as much as 5 liters of fuel for one operation (one day) at a unit price of IDR 7,500 and 0,5 liters of oil for one operation. The rates which are charged to visitors is by IDR 10,000/person. According to that, the average income of this business is between IDR 250,000 to IDR 500,000 on Sundays or holidays. The worker’s payment of this business is also 10% of the total revenues and given once in every 2 weeks.

Sanitary facility. The provision of public toilets is very helpful for the visitors; there are 6 units of bathrooms or toilets provided. The charge for this sanitary facility is divided into three such as IDR 5,000 for a shower, IDR 3,000 for defecate, and IDR 2,000 for urination. The income of this sanitary facility on Monday to Friday is between IDR 200,000 until IDR 300,000 while on Sunday is between IDR 500,000 to IDR 1,000,000. The worker's division is also based on the determined guard shifts with the income of 10% of the total revenue and given once in every 2 weeks.

Sellers in beachside. There are sellers in the beachside started to sell their goods since the existence of this ecotourism forest. They do their activities only on Saturday and Sunday in which they sell smoked fish, squid, and also crab. Besides that, they also sell drinks, coffee, rice, and coconut. Smoked fish is sold at a price of IDR 5,000/skewer, chicken rice by IDR 7,000/portion, coffee for IDR 2,000/glass, coconut at a price of IDR 8,000, and then squid and crab in each by IDR 40,000/kg.

The production assets of this business are the semi-permanent stalls located on the beach, carts, as well as the cost of fishing that is used to catch crabs and squid. The revenue that is generated from this business is ranged from IDR 500,000 up to IDR 1,500,000 depends on holidays and the number of visitors. The average income of this business is IDR 30,240,000/year with the average total cost by IDR 7,723,333. This includes the average fixed cost by IDR 743,333 and the variable cost by IDR 6,980,000. On average, the profit that is enjoyed by the beachside sellers is IDR 7,505,555/year/person.

Farmers. From 19 respondents, there are 6 respondents who have a farm with an extensive of 0,25 ha to 1,5 ha. Farming activity is a side job for them, this is a business that starts from a forest clearing on Karanggandu area. The types of the crops grown in this area are coconut, cloves, durian, and *jengkol*. Durian and *jengkol* are classified as an annual plant while cloves can only be harvested after 3 years and after that, cloves can be harvested twice a year. The average revenue from this farming activity is IDR 3,394,000/year. Durian could be sold for IDR 25,000/fruit, wet cloves could be sold for IDR 31,000/kg whereas dried cloves are IDR 41,000, and lastly, *jengkol* which is by IDR 5,000/kg.

Fisheries and Non-Fisheries Working Time of the mangrove resource users in Cengkrong Beach. The activity of mangrove reforestation in Cengkrong Beach provides a job development for the communities around the coast. In this following section, the work outpouring of mangrove resource users will be presented. The work outpouring is determined by using a workdays unit (*Hari Orang Kerja* or HOK*)*, where 1 HOK is equal to 8 hours per day. The HOK that is used by the households in mangrove forest area either in fisheries or non-fisheries activities is calculated in a unit per year to equalize the unit counted.

"Kejung Samudra" Members. The daily activities of "Kejung Samudra" members are managing mangrove forests, treating and monitoring mangrove growth, providing mangrove seeds, and managing the businesses such as boat rentals, motorcycle or car parking lot, and toilet or bathroom facility. This activity is performed daily starting at 09.00 AM in the morning until 17.00 pm while there is 1 hour for a break (lunch and pray). However, this is in contrast with the boat rentals which this business is depending on the sea tide. The division of labor time is divided by shifts so that the average work time is 4-8 hours/day. The total work outpouring of the "Kejung Samudra" member is full for one month and the average working time is 315 HOK.

Crab Farmers. Mud crab fishing activity is carried out during high tides so that the water will cover large areas of mangrove forests. Even though after the water is receded, some water still puddled in the area. Thus, during this low tide, crab farmers start looking for crabs among the crevices of sand and mangroves. Nevertheless, this activity is not implemented every day but only when there is high tide. Within a week, the high tides will occur 2 to 3 times. This crab fishing activity is carried out from 15.30 pm to 17.30 pm and with the help of crab fishing gear installation. Meanwhile, the Bubu tools are released in the next day at 05.00 pm until 07.00 pm, thus, the average result of this crab fishing in one year is by 72 HOK/person/year.

Fishermen. Fishing activity is only done on Saturday and Sunday from 10.00 am to 16.00 pm. In one month, this fishing activity could be performed 8 times by 3 respondents. By that, the average fishing activity that is carried out amounts to 72 HOK/person/year.

Stalls Owner in Parking Area. The average time that is spent on the stalls on Saturday, Sunday, and national holidays are 8-9 hours per day, from 09.00 am until 17.00 pm while the typical working day is about 6-7 hours per day. This makes the average working time devoted by the shop owner in a month by 192 hours. So, this can be said that the average time of the wives working in a stall is by 2520 hours/year or 315 HOK.

Sellers in Beachside. These selling activities are performed on Saturday and Sunday in the beachside. The duration of this activity is also depended on the visitors. This usually started at 09.00 am to 17.00 pm in which it makes the workers work 7-8 hours/day. Thus, the sellers in the beachside are likely to run its business in a month by 61 hours/month or 7,6 HOK/month.

Farm Activity. The activities that are carried out outside the fishing activity is field cultivation in the forest. The people tend to cultivate its farm or do the cultivation thing after their fishery activities have done. This activity is a side activity, they are not always doing this kind of job every day. In farming, the time that is spent in this occupation is approximately counted for 4-5 hours/day with the average of 1-2 times a week. The time that is spent for harvesting is determined by the type and number of trees; tree species are different if it comes to harvesting. For an instance, the harvest process of clove takes about 6-7 hours, while palm tree only takes 3 hours per harvest. In a year, an average time for harvest is amounted up to 730 hours/year or 91 person/days/year.

Household Income of the mangrove resource users in Cengkrong Beach. Household income in this community covers the income of "Kejung Samudra" members, crab farmers, sellers, and fishermen. This revenue is calculated by merging the income from fisheries and non-fisheries activity. The household income is grouped into several classes to know the level, interval, and the highest and lowest household income as presented in Table 1 below.

Based on the data that is presented in Table 1 above, it can be concluded that the biggest number of the respondent is as many as 11 respondents with the interval revenue of IDR 15,673,120 - IDR 26,954,576 while there is only 1 respondent with the income of IDR

67,547,488 – IDR 87,828,944. Furthermore, the highest value of household income is IDR 108,090,400 while the lowest value is IDR 15,683,120 with the average value of household income by IDR 35,876,390.

Table 1 – The Scale of Household Income

Class	Interval (IDR/year)	Total (house)
1	15.673.120 - 26.954.576	11
2	26.964.576 - 47.246.032	3
3	47.256.032 - 67.537.488	2
4	67.547.488 - 87.828.944	1
5	87.838.944 - 108.120.400	2
	Max	108,090,400
	Min	15,673,120
	Average	35,876,390

Household Outcome of the mangrove resource users in Cengkrong Beach. Household expenditure is divided into 2 groups such as food staple expenditure and non-food staple expenditure. The total household expenditure is the total expenditure of the fisherman that spends its money on non-food staple and food staple. The spending in food staple is all the expenditure that is used for domestic consumption such as rice, corn, tubers, tofu, tempeh, animal protein (fish and egg), vegetables, cooking oil, sugar, coffee, and others. Meanwhile, the non-food staple expenditure is the outcome on electricity, clothing, health, education, expenses for social events, and other expenses.

The consumption of food staple in mangrove household community is rice. In this area, rice consumption in a week is approximately 7 kg/week, this actually depends on the number of family members that consumed rice and also influenced by diet program. Occasionally, the people also consume tempeh or tofu even though it was not necessarily once a week. Whereas, tofu or tempeh is sold for IDR 2000/piece. The side dishes which are often consumed by the people in this area are fish which include tuna, crab, squid, *surut,* and so forth. In addition to fish, the people in the community also consume chicken eggs. The majority of respondents do not consume meat, they tend more on fish.

Almost every day, respondents also consumed vegetables such as kale, spinach, papaya, cabbage, young jackfruit (*tewel*), carrots, beans, eggplant, and so forth. For vegetables, they sometimes do not need to buy because they also grow their own vegetables or just go seeking in the woods. People in this area, in average, use cooking oil for as much as 1 liters of cooking oil/week and sugar 0,5 kg/week to 1 kg/week. They also like to consume coffee in which it requires IDR 3,500/pack but some respondents would prefer to make their own coffee that is made from coffee plants around the respondent's house. The need of food is normally purchased at a store near the houses which is approximately at a distance of 100 m while shop owners usually take on its goods itself.

The total average household expenditure in mangrove area amounts to IDR 14,712,263 within one year. Furthermore, the average expenditure on food staple is by IDR 10,083,571 and non-food staple by IDR 3,722,842. The highest non-food expenditure for the people is on education expenses which amounted up to IDR 9,000,000/per year and then followed by electricity by IDR 1,200,000/year. Thus, the total average of non-food staple expenditure is IDR 3,722,842. Based on the type of work, the highest spending on non-food staple is obtained by “Kejung Samudra” member among other types of employment by IDR 46,915,000/year. The size of the non-food expenditure is largely influenced by the number of family members, especially family members who attend school. Table 2 below presents the scale of household outcome in coastal communities.

The most household outcome of mangrove user communities is shown at the interval of IDR 10,445,000/year to IDR 12,945,000/year. The 2nd largest expenditure in one year is at the interval of IDR 12,955,000 to IDR 21,445,000 which is experienced by 5 respondents. The highest total household outcome in one year is IDR 46,915,000 while the lowest is IDR 10,465,000 with average household expenditures both from food staple and non-food staple by IDR 14,712,263/year.

Table 2 – The Scale of Household Outcome

Class	Interval (IDR/year)	Total (house)
1	10.445.000 - 12.945.000	11
2	12.955.000 - 21.445.000	5
3	21.455.000 - 29.945.000	1
4	29.955.000 - 38.445.000	1
5	38.455.000 - 46.945.000	1
	Max	46,915,000
	Min	10,465,000
	Average	14,712,263

Household Surplus. The surplus is the difference between total household income and household outcome. The household surplus is usually used as a savings or also for the purchase of production assets. The highest income surplus is the chairman of "Kejung Samudra" by IDR 61,145,400/year. Income surplus is widely used as saving for the people and their savings are usually in the form of gold or jewelry. This can be seen from the people which many of the wives use gold as their jewelry. The reason why they keep the savings in the form of jewelry because it is easy to be sold at any time in case of sudden needs.

CONCLUSION

The reforestation of mangrove forests in the coastal region of Cengkrong under POKMASWAS "Kejung Samudra" has been well managed. The dominant tree species which grow in Cengkrong coastal area are three types, namely: *Soneratia Alba, Avecienna sp,* and *Bruguiera sp*. The results of the reforestation could provide such household economic activities of local communities, especially for POKMASWAS "Kejung Samudra" manager.

The economic activity of mangrove forest management that is carried out by the administrators of POKMASWAS "Kejung Samudra" includes mud crab cultivation, mangrove seeds germination, parking management, boat rental, sanitary facility, and food stalls. Meanwhile, the economic activity that is conducted around the mangrove forests covers crab farming, fishing, and trading.

The work time for productive activities of the people in the community is quite enough. The average household still has time for leisure activities. Furthermore, the income of their activities may be used for household expenses and even create a household surplus.

SUGGESTION

The results showed that the reforestation and management of mangrove ecosystems can provide opportunities for economic activities in the surrounding communities that is related to tourism activities. Therefore, (1) the management of mangrove that takes into account of conservation needs to be done continuously (2) the development of other businesses that utilize the results of mangrove plants such as leaves and fruit needs to be introduced and developed due to the mangrove plant that grows on Cengkrong is already quite diverse.

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DEVELOPING MERCHANDISE FOR TOURISM USING PALMYRA PALM LEAF RIBS, PALMYRA PALM LEAVES AND PALMYRA PALM SAP

Sadia I Wayan Suma*, **Ketut**, **Supir I Ketut**
Faculty of Mathematic and Natural Sciences, Universitas Pendidikan Ganesha, Indonesia

*E-mail: prof.iwayansadia@yahoo.co.id

ABSTRACT
This study aimed to understand the reasons why people from Muntigunung and Pedahan, Bali Province, Indonesia, live as beggars and find alternative solutions used to build a good image for the two villages. The results of this study showed that some members of the villages who were formerly beggars had started to show an interest in the activities. They processed the sap of Palmyra palm tree sap not only to sell it to people in the surrounding areas but also were trained to process the sap into crystallized brown sugar to meet the demands of hotels and restaurants.

KEY WORDS
Beggar, products for tourism, Palmyra palm.

Muntigunung and Pedanan villages are located in Kubu District of Karangasem Regency, Bali Province. Geographically, the two villages are in the boundary of Karangasem and Buleleng regencies. The communities of the two villages are known, by Balinese, nationally and internationally, as the villages of origin of the beggars. They spread throughout Bali and beg especially in towns, such as Denpasar, Singaraja, Gianyar, etc. The problem of beggars becomes a serious problem for Karangasem regency and Bali province. Based on the observation result of the Social Department of Bali Province in 1994, the total number of beggar families from Muntigunung and Pedahan is 26, eleven families from Muntigunung and fifteen families from Pedahan. Every year the number of beggars increases. In 2009, the number of families who were beggars from Muntigunung increased to 53 families and from Pedahan to 72.

According to the result of an interview with some public leaders and old people in Muntigunung area (Tianyar Barat village) and Pedahan (Tianyar Tengah village), and the results of researches before, since the old time there has not been any social norm that regulates and orders people from Tianyar (now the village has been split into three: west Tianyar, central Tianyar and east Tianyar) to lead a life as beggars. The behavior of begging is a specific phenomenon in this areas, when compared to the history of beggars from other areas in Bali. It was told that before the natural disaster of the eruption of Mount Agung in 1963, the communities in these areas only knew *meurup-urup* (bartering with people from the wealthier areas). They used to bring dryland crops, such as corn, nuts, brown sugar, and palmyra palm sap, etc. Bartering was done because of the limitation of natural resources that could be cultivated to meet the basic need of the people, since Muntigunung and Pedahan areas are dry, especially in dry season it is difficult to find water for irrigation and household needs. After doing the barter activity for a while, their behavior gradually changed into beggar's behavior. Begging is done by the way of showing a face that is very suffering, poor, and by carrying small children and even babies and wearing dirty clothes with the hope that this will elicit a pity feeling in the people who see them. They go from door to door in towns and villages which are relatively more fertile and advanced than their village. No one know for sure when exactly the change from barter to begging started.

Various factors cause Muntigunung and Pedahan villagers to make their living by becoming beggars which have been mentioned by many people from various organizations and related parties with the ways of how to solve the problem. However, beggars keep on existing and the number and their spread tend to increase from year to year. As argued by

various groups of both local and international groups of people in Ubud who call themselves Ubud Community, beggars in Ubud area believe that they exist in an organization who manipulate other people, especially women with limited amount of money that are found in the two villages. While based on an interview and observation made in this study, the local government of Karangasem Regency has tried to solve the problem of begging through the policy of accelerating the process of overcoming poverty problems. The local government of Karangasem solves the beggar problem by engaging various organizations comprehensively in an integrative way. The socioeconomic approach with the focus on welfare has also been done but has not been able to solve the problem. The reality is that up to the present time the beggar problem is still a quite resisting problem.

The major cause of begging behavior in the communities of Muntigunung and Pedahan is low quality human resources. The beggars from the two villages in general (more than 70%) never got any formal education, while the rest could have a formal education but did not graduate from elementary school. The low level education can have an implication in the negative behavior of a person, including in meeting his/her life necessities. Thus, in this study an activity was done as a problem solving alternative to control the development of the number of beggars in the villages of Muntigunung and Pedahan. The activity in this study started with the collection of data to understand the reasons they beg. The reasons why some villagers of the two villages become beggars is interesting to be investigated by using critical ethnographic approach, and based on the findings a solution can be given according to the condition of the people and the existence of alternative sources.

Community - Based Tourism which is often used by the tourism actors as reference in developing tourism in Bali should follow the ideas, vision and missions of community-based tourism development. Thus the idea of Cohen and Uphoff (in Prasiasa, 2013) on community participation and its stages need to be understood and applied in developing tourism. Cohen and Uphoff's idea (in Prasiasa, 2013) is as follows:

"...people's involvement in decision making processes, in implementing programs, their sharing in benefits of development programs and their involvement in effort to evaluate the activities in such programs (Cohen and Uphoff, in Prasiasa, 2013)".

The notion of participation of the community members as stated by Cohen and Uphoff above can be used as the basis in developing tourism in Bali that is sustainable and community-based thereby the use of tourism development can be felt by the community in the economic, social and political aspects.

Tourism products are obligatory element in tourism development. Using the idea from Muljadi and Warman (2014) a tourism product is a real and unreal forms in a unit of a series of travels that give good and satisfactory experiences to tourists. To understand the desire of tourists to get a satisfactory service, there are many tourism products in the form of food, drink and handicrafts produced openly. In this case, the tour product entrepreneurs give the opportunity to tourists to come to production centers to see the process of making the tourism products.

Tourism products as everything that can be sold and produced by combining production factors and as something that is offered to consumers including in it a new innovation. Agricultural crops produced the people are very potential to be developed as tourism product (Na Songkhla and Somboonsuke, 2012). In this case palmyra palm tree agricultural crop can be processed into brown sugar or various palmya palm plaitings can be made into tourism products by adjusting them according to international tourism products standardization such as easy to carry, clean and hygienic and safe.

METHODS OF RESEARCH

This article explains about the development of tourism products with leaves, leaf ribs, and sap of Palmyra palm trees as their raw materials to solve beggar community problems in the villages of Muntigunung and Pedahan. The activities done in the effort to solve beggar problems are to develop and diversify dry land various types of tourism products by applying PALS method (participatory action and learning system). Using PALS method it is expected

that all the beggars are involved directly and actively in the process and evaluation of tourism products development. This activity is expected to have a significant impact on the changing of beggar culture into creative and autonomous culture toward a civil society. The data about the potential of the villages both that are related to natural resources and human resources as well as those that are related to the behaviors of the beggar community in the villages of Muntigunung and Pedahan were collected through survey and was followed up by in-depth interview with the community leaders by using sociological and cultural approach as well as critical ethnographic approach. The data obtained from the findings in the field through research, journals, and relevant books were analyzed descriptive-qualitatively. The data display and the interpretation that is related to the writing of a narrative text and with the quality of thick description in the unity of form, system, patterns, explanation, configuration,, cause and effect order, and proposition, both of those related to a certain display and ideology and dimensions of power or socio politics behind it. The drawing of conclusions or verification includes authentic things, subjective meaning, concept finding, and universal process. The results of data analysis are presented informally in the form of descriptive-narrative format.

RESULTS AND DISCUSSION

Meaningful Reasons for someone to do the Practice of Begging in Bali. Begging is an activity of begging accompanied by sad appearance is an economic practice done by many people in Indonesia. The phenomenon of the existence of beggars is very difficult to solve, although some solutions have been given by the government and academicians to reduce the number of beggars. The attempt at reducing the number of beggars is also done to improve the image of the areas or the country. The solution to this social problem of begging has to be given comprehensively, which is accompanied by an understanding of the basic reasons why someone does the begging activity as a negative social activity and even it tends to lead to social pathology. As stated by Namwata et al. (2012) that street beggars revealed that mobility of street beggars between places often depends on the availability of income, weather (season), experience of begging life, harmony/disharmony with families/relatives, relations made with friends and circle of contact with other people. The condition that occurs in Muntigunung Village and Pedahan Village have in common, begging is done by some children and even babies, makes some women in the villages it was difficult to leave his life as a beggar. On the other hand the poor their social and cultural quality makes they have no shame as beggars.

Low Quality of Education has an Implication on the Community Cultural- Social Low Level of Awareness. Education is one of the important assets that a person has to own in his/her social life in the society. Bourdieu (in Fashri, 2014) mentions that the intellectual quality produced by education is the form of cultural asset that is very important in improving his/her life quality. While Plummer (2011) mentions that the cultural source owned by someone includes the possession of the ability to access information, knowledge and skill. Plummer introduces a theory that a cultural resource is related to other cultural resources, that is economic, social, symbolic, political, body, and personal resources. The quality of education someone has, that is knowledge and skills are his/her asset in choosing a decent job. On the contrary, the low level of one's education can have an implication in the increasingly low level of his/her bargaining value in selecting a job. The low level education does not only has an implication on the social awareness level. This occurs in two villages, that is Muntigunung and Pedahan villages, Karangasem Regency, Bali Province. The low quality of education traps him/her in a bad life that is to become a beggar. He or she also chooses a job as a beggar because of lack of awareness of the act of begging as a social pathology.

Education is not only obtained by someone from school, but also from family and even the latter is the beginning developer of one's cognitive structure. The low level education owned by a family of course will have an implication in the low level of social awareness socialized in the family. Family has an important role, as mentioned by Syarbini (2016) that

family is the first and major instituti born of education that plays a very important role in developing the child's trait, character and personality. In the family parents both father and mother become the most important examples for the children. Based on the observation and in-depth interview, it was found that begging spirit is born and formed in the family environment. If the father is a beggar or if the mother is a beggar or if both of them are beggars, then the children tend to become beggars. The activity of begging from Muntigunung and Pedahan villages are mostly done by women. This is quite a cause of concern since as the closest individual to the children psychologically a mother can easily influence the children's way of thinking. A mother who is a beggar tends to cause the children to become beggars too.

A highly educated person, sociologically, tends to have a broader range of occupational choices. Similarly, those with a high self-esteem and prestige. As the consequence, they do not only have a chance to avoid becoming beggars, but they also have a feeling of shame to become ones since beggars do not have a high prestige or becoming a beggar do not conform to their educational backgrounds. Education is the most important asset which Bourdieu categorizes as cultural capital which a person able to present himself in public (Fashri, 2014). On the contrary, a lowly educated person does not feel ashamed to become a beggar. Because the low education limits the chance for him/her to have a decent job in the formal sector. The job vacancies in the informal sector include a beggar. The people choose to be beggars since to be a beggar one does not need to have a diploma; it does not need finance; it does not a sophisticated gadget; it does not need a business permit, etc. (de Soto, 1991). The major capital needed is a willingness to eradicate shamefulness which at the same time means to neglect prestige.

Enhancement of education is one of the endeavor to address the wide spread of beggars. Thus, the Muntigunung village, Kubu district, Karangasem regency custom leaders meeting is held once a month (once in 35 days) on *Wage* Wednesday (*buda wage* day) to make a *perarem* (a customary regulation) about the obligation of the village community members. One of the regulations is compulsory education for children of 7 - 12 years old at the primary school. Muntigunung village head stated that the regulation drafted in the meeting of custom leaders had been effective, but it was not yet optimal. This is because the regulation has not had a legal binding, since Muntigunung village, Kubu district, Karangasem regency up to now have not got a legitimate *awig-awig* (customary rule). Finally, all the activities are only based on *pararem* the implementation of which is based on the awareness of the *krama*/village community members themselves.

The process of education starts from the family and mother is very important in to educate children to have autonomous attitude since she is regarded the nearest person to the children. A mother can understand the forms of approaches that have to be used to teach the children. A mother is model for the children to grow, thus if she is practicing begging, then the children will follow her footsteps. The involvement of women, especially those who have been married in begging are caused by some factors such as 1) the people's economic condition is very bad and the incomes that they earn from seasonal farming cannot meet their basic needs; 2) the land that is cultivated is very narrow. Even some of them do not have any cultivated land at all; and 3) the narrow range of jobs available which the local people need.

The fact that there is a narrow range of jobs available for them cannot be separated from their low education. The results show that the most part of beggars (71.43%) never had any education, and the rest (28,53%) did not graduate from elementary school. In general, this shows a very low quality of capital that the beggars have seen from their educational level. Referring to the research results of Iqbali's work (2014) that women mostly (17 people) do the begging Sadia et al. (2016) showed that the number of beggars coming from Muntigunung village is 80; and those who came from Pedahan village is 58, most of them (70%) are women. This is not separable from the role of women , especially when they are adults and/or are married structurally have the domestic work, that is managing all that are related to women affairs, are also required to meet the family's everyday life need. They do the begging activities probably because of discoursive and practical influence. The discursive

awareness refers to one's capability to reflect and to give an explanation to meet their family need. Begging activity will make it easy for them to earn money in such a way that it will sooner or later continually become structured (Giddens, in Priyono, 2002).

The Low Value of Small Change as an Important Factor in the Maintenance of Beggars in Bali. The number of beggars is increasing in cities such as Denpasar because they get money easily. The money that they get is in small changes. This cannot be separated from the low value of small change. People give a low value to small changes especially IDR 1,000 and IDR 2,000 and this opens a business opportunity to others. Based on the interview with someone who does a begging while singing activity around traffic lights in Denpasar, a business opportunity was revealed as follows.

"In every traffic light area I can get money from IDR 1,000 to IDR 5,000 for every time the light turns green. If in an hour this occurs thirty times, then the amount of money that I get in an hour is from IDR 30,000 to IDR 150,000, then if I work for 8 hours in a day, then my daily income is around IDR 240,000 up to IDR 1,200,000, an good amount of money compared to working at a firm which does not guarantee that you get this much (Deni, 28, interviewed on the 15th of July 2016)."

The fantastic amount of money can be earned by a beggar who begs while singing a song, which if totaled for a month then he or she will get IDR 7,200,000 up to IDR 36,000,000. By looking at the fact that the amount earned by the beggar is great, new beggars start to be seen in Denpasar area.

Since the amount of money that one gets by working as *pengamen* (a singing beggar) makes it very common in many places in Denpasar. This practice has a lot in common with just begging, that is asking for money without working and this act does not need much money.

The small changes issued by the government of Indonesia are actually important means of trading, especially in traditional markets but this has a negative effect. Most of the people at the middle and high class tend to use banknotes of high value in doing a transaction. This causes small changes to be kept and used for other purposes, including giving them freely to the beggars. Borgias (2013) talks about *eligo ergo sum* which means 'I choose, therefore I exist.' humans as creatures who have a desire always want to exist in the society. Thus, when some people give small changes to the beggars this act communicates the message that they are good people who can donate their money to the poor. Actually the same message could have been expressed by other ways, like by donating money to an orphanage where it is very obvious that there are many children without parents and are in need of money to improve their quality of life, which is not the same as giving money freely to those who regard small money as a business opportunity.

Suyanto (2013) states that contemporary sociology is based on the assumption that an individual's act in economic sector is influenced by social relations. In addition, it is also assumed that the thing that is called an economic act is not always rational-calculative, and is not free from giving material help without considering who is being helped. In addition, the desire to be regarded as a person with a high social spirit is also the goal of a donor, without considering the background of the begging activity and the life that the beggar is focusing at the time he or she is at home from begging. For this reason, a more rational and humane valuation of small change, whatever is the value needs to be improved, since this can cause a negative impact , that is the emergence of structured beggars. On the other hand there is also the assumption that helping the poor including the beggar can provide a positive influence in the life. As proposed Ahmadi (2010) said "The examination of peoples' attitudes toward begging and beggars indicated that in people's opinion helping beggars can have a positive effects on human life therefore for some social groups such as people of rural social origin and people with low education and married people and those of low education and married people and those of low social classes, the beggars, and their community have a positive function for the society and they have favorable feeling toward them". Thus, the attitude of good people who always gave some money to beggars will be one of the inhibiting factors in solving the problem of beggars.

Pragmatical Attitude in Meeting the Demand of Lifestyle Makes a Person Justifies the Means to Get Money in an Instant. The choice to be a beggar is seen as an opportunity to get money easily. In general, a begging activity is done by a person with a low social awareness with a pragmatically attitude. Barker (2005) mentions that the pragmatically attitude has become a habit in the society including those who see that to be a beggar one does not need to work hard but can earn money. Although it is realized that to become a beggar is bad, they still keep on becoming one. This cannot be separated from the benefit that one gets without working hard. Especially, when the money earned by begging can exceed the amount one gets after working a full day, and this causes it very difficult to stop the practice without the participation of all people, including those who regard that is better to give small changes to the beggars.

Ignoring the shame or prestige, is done not only because of the fact that one cannot help as the concomitant effect of not having a diploma, but can also be caused by an opportunity and time that one becomes a beggar whose number is high. Formerly, the number of beggars was small and was initiated by the people who could defeat their shameful feeling, but following the human's tendency to like to imitate or follow other's footsteps, then if there is a successful beggar, others will follow his/her footsteps, which causes the increasing number of beggars. So the number of beggars becomes higher and higher. As the consequence, the feeling of shamefulness disappears, because beggars have become a feasible pattern in one's living. Even, it can cause a reversed phenomenon that is people who do not beg become ashamed, since it breaks the general pattern in a community.

Begging behavior in the community is also caused by the act of imitating a friend who is successful in collecting money from begging, this changes the perspective into the one that sees begging as a shortcut to get money. With the begging behavior a symbolic interaction develops. Blumer (in Poloma, 2010) states that a symbolic interaction is geared to three premises: 1) humans react to something based on the meaning of that thing to them; 2) the meaning comes from his or her social interaction with others and 3) the meaning is perfected at the time the social interaction takes place. They use ways that shows their miserable conditions or carrying with them babies to make people want to give them money.

The beggar's action in doing his or her activity closely follows the human nature as homo socius, they are not only bound by social structure, that is that they become members of the village or town community, but they also form a begging social system. It means that in doing the begging practice they form a social system, usually formal and neatly organized or the reverse by forming an informal social group (Walgito, 2007). This is very important to meet various needs during the time they are away from home. However, whatever form the group takes, it of course, has values and norms as the morality principle to guarantee the group life.

In whatever form the social system is, the infrastructure that is related to the beggar's life cannot be separated from the ideological super structure. Ideological superstructure is the recipe to act as a beggar in the social structure by involving various aspects of material infrastructure. For example, the power game in the *kuren* environment (wife environment) can cause a beggar to appear - mother and or children are tied to ideology, that is gender ideology and paternalistic ideology. Even it does not preclude the probability of the role of religion, that is a child obeys his or her parent or a woman obeys her husband, or it can also be caused by Hindu religion. Hinduism orders a woman to respect her husband or a child to respect his or her parents. In the same way the choice of an occupation as a beggar can also be caused by the idea or value system that sees a begging job as feasible (religiously legitimate) seen from the normative principle. When this is related to work ethic, then a beggar can be seen in the work ethic perspective. Does a beggar have a low achievement motivation (McClelland, 1987). Even not less in importance is that a beggar leaves the work in agricultural sector, or it can also be seen from the limitation of the knowledge that the beggars have about agriculture and or other sources of income.

The Involvement of Some Persons in the Community in Beggar Communities in Bali. Beggars in the Muntigunung Village and Pedahan Village are mostly a women. Life stressors

experienced by women who live in a dry area with various limitations cause them as a beggar. In this study women have a very important role in the movement of beggars in the Muntigunung Village and Pedahan Village. Women who have limited cultural capital such as less of education caused them do not think better before making himself as a beggar. Moreover, they were not understanding the importance of cleanliness in life, causing women in both of the village take their children while practice as beggars. The same findings to Khan, Menka et al. (2013) which explains “Poverty and unemployment are the main problems found among the beggars in the study area along with the problems like irregular supply of water, lack of sanitation, and proper housing condition. The condition of women in the Muntigunung Village and Pedahan Village in addition to having a variety of limitations, they also at under pressure, where their husbands often tell them to beg that the results are used for fun”.

Begging done by the people in Muntigunung and Pedahan villages, Karangasem regency, Bali is not only caused by the lack of awareness of the people, low value of small changes, and the pragmatical attitude of the lower class people. This phenomenon also happens because of the pressure from some persons in the community who downgrade women, as implied in the patriarchal ideology. The weak position of women and the strength of patriarchal culture are caused by paternalistic power in the patriarchal culture. The paternalistic power which is indeed the main element in patriarchy directly makes women have under men’s control. Men’s power in patriarchal culture can be illustrated through Bhasin’s account (2002, in Atmadja, 2010) as follows.

“The accurate way to describe men’s control over women is through paternalistic power. There is power, but is paternalistic in character since women are given a place to live, food and security vis-a-vis outsiders. Paternalistic power has oppressive aspects, but it also involves a set of mutual responsibilities which are often regarded non-oppressive. It is this that makes it difficult to be recognized and opposed (Bhasin, 2002, in Atmadja, 2010)”

Understanding men’s power that is legalized in the patriarchal culture is interesting and needs to be scrutinized, since there are many implications that surface especially in women’s life, including female beggars in Muntigunung and Pedahan villages.

The power relation in the family is not less in importance in the context of emergence of beggars. As it happens in Balinese community, in a nuclear family or *kuren* family (wife family) there is a power relation, that is hierarchically, the power is centered in the father. The father has power over the wife and the children. The father and the mother are parents to the children and have power over them (Atmadja, 2010). Such power relation can easily make the emergence of a beggar. In this context, the father, for example, both because of poverty or laziness or the desire to show that he is the king in the *kuren* - human behavior is motivated by the desire to hold the power, can easily use his power that is by forcing the wife and children to become beggars. Similarly, the father and the wife as parents, who have power over their children, can easily force them to become beggars.

The force by the father toward his wife and children to become beggars, and similarly the force by the parents toward their children to become beggars do not always mean a physical force or using physical violence commonly called domination, but it can also be done gently or through the rising of cultural awareness called hegemony. Thus, it can be concluded that a person’s background to be a beggar is not always due to his or her internal motivation, but can be related to power game that is centered in the father that is directed to the wife and children. The persons who are poor in power, that is, the mother and the children can easily be forced to become beggars by using violence, that is, physical, economic and or symbolic power (Atmadja, 2010).

Power does not only resides in the family, but it also exists in communities, that is *desa pakraman* and *desa dinas*. The power attached to *desa pakraman* - in *prajuru desa pakraman* and in power in *desa dinas* is in the hands of the head of the village. The power attached to these officials, actually, can control their residents not to become beggars, both preventively and curatively. But the reality is different, that is they do not care. The cause can be because the power of *prajuru desa pakraman* and the head of the village is very small so that it is not strong enough for prohibiting the residents to become beggars. Not to mention

the social relation between him and the resident, for example the close relation between *prajuru desa pakraman* and the head of the village with the beggars, especially with the pragmatically frame of thought to get some benefit from the begging activity, which can cause the power they have is not used optimally or even is used in a compromise. Such a condition causes the power capital disfunction so that consciously or unconsciously, *prajuru desa pakraman* and the head of the village who can legally and formally use their power to prevent begging practice act on the opposite way, that is they allow or pretend not to know the existence of beggars and use rationalization to defend themselves.

Alternative Solution in Minimizing the Number of Beggars in Bali. Muntigunung and Pedahan villages are a dry land which causes part of their society choose to live as beggars. The people in the villages pay less attention to what other people say about their so-called profession due to their low education. This research attempts to seek an alternative solution which should imply in the reduction of number of beggars in the two villages.

Developing Handicraft Products Using Local Agricultural Crop as their Raw Materials as an Alternative Solution to Control the Number of Beggars in Bali. Agriculture as one aspect of Balinese culture has to be able to give benefits to the people in tourism. In line with the development of Tourism in Bali that rests on the community's culture, Pitana (2004) stresses that agriculture is the pillar of Balinese cultural life as follows.

"Balinese culture that is inspired by Hinduism generally makes all of the elements of its culture absorbed in Balinese community daily life dominated by agricultural life, so that Balinese culture is an agrarian-based culture. In this case, agrarian culture penetrates all aspects of life such as religious ritual cycles, the contents of material in every ritual, worship of gods so that agricultural life is the pillar of the cultural life (Pitana, 2004)".

Understanding that agriculture is the pillar of Balinese community life makes it necessary to have an appropriate strategy in using agriculture and its products so that through the agricultural life the people can increase their economic welfare, including through creating tourism products from the agricultural products. Purwanto (2009) explains that the agricultural vision in the 21st century is the creation of modern agriculture, that is strong, and efficient. To achieve this the farmers need to be empowered to create farmers who are modern, autonomous, wealthy and fair. Agriculture as an industry that has existed since the old day should receive more attention in order its sustainability can be maintained so that the farmers can be wealthy. The agricultural industry itself, if we focus on it well and if we accept various positive developments, will produce optimal yields. Similarly, the development in science and technology for agriculture produced by academicians and practitioners need to receive attention both from the agricultural community and the government.

Agricultural crops of the community that are processed into tourism products can be categorized as cultural industry. Using the perspective of Frankfurt school, cultural industry is a product produced for mass consumption, in a big number and determines the characteristic of the consumption, in which two characteristics that characterize cultural industry are the presence of standardization and individualism (Suyanto, 2013). Cultural industry can be defined as a culture that has undergone commodification and industrialization. Along with the development of creative industry by the government of Indonesia to improve the economy of the community, cultural industry also undergoes a rapid growth.

Culinary as cultural heritage is a cultural product that is appropriate to be developed since in its development it has a close economic relation with creative industry (Ardika, 2004). Culinary as one of the heritages of Balinese community also experiences commodification and industrialization processes to become cultural product as the development of cultural tourism. In this case, the agricultural products of the community can be processed in such a way to become tourism product of culinary, including palmyra palm tree sap produced from the processing of palmyra palm trees that grow well in the villages of Muntigunung and Pedahan.

Palmyra palm leaves are used to make handicrafts, such as cili (the leaves are plaited into a female figure as the symbol of Dewi Sri) (Covarrubias, 2013). The Cili form is used as a wall decoration, slippers, tissue box, and Hindu ritual facility. The palmyra palm leaf ribs are used to make *ingka* for fruit stand , spoon place, decorated lamp that are needed by

hotels, restaurants, and tourist destination areas. The use of palmyra palm leaves and leaf ribs that are available in abundance in nature are cheap if sold as raw materials. The processing of palmyra palm leaves and palmyra palm leaf ribs as souvenirs and as products used by hotels will raise the selling price of the handicrafts of Muntigunung and Pedahan villages. Balinese women actually have the skill in making *janur* for temple rituals. That skill is a cultural capital that can be used to obtain economic capital, in line with Bourdieu's idea that cultural capital can be exchanged for economic capital and the reverse (Bourdieu, in Fashri, 2014:110). By training the beggar- residents in the villages of Muntigunung and Pedahan in making decoration handicrafts from the leaves and leaf ribs of palmyra palm we can improve their skill (cultural capital) which will be followed by an increase in their economic capital. The ownership of cultural capital and economic capital by the beggar communities in Muntigunung and Pedahan villages will arouse the awareness of "shamefulness culture " and will end with the decrease in the begging activity. The activity in the community service conducted by Sadia et al. (2013) the program called Ipteks bagi Wilayah (IbW) which lasted for three years (2011-2013) showed that humanistic sociological approach and life skills training for beggar community in the villages of Muntigunung and Pedahan could decrease the number of beggars who joined the IbW program by 65%.

The Importance of Involving Women Public Figures in Controlling the Number of Beggars in Bali. Most of the people who become beggars in Muntigunung and Pedahan villages, Karangasem regency, Bali province are women. Most of the women beggars are married with or without children. Ironically, babies are often used by the women when begging, even the babies selected tend to be female. Based on the findings in this study, this is because of the oppression by men who have the position as the heads of the families. They often force their wives and daughters to beg. This fits in the literal meaning of patriarchy given by Bhasin (1996) who defines patriarchy as men's power. In this case, in the community life or family life in the patriarchal culture, whether the members are willing or not to accept it, it is men who hold authority, regulating everything. This is true with women in the villages of Muntigunung and Pedahan villages.

Based on the findings in this study, some women are also aware that a beggar is not a profession but a social pathology that has to be treated in order that it will not happen to the next generations. Women who are aware need a model of women who are public figures and capable of creating a piece of work which can be exchanged for money. In this context, there is need for the role of women who have a strong capital to drive other women who are still beggars to change profession into craftswomen by creating various handicrafts using agricultural products as their raw materials. Various forms of activities done by women in the two villages both by women who have never been beggars and those who are beggars as shown in Figure 1 below.

Figure 1 – Women in Muntigunung Village Who are Making Handicrafts Using Palmyra Palm Tree Agricultural Products as their Raw Materials

In this study, the approach to the women in Muntigunung Village was done to change the paradigm of thinking that begging activities are activities that are bad. In this study, women are taught to process agricultural products into the tourism product. It is similar to that performed by Namwata et al. (2014) in his article titled "Consequences of Begging and Future Aspiration of Beggras to Stop Begging Life in Central Tanzania". Namwata et al. (2014) said “The most effective approach to solving the issue to street begging is trough counseling. It is a process of helping beggars to engage in better choices in order to have future plans and aspirations to get rid off begging life. Counseling can also help beggars to be assertive and in the process become asset instead of liabilities to their families and society at large. In this case, counselors can apply their skills in vocational, educational-social counselling will enable beggars to explore alternative ways off utilizing their acquired skills”. In the course of this research, women in the Muntigunung Village and Pedahan Village invited to Developing Merchandise for Tourism by Using Palmyra Palm Leaf Ribs,Palmyra Palm Leaves and Palmyra Palm Sap.

The Importance of the Acceptability of Products Produced by the Beggar Community by Tourism Industry. The acceptability of handicrafts produced by the beggar community in the villages of Muntigunung and Pedahan by tourism industry is very important. It is important that their products be widely accepted, including by tourism industry, the major industry in Bali, including Karangasem regency and this will have an impact on their perspective in which they believe that they can earn money by using a better way. To reach this goal, the roles of various parties: the government, tourism industry actors and academicians are needed in order that the products produced by the beggar communities can have a direct impact on their economic life. In order the products produced can become tourism industrial products, the way how the products is presented has to conform to the needs and demands of tourism. To achieve this objective the writers did in-depth interview in some starred hotels to find out the types of products that can be developed by the communities in the villages of Muntigunung and Pedahan, Karangasem Regency, Bali Province.

Tourism products are the obligatory elements in developing tourism. In Muljadi and Warman (2014) it is explained that tourism products are the real and unreal things in the series of tours that can only be enjoyed when all of the series can offer good and satisfying experiences to the tourists. In this context, the tourism products meant can take the form of goods and services. Food, beverages a handicrafts produced by Balinese people can also be categorized as tourism products. Understanding the tourists’ desire to get satisfying services, now there are many tourism products like food, beverages and handicrafts that are produced openly. In this case, the tourism product centers give an opportunity to the tourists to come to the centers to see the process of making the tourism products. It is this that becomes an added value to the tourism products. Government, especially at the district level of government in this regard is expected to be a medium that helps in the marketing of products produced by the people in the Muntigunung village and Pedahan village , so that the sustainability of the production will be able to overcome the problem of beggars who have switched as artisans. As proposed Namwata et al. (2014) that likewise, the local and central governments must support beggar by integrated methods, based not only on prohibition, but also on a range of job offers.

Kotler and Amstrong (1989) gives us a perspective that agricultural products produced by farmers have a great potential to be developed into tourism products. In this case, Palmyra palm tree agricultural products that are processed into brown sugar or other kinds of plaited work can be presented as international tourism products which are easy to carry, clean and hygienic and safe.

CONCLUSION

The development of handicrafts using local agricultural products (leaf ribs, leaves and sap of Palmyra palm trees) can become an alternative in controlling the number of beggars who spread over Bali. In the light of observation in the field it is clear that the existing

agricultural products in the villages of Muntigunung and Pedahan, Karangasem Regency, Bali can be processed into various handicrafts and the raw material for food. The communities in the two villages who focus on the making of the tourism products are mostly women. They need to be oriented to choose the processing of agricultural products rather than to become beggars, although they can collect more money from the begging activity.

The involvement of women in developing the handicrafts is very important, considering that so far the number of women beggars is significantly numerous. The nature of human as an imitating creature is one of the factors why a person chooses a job. Thus in developing the women groups who are socially aware and capable of earning much money through creating handicrafts has to be done intensively, in order that the women who are still beggars are interested in being involved in the activity and gradually can leave their jobs as beggars.

The acceptability by tourism industry in Bali of the products produced by the beggar community to stimulate women not to be beggars any longer is very important to be done. With the acceptance of the products produced by the communities in Muntigunung and Pedahan villages, especially for those who are ex-beggars by tourism industry can become an appeal to other women beggars to be involved in the production of the handicrafts. The economic benefit felt directly through the sale of the handicrafts as tourism products will give them a deep understanding that there are better jobs than becoming a beggar.

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INSTITUTIONAL PERFORMANCE ANALYSIS OF UPPB ON RUBBER TRADE SYSTEM IN SOUTH SUMATRA, INDONESIA

Novayanti*
Agricultural and Food Security Agency, Palembang, Indonesia

Sriati, **Yamin**, **Amruzi Minha**
[2]Faculty of Agriculture, University of Sriwijaya, Indonesia

*E-mail: novayantikushartoyo@yahoo.com

ABSTRACT
A study of the institutional performance of Natural Rubber Processing and Marketing Unit (*Unit Pengolahan dan Pemasaran Bokar* or UPPB) on rubber trade system in South Sumatra. The purpose of this study is to analyze the institutional performance of UPPB on rubber business administration in South Sumatra. The institutional performance of UPPB on rubber marketing in South Sumatra is influenced by the characteristics of its farmers, institution, institution leadership, values, and local government (autonomy implementation). While on the other hand, the physical and social environment of the farmers, institution leadership, and social institution do not affect the institutional performance of UPPB. In addition to that, the institutional performance of UPPB has certainly affected the welfare of the farmers. If the institutional performance is increasing, the welfare of the farmers will be improved too (vice versa).

KEY WORDS
UPPB, institutional performance, trade system, rubber marketing.

Indonesia is one of the countries which has a fairly extensive rubber plantation. Based on the data from Indonesian Plantation Research Center, an approximately 85,17% of about 3,5 million hectares' area of rubber plantation is the people's plantation in which it involves 2,093,803 farmers. Another thing about this fact is that the area of people's rubber plantation has increased by 1,78% in the last 10 years.

Based on a review of *Bank Indonesia* (The Indonesian Bank) , not only as a source of foreign exchange revenue, rubber industry is also a source of employment in which 53,4% of South Sumatra's population work in the agriculture sector, especially the rubber business. However, the contribution of rubber in the economy tends to be down as a result of a decreased rubber commodity export due to a lower commodity price. Of the average total rubber export in Sumatra per year, the value of the loss has reached between the price of $364,78 per year. This was caused by the rubber price in Indonesia that was happened to be the lowest compared to other countries because of its low quality. With the decreased rubber commodity export and price, this made farmers' welfare to be dropped in which it was reflected in the fall of NTP (*Nilai Tukar Petani* or Farmers' Exchange Rate).

Historically, in the natural rubber trade system, an institutional system that regulates the interaction between actors in natural rubber marketing system has been formed naturally. Rubber farmers sell their product to the peasants who are generally own a convenience store or smokehouse. The relationship between peasants with farmers is formed in an institution in the form of agreement (rules) that regulates not only limited to the transactions of natural rubber but also in terms of farmers' basic needs. Based on the author's observation, the trade system of natural rubber in South Sumatra shows a very complex structure and directed to oligopsonistic market.

In the regulation of the Minister of Agriculture number 38 article 16 of 2008, it is stated that in term of natural rubber processing and marketing activities, the farmers are being grouped in UPPB (Natural Rubber Processing and Marketing Unit or *Unit Pengolahan dan*

Pemasaran Bokar); there are 8 regencies/cities in South Sumatra which have UPPB. The total UPPB in South Sumatra is as much as 72 UPPB, however, there are only 7 regencies/cities in South Sumatra which have a registered UPPB (precisely, there are 71 registered UPPB). In correlation with that, this study aims to analyze the institutional performance of UPPB on natural rubber business administration in South Sumatra.

LITERATURE REVIEW

The term institutional includes two important demarcation, such as (1) norms and conventions, and (2) rules of the game. Sometimes, an institutional is formally written and enforced by government officials, but it also can be written informally due to the rules and norms which are adopted by society. So, an institution can be defined as collective activities in a control or jurisdiction, deliverance or liberation, and expansion of individual activities as mentioned above (Arifin, 2005).

Seen from the formation process, there are two forms of institutions, namely an institution which grows naturally and an institution which is constituted deliberately based on the purpose of development (Saptana, 2006). While according to Anindita (2004), an institutional trading system covers a wide range of business organization which is build to run a marketing system.

The Regulation of the Minister of Agriculture number 38/The Regulation of the Minister of Agriculture/OT.140/2008 regarding Guidelines for Natural Rubber Processing and Marketing is stipulated by the Minister of Agriculture on August 12, 2008, in which it consisted of 6 chapters and 39 articles. The scope of this regulation covers; Processing, Institutional, Marketing, Development, and Supervision. By that, in order to improve the economy scale in processing and marketing the enterprises, an institution of Natural Rubber Processing and Marketing Unit (UPPB) is established.

The performance or outcome in an institutional system is the result of a complex process that is influenced by various factors. (Ostrom, 2006).

RESEARCH METHODOLOGY

This study was conducted from September until December 2016 in South Sumatra Province as one of the largest rubber producers in Indonesia. The 7 districts/cities which were chosen to be the focus of this research were Ogan Ilir (OI), Muara Enim, Prabumulih, Ogan Komering Ilir (OKI), Ogan Komering Ulu, Ogan Komering Ulu Timur (OKUT), and Banyuasin. Those areas became the focus of this research not only by the fact that these 7 districts/cities were the center of rubber producers in South Sumatra but also that they had the institutional form of the rubber trade system in the registered UPPB and other agencies such as cooperatives and farmers'group. The selection of the seven locations was done intentionally (purposive) because each district/city has an institutional form of rubber trade system with the above provisions.

Furthermore, survey method and literature will be used as an object of study. In this study, survey method was limited by observing the phenomenon with the survey sample, data, and information from a group of respondents as a representative embodiment of the study object.

Moreover, the data used in this study were primary data and secondary data. Primary data was taken from respondents through interviews by using a structured questionnaire and in-depth interviews with several selected respondents. The source of primary data was not only from the employee of the registered UPPB and other institutions such as cooperatives and farmers' group but also from the rubber farmers in the local area of Ogan Ilir (OI), Muara Enim, Prabumulih, Ogan Komering Ilir (OKI), Ogan Komering Ulu, Ogan Komering Ulu Timur (OKUT), and Banyuasin. Meanwhile, the secondary data was obtained from various sources such as annual reports of district/city evaluation and relevant research literature.

The samples or subsets of this research were the institution of rubber trade system and farmers' in rubber production center districts/cities that have the registered UPPB and other

institutions such as cooperatives and farmers' group. In this study, there would be an assessment of the phenomenon of institutional performance on rubber trade system in South Sumatra and also an evaluation of the dimensions and interrelations by using SEM (Structural Equation Model) technique.

Based on the population distribution in each layer, the percentage that was used in the sampling was adapted to the number of the population so that it would be a representative of scientific principles. In all layers of samples, only 30% of the sample would be taken due to the fact that the population was < 1000. The sampling of this study was carried out with probability, which was a stratified random sampling. On the other hand, the amount of the samples which was taken in each stratum was based on a proportionate stratified random sampling. From 7 population, there would be 4 targeted population; the population was then divided into 2 strata based on the existence of registered UPPB and other institutions, namely:

The data processing and analysis which require the help of statistical tools was carried out by using descriptive statistics and inferential statistics. Besides that, the value of t_{count} compared with the value of t_{table} was used to know the difference between the mean of each variable in the 2 groups of samples. This means if $t_{arithmetic} \leq t_{table,}$ then, there was a difference in between the mean. Meanwhile, when $t_{count} > t_{table}$, then, there would be no difference between the mean of the samples that was tested at a significance level of $p < 0.05$ ($\alpha = 0.95$) or $p < 0.01$ ($\alpha = 0.99$).

RESULTS AND DISCUSSION

Table 1 – The Best Output Outer Model, AVE and Composite Reliability

Outer Loadings

	X1	X2	X3	X4
X110	0.800968			
X13	0.845960			
X23		1.000000		
X33			0.560991	
X36			0.863683	
X42				0.996880
X43				0.639998
	X5	**X6**	**X7**	**Y1**
X51	1.000000			
X61		0.920491		
X62		0.766646		
X72			1.000000	
Y110				0.790442
Y111				0.524613
Y12				0.529105
Y14				0.695794
Y15				0.774771
Y16				0.700107
Y18				0.617680

AVE

	AVE
X1	0.678599
X2	1.000000
X3	0.530330
X4	0.701684
X5	1.000000
X6	0.717525
X7	1.000000
Y1	0.448007

Composite Reliability

	Composite Reliability
X1	0.808415
X2	1.000000
X3	0.683621
X4	0.817878
X5	1.000000
X6	0.834393
X7	1.000000
Y1	0.847420

From the table above, the evaluation of outer model includes:

The value of outer loading is a measurement model coefficient which measures the construct validity of the PLS model. The value of this outer loading is considered valid when it is > 0,5. From the results of the output, as we can see above, all outer loading values are valid.

Average variance extracted (AVE) is the average of the outer loading variance which quantifies the construct validity of the PLS model. The value of AVE shows a valid (accurate) model when it is > 0,5. So, from the table, there is 1 invalid AVE which is the Y1 construct.

The value of composite reliability (CR) is a coefficient that determines a construct reliability of the PLS model. CR value is seen as a reliable (trustworthy) model when the CR is > 0,7. By that, we can conclude that 1 CR is not reliable (X3 construct). Due to the good values of outer loading, the value of AVE in Y1 construct and CR in X3 construct can be tolerated in order to protect the indicator of Y111, Y12, and X33 which are already valid.

Table 2 – Output Inner Model: R Square and Path Coefficients

R Square

	R Square
X1	
X2	
X3	
X4	
X5	
X6	
X7	
Y1	0.478040

Path Coefficients

	X5	X6	X7	Y1
X1				0.204898
X2				0.069346
X3				0.226750
X4				0.286699
X5				0.125333
X6				0.360715
X7				0.023142
Y1				

Significance test (t-test) for Path Coefficients is not succeeded, so, the bootstrapping method is given with this following results:

Table 3 – Output Inner Model with *Bootstrapping*: Path Coefficients (Mean, STDEV and T-Values)

Path Coefficients (Mean, STDEV, T-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)
X1 -> Y1	0.204898	0.205236	0.080941	0.080941
X2 -> Y1	0.069346	0.074293	0.104666	0.104666
X3 -> Y1	0.226750	0.217844	0.102080	0.102080
X4 -> Y1	0.286699	0.278687	0.107539	0.107539
X5 -> Y1	0.125333	0.117334	0.085001	0.085001
X6 -> Y1	0.360715	0.379582	0.133378	0.133378
X7 -> Y1	0.023142	0.020385	0.111595	0.111595

	T Statistics (|O/STERR|)
X1 -> Y1	2.531450
X2 -> Y1	0.662548
X3 -> Y1	2.221307
X4 -> Y1	2.665997
X5 -> Y1	1.474477
X6 -> Y1	2.704457
X7 -> Y1	0.207375

Outer evaluation model (measurement model), includes:

The value of outer loading is a coefficient which measures the construct validity of the PLS model. The value of this outer loading is considered valid when it is > 0,5. So, from the results, the values of valid outer loading are given in Table 4.

Average variance extracted (AVE) is the average of the outer loading variance which quantifies the construct validity of the PLS model. The value of AVE shows a valid (accurate) model when it is > 0,5. From the results of the output, all AVE values are valid.

The value of composite reliability (CR) is a coefficient that determines a construct reliability of the PLS model. CR value can be said as a reliable (trustworthy) model when the CR is > 0,7. As we can see from the output, all CR are reliable. Then, here is the summary of AVE and CR (Table 5).

The evaluation of inner model (structural model) is the path coefficients which measure the influence of the constructs. In order to test the path coefficients with t-test, the following hypothesis is given:

a. H_0: No partial effect (X1, X2, X3, X4, X5, X6, and X7 to Y1).
b. H_1: No partial effect (X1, X2, X3, X4, X5, X6, and X7 to Y1).

Table 4 – The value of outer loading with SEM-PLS UPPB

Construct	Indicator	Loading
X1	X110	0,800968
	X13	0,845960
X2	X23	1,000000
X3	X33	0,560991
	X36	0,863683
X4	X42	0,996880
	X43	0,639998
X5	X51	1,000000
X6	X61	0,920491
	X62	0,766646
X7	X72	1,000000
Y1	Y111	0,790442
	Y110	0,524613
	Y12	0,529105
	Y14	0,695794
	Y15	0,774771
	Y16	0,700107
	Y18	0,617680

Table 5 – The value of AVE and CR with SEM-PLS UPPB

Construct	AVE	CR
X1	0,678599	0,808415
X2	1,000000	1,000000
X3	0,530330	0,683621
X4	0,701684	0,817878
X5	1,000000	1,000000
X6	0,717525	0,834393
X7	1,000000	1,000000
Y1	0,448007	0,847420

In this t-test, the value of path coefficients is said to be statistically significant if the value of $|t\text{-}value| \geq t_{\alpha/2v}$. From here, a calculation of $\alpha/2 = 0,05/2 = 0,025$ dan $v = n - p = 144 - (18 + 7) = 199$ is generated, so that the value of t_{table} or $t_{\alpha/2v} = t_{0,025\ ,\ 119} = 1,9719$ (approach value on $v = 200$).

CONCLUSION

The institutional performance of UPPB on natural rubber trade system in South Sumatra is influenced by the characteristics of the farmers, institution, institution leadership, values, and local government (autonomy implementation). While on the other hand, the physical and social environment of the farmers, institution leadership, and social institution do not have any effect on the institutional performance of UPPB.

Besides that, the institutional performance of UPPB could affect the welfare of the farmers. When institutional performance is increased, the welfare of the farmers will also be enhanced, vice versa.

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THE PERSPECTIVE OF THE AGENCY THEORY IN BUDGET PREPARATION OF LOCAL GOVERNMENT AND ITS IMPLEMENTATION ON BUDGET PERFORMANCE AND FINANCIAL DECENTRALIZATION TO REALIZE PERFORMANCE OF LOCAL GOVERNMENT OF REGENCIES AND CITIES IN BANTEN PROVINCE

Marwan Jubery*
[1]Doctoral Program of Management, Faculty of Economics and Business, Universitas Brawijaya, Indonesia

Moeljadi, **Ananda Candra Fajri**, **Djazuli Atim**
[2]Faculty of Economics and Business, University of Brawijaya, Indonesia

*E-mail: marwanjubery@gmail.com

ABSTRACT
The purpose of this study is to examine and analyze the perspective of the Agency Theory in the formulation and implementation of local government budgets. This research was conducted at regencies / cities in Banten employing survey method and regression analysis in hypothesis testing. The population was all regencies / cities in Banten. Selection of the sample was the entire population (census). Data consisted of secondary data and was classified as panel data; covering the cross section and time series data. Sources of data were from DPKD[1], Bappeda[2] at regencies and cities, and the Central Bureau of Statistics in Banten from 2009 to 2014. The analysis was done using Path Analysis and Partial Least Square (PLS). The findings indicate that: (1) the change of PAD[3] does not affect the Opportunistic Behavior of the Legislators; (2) the amendment to the Budget of DPRD[4] positively affects the Opportunistic Behavior of the Legislators; (3) budget decentralization affects Regional Financial Performance; (4) budget decentralization does not affect the Local Government Performance; and (5) Regional Financial Performance affects Local Government Performance. Analysis on the Agency Theory Perspective shows that: (1) budget allocated for DPRD and infrastructure has increased, while budget on health and education has decreased; this indicates the Opportunistic Behavior of Legislators; and (2) when it comes to budget policies, the executive and legislative tend to practice moral hazard for their own self-interest; the fact reveals much bigger compared to development expenditures in APBD[5]. The decisions are related to the contracts given to outside parties, which can produce *rente*[6] in the form of commissions.

KEY WORDS
The perspective of the Agency Theory in public budgeting, opportunistic behavior of the legislators, decentralized budget, regional financial performance, local government performance

Opportunistic behavior may occur at all levels of public budgeting, from the planning to the payment of public funds. Political corruption may occur in the local budgeting process where political decisions are very dominant, done by diverting public resources allocation (Garamfalvi, 1997). Corruption in the implementation of the budget is administrative corruption as administrative decision is more dominant. In the end, political corruption will lead to administrative corruption. Opportunistic behavior brings much impact on budget allocation decisions for capital projects (Tanzi and Davoodi, 2002).

[1] *Dinas Pengelolaan Keuangan dan Aset Daerah, translated as the Office for Management of Regional Finance and Assets.*
[2] *Badan Perencanaan Pembangunan Daerah, translated as Development Planning Agency at Sub-National Level.*
[3] *Pendapatan Asli Daerah, translated as Locally Generated Revenue.*
[4] *Dewan Perakilan Rakyat Daerah, translated as Regional House of Representative.*
[5] *Anggaran Pendapatan dan Belanja Daerah, translated as Local Revenue and Expenditure or Local Budget.*
[6] *Some kind of interests.*

Opportunistic behavior of politicians in decision-making related to public investment is caused by decisions related to (1) the amount of the public investment, (2) the composition of the public investment, (3) the selection of specific projects and location, and (4) the design of each public investment project. The decisions are related to the contracts given to outside parties, which can produce *rente* in the form of commissions. Thus, corruption would increase the number, magnitude, and complexity of the projects, causing: (1) an increase in the ratio of public investment to GDP; (2) a decrease in the productivity of public investment; (3) a reduction in the allocation for public services budget; and (4) a decline in economic growth (Tanzi and Davoodi, 2002).

Inappropriate political representation and weak institutions lead to many opportunities for political corruption. The findings of Abdullah and Asmara (2006) show that legislators in some local governments in Indonesia show opportunistic behavior in the budgeting process; they use the process for political corruption. Therefore, to explain the phenomenon of self-interest in the public budgeting, Agency Theory can be used as a theoretical basis (Christensen, 1992; Johnson, 1994; Smith and Bertozzi, 1998).

The perspective of Agency Theory in the formulation and implementation of local government budgets in essence sees how people vote for politicians to make public policy and they provide the funds by paying the tax (Von Hagen, 2002). The politicians should represent the interests of the people in budget allocation. In fact, the legislators do not always have the same preferences with the public (Groehendijk, 1997). Therefore, Lupia and Mc Cubbins, 2000 warn that the delegation of authority has the consequences of abdication. The issue of abdication becomes more real when there is no formal institution that serves to supervise the performance of legislators.

The role of the central government towards fiscal decentralization policy is considered a way out for the welfare of the community, because local governments know the actual priorities or the main programs in implementing the budget for the welfare of the society (Musgrave, 1959; Oates, 1993). Granting fiscal authority and transfer of funds by the central government is intended to enable local finance and authority for the area to manage all local financial potential optimally.

Budget decentralization does not affect the performance of local governments. Budget decentralization can actually create an opportunity for local governments to undertake less responsible and less sustainable spending, if it is done without institutional readiness of administration and bureaucracy as well as adequate human resources (Phillips and Woller, 1997). The findings are supported by Stephen and Russek (1997) on the impact of the fiscal structure on economic growth. First, the increase in the budget surplus will boost economic growth, when spending on education or public transport can be reduced or corporate income tax can be increased. Second, if the sales tax and other taxes are used for transfer payment, then economic growth will decrease, but if corporate income tax is used for transfer payment then economic growth will increase. Third, tax will negatively affect economic growth when state revenue is used to fund education, public transportation, and public safety. Those findings show that economic growth happens when fiscal is intended to increase income tax and sales tax, but not to community service.

Decentralization is expected to encourage the local experience of the local government, by studying the experience of other regions in the implementation of decentralization (Musgrave, 1959; Oates, 1993). This also will realize local accountability, i.e. to encourage local governments to be able to distribute and allocate resources to the welfare of society by taking into account the rights of its people. Rights of these communities include service to the community, especially health care, education, and infrastructure.

THEORETICAL AND HYPOTHETICAL REVIEW

The Perspective of the Agency Theory in the Process of Local Government Budget. The rationality in the Agency Theory is as follows. The principal makes a contract with the agency, either implicitly or explicitly, in the hope that the agency will do the job as desired by the principal. Agents are considered to have a lot of information about actual performance,

budget management, motivation, and real purpose. Executives want to maximize their budgets in the formulation and implementation of local government budgets, but in reality, the executive tends to do “budgetary slack” and leads to the misallocation of the budget for their own benefit (self-interest). This potentially creates moral hazard and adverse selection. The tendency of misallocation in government spending is part of a political battle between the politicians and executives, which never benefit the poor. When the allocation decisions are made, their motivation to output budget is rent seeking. The preference of the legislators (DPRD) is over their own budget and infrastructure projects because it is easier to use for the fulfillment of the promise to their voters (Keefer and Khemani, 2003).

The Perspective of the Agency Theory in the Implementation of Local Government Budget. The perspective of the Agency Theory on Local Government Budget Implementation quantitatively and structurally can be analyzed through policies that have been taken in local government budgeting process previously associated with decision-making: (1) the amount of the public investment, (2) the composition of the public investment, (3) the selection of specific projects and location, and (4) the design of each public investment project. The decisions are related to the contracts given to outside parties, which can produce *rente* in the form of commissions.

RESEARCH FRAMEWORK AND OPERATIONAL VARIABLE

According to Garamfalvi (1997), corruption can occur at all levels of budgeting, from planning to the payment of public funds. Political corruption may occur in the local budgeting process where political decisions are very dominant, done by diverting public resources allocation. Corruption in the implementation of the budget is administrative corruption as administrative decision is more dominant. In the end, political corruption will lead to administrative corruption.

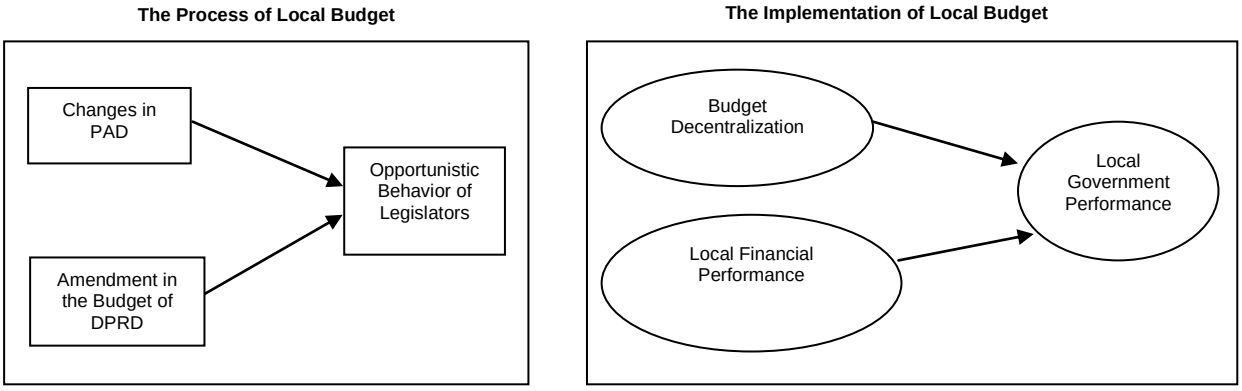

Figure 1 – Research Framework

Operational Definition for Amendment in the Budget of DPRD. In budgeting, conflicts happen between the legislature (principal) with government / local government (agent) in the case of: 1) preparation of APBD, especially in the post of budget for DPRD; 2) the position of DPRD budget to PAD; 3) the position of protocol for legislators and their facilities; and 4) the discussion of the annual accountability report by the regional head (Yudhoyono, 2004: 39). DPRD has different preferences with executives on the total budget for DPRD, education, health, and infrastructure (Abdullah, 2004). Operational definition of variable of DPRD budget amendment (PDPRD) in this study was calculated from the percentage of the increase in DPRD budget and the secretariat budget of the current year reduced by DPRD budget and the secretariat budget of the previous year.

Operational Definition for Opportunistic Behavior of the Legislators. Results of research by Tanzi and Davoodi (2002) provide evidence of opportunistic behavior of politicians in making decisions on public investment. The politicians make decisions related to ((1) the

amount of the public investment, (2) the composition of the public investment, (3) the selection of specific projects and location, and (4) the design of each public investment project. The decisions are related to the contracts given to outside parties, which can produce *rente* in the form of commissions. Operational definitions of opportunistic behavior (OL) in this study is: 1) calculating the spread of budget for education (ΔPdk), health (ΔKes), public works (ΔPU), and DPRD (ΔLeg) and; 2) accumulating ΔPdk, Δkes, ΔPU, and ΔLeg.

Operational Definition for Budget Decentralization. There are three indicators for budget decentralization based on empirical findings. First, it is measured by the ratio of the total expenditure of each regencies / cities (APBD) to total government expenditure (APBN) (Phillips and Woller, 1997; Zhang and Zou, 1998). Second, it is measured by the ratio of the total development expenditure of regencies / cities (APBD) to total national development expenditure (APBN) (Zhang and Zhou, 1998). The local government is authorized to determine the allocation of the expenditure which is to increase local revenue (PAD).

Operational Definition for Local Financial Performance. There are some measures in government organizations to measure the financial performance, i.e. independence ratio, effectiveness ratio, efficiency ratio, and growth ratio (Halim, 2007). Local independence ratio is interpreted by comparing the total revenue (PAD) toward DAU[7] (Halim, 2007: 232; Uchimura and Suzuki, 2009; Bird, 1993; and Khusaini, 2006. Local effectiveness ratio refers to the comparison of realized local revenues toward the target set by the real potential of the area (Halim, 2007: 234). Local efficiency ratio refers to the ratio between the total expenditure toward total revenue (Halim, 2007: 234). Local growth revenue ratio is calculated by subtracting the revenue of the year with the revenue of the previous year (Halim, 2007: 241).

Financial performance of local government is said to be good if the management is independent or less dependence on the central government in the use of sources of local income. It is effective in achieving the realization of the targets that have been planned, meaning that the use of the budget is based on the target. It is efficient in activities and budget, meaning that spending is only intended for the main programs or priorities of development directly, and is coupled with the increase in the sources of the income. Finally, local revenue increases from year to year.

Operational Definition for Local Government Performance. Local Government Performance is based on welfare and is defined as success in improving public services. Achievement of basic needs for the people is reflected in the Human Development Index (HDI) (Lindahman and Thurmaier, 2002). The united National Development Program (UNDP) has been using this index since 1990 to measure the achievement of human development of a country. Although it cannot measure all dimensions of development, but it is able to measure basic dimensions of human development thought as the reflection of the status of basic capabilities of population (Chiristy and Adi, 2009).

However, the application of HDI as the measure of the public service if supported with adequate local infrastructure will accelerate the improvement of public services. Performance is said to be good if local governments increased public services; increased community service can be indicated by the increased budget for health for the sake of increasing Life Expectancy Index, by the increased budget for education for the sake of increasing Education Index, and by the increased budget for infrastructure for the enhancement of the Regional Infrastructure Development Index.

RESEARCH HYPOTHESES

The Effect of Change in PAD toward Opportunistic Behavior of Legislators. The preference of legislators is on infrastructure projects because it is easier to use for the fulfillment of their campaign promise to their voters (Keefer and Khemani, 2003). Education and health are basic needs that should be given by the government, both central and local,

[7] *Dana Alokasi Umum, translated as General Allocation Fund.*

and influence economic growth (Davoodi *et al*., 2003; Gupta *et al*., 2002). The increase on PAD brings positive effect on the budget allocation for DPRD (Abdullah, 2004).

The findings of the previous study by Sularso and Restianto (2011) in the Province of Central Java are as follows. First, the larger the amount of revenue by regencies or cities, the greater the opportunistic behavior in the budgeting process is. Second, the greater the number of SiLPA in the budgeting of regencies or cities, the greater the opportunistic behavior is. The greater the amount of DAU received by regencies or cities, the greater the opportunistic behavior is. Thus, the first hypothesis in this study is:

H1: The change in PAD affects opportunistic behavior of legislators.

The Effect of Amendment in the DPRD Budget toward Opportunistic Behavior of Legislators. Differences in preferences between the executive and the legislative in budget allocation will result in Opportunistic Behavior of the legislators. DPRD can force the executives in sectorial expenditure allocations. Allocation for infrastructure and DPRD is proposed to increase, but the allocation for education and health is decreased. Enormous discretionary power of legislative in terms of supervision and budget causes discretion over the use of the DPRD budget not in accordance with public preferences (Abdullah, 2004). Previous finding by Colombatto (2001) state that changes in DPRD budget affects the Opportunistic Behavior of the legislators. Thus, in this study, the second hypothesis proposed is:

H2: Amendment in the DPRD budget affects Opportunistic Behavior of legislators.

The Effect of Budget Decentralization toward Local Financial Performance. The results of the research by Andros M P Hasugian (2006) entitled "The Impact of Fiscal Decentralization toward the Regional Financial Performance and Poverty in the Cities and Regencies of West Java Province" show that the central government's fiscal decentralization is the right step. In addition to revenue increase, fiscal decentralization also reduces poverty. Indication on the dependence of local governments on the central government is still high.

The mechanism of transfer of the central government can reduce the gap with the local governments, but not the gap between regions (Sumedi, 2005). Independence level decreases after decentralization, while PAD levels of urban areas are greater than other areas do (Pakasi, 2005).

Structural expenditure of each regencies or cities in Banten is reflected in the extent to which direct spending dominates routine spending. Ideally, local government budget should be used for development spending rather than for others. The findings by Demelo (2000) show decentralization of government budget will increase knowledge about the characteristics and needs of local communities. This knowledge will encourage more areas to be independent, effective, and efficient, as well as encourage public accountability and transparency in the provision of public services and more democratic decision-making. Thus, in this study, the third hypothesis proposed is:

H3: Budget decentralization affects local financial performance.

The Effect of Budget Decentralization toward Local Government Performance. The findings by Phillips and Woller (1997) show that budget decentralization does not affect the performance of local governments. Budget decentralization can actually create an opportunity for local governments to undertake less responsible and less sustainable spending, if it is done without institutional readiness of administration and bureaucracy as well as adequate human resources. It is better for local governments to be able to identify and meet the needs of local communities (local needs) as the local governments are closer to the people (Musgrave, 1959; and Oates, 1993). Local government spending must be based on main programs or priorities in order to meet local needs, and should be directed to the improvement of services to the community.

The findings are in contrast with the ones by Lindahman and Thurmaier (2002), revealing that budget decentralization brings positive effect on the fulfillment of basic needs for the community (basic needs, better education, and healthier population). Fulfillment of basic needs that are better tailored will produce individual and social welfare, as well as the reflection of good government performance. This can happen because budget decentralization will allow local governments to mobilize and utilize local resources more

easily as to improve public services as a measure of government performance (Peterson, 1994). Thus, in this study, the fourth hypothesis proposed is:

H4: Budget decentralization affects local government performance.

The Effect of Local Financial Performance toward Local Government Performance. The findings of the study by Ardhini and Hand (2011) show that in the perspective of the Agency Theory proves that the ratio of local independence brings a positive non-significant effect to the ratio of capital expenditures for public services; the ratio of the local finance effectiveness brings positive effect on capital expenditure for public services; the ratio of local finance efficiency brings a negative non-significant effect on capital expenditure for public services; and the rest of the previous year budget (SiLPA) brings a positive and significant effect on the realization of capital expenditures for public services. Thus, in this study, the fifth hypothesis proposed is:

H5: Local financial performance affects local government performance.

METHODS OF RESEARCH

This study is quantitative with secondary data source with scale ratio data. This study uses hypothesis-testing model. Selection of study design is to test the hypothesis empirically for direct and indirect influence, or to give an explanation or a causal relationship between the variables studied by testing hypotheses (confirmatory research) (Sekaran, 1992).

Population is the generalization region of the object and the subject that has certain qualities and characteristics defined by the researchers to learn and then be deduced (Sekaran, 1992). The population in this study was the regencies and cities in the Province of Banten. The sample size was the entire study population (census) comprising of four regencies and four cities. The regencies were Lebak, Pandeglang, Serang, and Tangerang. The cities were Tangerang, Cilegon, Serang, and Tangerang. Data was obtained from the Accountability Report of the Mayor already put in Regulations and Budget Realization Report (LRA) from 2009 to 2014.

Data was obtained from DPKD, Bappeda, and BPS[8] Banten. Type of research data was a panel data covering cross section data and time series. Scale type of the data in this study was ratio scale, the scale of which has a value-based that cannot be changed. This ratio also has a numeric value, order, distance and an initial value (origin) (Hartono, 2007).

The analysis technique used by the Agency Theory in the budgeting process of local government in this study was Path Analysis, given all the variables can be categorized as observable variables. For analysis on the implementation of local government budget, Partial Least Square (PLS) was used as the category was unobservable. Partial Least Square (PLS) is a soft modeling method of analysis because it does not ask the data to be specific to the measurement scale, which means the number of samples can be small, or below 100 samples (Widodo, 2006). The use of PLS in this phase is because PLS can be used to confirm the theory of the relationship between variables and to recommend relationship of variables whose theoretical concept or empirical support are weak. In addition, PLS does not require many assumptions, the sample size should not be large and can be applied at all scales of data (Widodo, 2008).

FINDINGS AND DISCUSSION

Changes in PAD have no direct effect toward Opportunistic Behavior of the legislators. The hypothesis testing results produced a path coefficient of 0.042, T-Statistic of 0.702 smaller than 1.960 (0702 < 1.960), and P-value of 0.486 that is greater than that required by 0.05 (0.486 > 0.05). This implies that although revenue of regencies / cities in Banten increased from year to year, it does not contribute to opportunistic behavior of the legislators, as the mechanism of PAD has been integrated with the system of public service.

[8] Biro Pusat Statistik, translated as Central Bureau of Statistics

Changes or amendment in DPRD budget positively affects Opportunistic Behavior of the legislators. The hypothesis testing results produced a path coefficient of 0.912, meaning very strong. Then, T-Statistic of 15.385 is greater than that required by 1.960 (15.358 > 1.960). The P-value of 0.000 was less than 0.05 (0.000 < 0.05). The results of this study confirm the results of previous findings (Abdullah, 2004) that DPRD budget changes affect the Opportunistic Behavior of the legislators. Government Regulation Number 37 of 2005 regulating the financial position of legislators indirectly gives motivation for legislators to misallocate the budget when the amount is associated with local financial capacity (measured from the amount of PAD). The Government Regulation is not run properly, and it is used as a justification to allocate an even bigger legislative budget. It shows that the legislators allocate funds for their benefit exceeding the amount allowed in the regulation (Jaya, 2005). Preferences of the legislators is to amend the budget by raising the infrastructure budget and the budget for them (DPRD) while lowering education and health budget; and this has led to the greater chance of occurrence of opportunistic behavior by legislators.

The statistical results show a path coefficient of 0.973, T-Statistic of 55.980 > 1.960, and P-value of 0.000 < 0.05, and using a cut-off value of T-table at 1.960 (Ghozali, 2006: 31), the study shows budget decentralization affects the local financial performance. These results support the previous findings by Andros M P Hasugian (2006). Thus, the central government's policy to fiscal decentralization is the right step. In addition to revenue generation, fiscal decentralization policies also reduce poverty. This indicates the dependence of local governments on the central government is still high. The central government as the representative of the local governments gives fiscal authority and the transfer of funds to local governments (agents) supervised by DPRD (the principal) to be managed in accordance with the priorities. This way, the management is more efficient and is able to increase revenue for the welfare of society.

Results of statistical on the effect of budget decentralization toward local government performance shows the coefficient value of 0.083, T-Statistic of 0.315 smaller than the T-table (0.315 < 1.960), and P-value of 0.315 greater than 0.05. These results suggest that budget decentralization does not affect the local government performance. Local government expenditure is related to the balanced funds and PAD as one of the basic capital for local governments that are not able to reach and improve the performance of local government. Local government performance is intended for public sector services, i.e. health, education, and local infrastructure for the welfare of the society. These results confirm previous findings by the World Bank (1997) that budget decentralization in developing countries, if not matched with the quality of personnel and political accountability, will only create bad and corrupt government and poor public services. This will be worse if the budget decentralization policy is taken without a clear political consensus and the readiness of administration and appropriate legal instruments. Further budget decentralization can actually create an incentive for local governments to undertake less responsible and sustainable spending, if the application is without institutional readiness, both administration and bureaucracy, and if there are not adequate human resources (Phillips, 1997).

The analysis on the effect of regional financial performance on the Local Government performance generates a path coefficient value of 0.767 and the value of the T-Statistic greater than the T-table (8,872 > 1,960) with a P-value of 0.000. These results confirm previous findings by Dawn and Ghozali (2013) that regional financial performance affects the performance of local governments. This means if the capital expenditure is addressed to the public service, then budget decentralization can encourage economic efficiency and dynamically will encourage the economic growth of the region, so the impact of economic efficiency and economic growth will improve public services as a good indicator of government performance (Martinesz and Mc Nab, 1997).

Meanwhile, in terms of the results of analysis on the perspective of the agency theory in the process of local government budgeting, facts discovered show that the composition of DPRD budget each year has experienced substantial increases annually in an average of 25.5%. This increase is not proportional to the increase of annual revenue. Government

Regulation Number 37 of 2005 regulating the financial position of legislators indirectly gives motivation for legislators to misallocate the budget when the amount is associated with local financial capacity (measured from the amount of PAD). The Government Regulation is not run properly, and it is used as a justification to allocate an even bigger legislative budget.

Besides DPRD budget allocation, infrastructure budget allocation for regencies / cities in Banten has also experienced a considerable rise in an average of 30.05% per year; it is allocated for the construction of facilities and infrastructure services to the public. Work on these projects is generally done by a third party through an auction with legislative and executive intervention. Allocation of fund for infrastructure and DPRD is deliberately increased, but allocation of fund for education and health declines. The composition of DPRD budget and the infrastructure budget for the regencies / cities in Banten continuously increases every year and this has led to the assumption of misallocation of budget for the interest of DPRD. These findings confirm the findings by Colombatto (2001). The tendency of misallocation in government expenditure is part of a political battle between the politicians and executives, which obviously has never benefit the poor. When the allocation decisions are made, their motivation to output budget is rent seeking. Their preferences are to onduct budgetary slack, even commit moral hazard.

Moreover, the results of analysis on the perspective of the agency theory in the implemetation of local government budget. The composition of expenditure for regencies / cities in Banten reveals substantive and structural expenditure, cost allocation budget for the local bureaucracy, and bigger routine expenditure than capital expenditures. This is consistent with the findings by Eko (2006) that of the eight regencies / cities, indirect expenditure on average absorbs 60.5 percent of personnel expenditure. Part of it is allocated to direct expenditure, but the composition of its development expenditure is only 12.5% of its overall APBD.

Contribution of DAU during the period of analysis, from 2009 to 2014, is still very high, in average accounted for 62.5% of the revenue. This shows the lower level of independence of the regions; the tendency is the decline in the ratio of PAD to revenue. DAK[9] of regencies / cities in Banten is relatively small when compared to DAU. Under the rules, DAK is only used to finance the physical activities or projects, and they should be supported by at least 25% of local budget. Logically, the greater the DAK, the greater the capital expenditure is, and it directly affects the performance of local government.

CONCLUSION

The Results of Analysis on the Perspective of the Agency Theory in the Process of Local Government Budgeting. The PAD change does not affect the Opportunistic Behavior of the legislators. This means that the increase in local revenue (PAD) of regencies / cities in Banten from year to year does not contribute to opportunistic behavior of the legislators, as local revenue is collected through direct transfers to local government bank accounts that have been integrated with the system of service and admission revenue.

Moreover, the amendment in DPRD Budget affects the Opportunistic Behavior of the legislators. This means that the Government Regulation Number 110 of 2000 as amended by Government Regulation Number 24 of 2004, subsequently amended by Government Regulation Number 37 of 2005 which regulates the finance position of legislators, indirectly giving motivation to the them to misallocate the budget when the amount of expenditure for legislative is associated with local financial capacity (measured from the amount of PAD).

The Results of Analysis on the Perspective of the Agency Theory in the Implemetation of Local Government Budget in the Province of Banten. Budget decentralization affects the regional financial performance. This means that the central government as the representative of the local government gives fiscal authority and the transfer of funds to local governments (agents) supervised by DPRD (the principal) to be managed in accordance with the priorities.

[9] Dana Alokasi Khusus, translated as Special Allocation Fund

This way, the management is more efficient and is able to increase revenue for the welfare of society.

The Perspective of the Agency Theory. The results of this analysis can be seen from the executive pro-people policies. The results of a comparative analysis on the amount of routine and development expenditures on items of direct and indirect expenditure in the budget shows the government allocates a bigger budget for routine expenditure than for development expenditure (capital expenditure).

Budget decentralization statistically does not affect the local government performance. This means that fiscal authority and the transfer of funds by the central government to local governments (agents) that are supervised by DPRD (the principal) as a unit in the system is not able to increase the Local Government Performance directly.

The results of this analysis show the tendency that budget allocation in local government is part of the political fighting among politicians, those pro and contra to the poor. When the allocation decisions are made, the legislative preferences related to expenditure trigger moral hazard.

The results of this study show that financial performance statistically affects local government performance. The high dependence on transfer of funds to the central government does not affect the performance of local governments. It implies that the local government should be more careful in using the revenue from the community rather than funds transfer (grant) received from the central government.

The results of analysis of this study reveal that supervision of DPRD is on the political dimension and not on the professional dimension of administration conducted by functional supervisors. DPRD emphasizes supervisory duties in terms of the use of executive power than the real living conditions of the people, of whether executives in their activities have benefited the people (voters) or whether the people have obtained proper services.

SUGGESTIONS

The success on the implementation of budget decentralization depends on the design tailored to the characteristics of each local authority, although it is designed to be uniform (default) by the central government.

Changes in the model or system of governance from centralization to decentralization in Indonesia obviously require a change in mindset and behavior of government officials in regencies / cities in Banten.

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THE DEVELOPMENT PERCEIVED OF PRODUCT COMMENTS TRUST-ABILITY ON SOCIAL MEDIA: A SOCIAL INFORMATION PROCESSING (SIP) THEORY APPROACH (SURVEY ON FACEBOOK COMMUNITY OF TAIWANESE STUDENTS COLLEGES)

Azizah Nurul[1]*, **Suyadi Imam**[2], **Kusumawati Andriani**[1]
[1]University of Brawijaya, Indonesia
[2]National Central University, Taiwan

*E-mail: nurul.azizah074@gmail.com

ABSTRACT
Web 2.0 based social media, such as Facebook, Twitter, et cetera, has become a popular platform for consumers to look for required information. In the current social media era, the ease of the access of the internet has promoted the utilization of WOM through social media, which is titled social WOM (sWOM hereinafter) in the current study. As a consequence, sWOM has become a prevalent tool for practitioners to take it as an effective marketing tool. However, the ease of interactive nature of social media which differs from the physical may make the effective ways of applying WOM for marketing promotion purposes in virtual environments inapplicable. In the current research, an attempt is therefore conducted to explore the predicting variables of the perceived trust-ability on social media. The two of variables related to social information processing are drawn and hypothesized to affect the perceived product comment trust-ability on social media through comment involvement as a mediator. The scales are adapted from prior literature and a back-translation technique is used to compose the questionnaire. Data are then collected in either private and national university while PLS is used to analyze the collected data. The theoretical and managerial implications are discussed while future research directions are outlined as well. The current research is one of the pioneer works in the ways applying the theoretical concept in sWOM to development the perceived product comment trust-ability on social media.

KEY WORDS
Product Comment Trust-Ability, sWOM, Social Information Processing (SIP) Theory.

Web 2.0 based social media allows users to utilize the web more personally (Kaplan and Haenlein, 2010) and able to interact such as sharing, commenting, and connecting (Katrin, 2015) with their social media communities in an immediate fashion. These unique characteristics have attracted numerous surfers to access social media. According to Jeff (2015), nearly 70% out of the 3 billion active Internet users have social media accounts while more than 95% marketers are reported to have participated in social media marketing (Michael, 2015). However, most social media users ignore social media advertisement and more than 45% consumers have experienced badly on social media marketing (Augie, 2014). In the Web 2.0 based social media era, consumers prefer seeking information from word of mouth rooted on social media, i.e., social WOM (sWOM hereinafter), rather than from a firm's website (Hajli, 2013). Therefore, an alternative solution to improve poor social media marketing performance can be to engage consumers through sWOM (Kaplan and Heinlein 2010). sWOM is regarded as an useful instrument to develop, create and strengthen the relationship with customers, and thus has been prevalently applied in recent years (Chow, 2015). The availability and widespread of sWOM in recent years (Hajli, 2013) have changed the focus of consumers in dealing with the comments in sWOM from presenting comments, to evaluating comments, and then nowadays utilizing comments in social media (Zhiming 2014). Product comments on social media, one type of sWOM, are considered the most effective and helpful social media marketing tool (c.f., Park and Lee, 2008; Cheung and Thadani, 2010). The perceived trust-ability essences play a significant role in arousing consumers' purchase intention and leading to their final decision making (Park and Lee,

2008). Insight into the driving forces of perceived trust-ability of sWOM, product comments is thus essential in the application of social media marketing.

The Social Information Processing (SIP hereinafter) theory is an interpersonal, relational communication theory applied in the Computer Mediated Communication (CMC) environment (Walther and Burgoon, 1992). Its applicability has been evidenced in various settings, such as customer-focused voice in hospitals (Lam and Mayer, 2014), organizational employee trust (Ng and Feldman, 2013), and online dating (Farrer and Gavin, 2009), through various combinations of the SIP theoretical concept. The current research therefore mainly borrows the SIP concept as the fundamental theoretical ground to develop a three-stage framework in which determinants drive the perception of sWOM product comments through an intervening mechanism, thus achieving and enhancing the effectiveness of social marketing. By doing so, the current research contributes to the validation of the applicability of the SIP theory on sWOM. A framework driven by SIP and derived from the interactive, relational communication perspective in dealing with the effectiveness of sWOM product comments is developed and tested. New insight is thus gained and a set of immediate guidance with empirical verification for social media marketers is thus drawn and provided. The rest of this research is organized as follows. Literature is reviewed, hypotheses are developed, and the conceptual framework is formulated. Then, research methodology is presented, followed by data analysis. The current research concludes with a summary of the study, a discussion of the theoretical and managerial implications, and potential avenues for future research.

LITERATURE REVIEW

The SIP theory (Walther, 1992) is an inter-personal communication theory used in the CMC environment. The theory describes how people meet and develop online relations (Utz, 2000). According to the SIP theory, in online communication despite the unavailability of nonverbal vocal and physical cues, the relationships are expected to approach face-to-face levels over time (Walther and Burgoon, 1992). With time, it is also evidenced that online communicators are able to generate, transmit, and manage interpersonal impressions to signal affective information (See among others, Lam and Mayer 2014; Ramirez et al., 2007; Walther and Burgoon, 1992). The theory suggests that even in an online environment, communication does progress from non-intimate to intimate areas. Contrarily, the SIP theory postulates that when motivated to develop relationships, even though online communicators are unable to provide verbal cues at their disposal, they adapt to the restrictions of the medium by looking for cues and by adapting their social expressions. Thus, relationship development takes place through language context only (Walter, 1992). The underlying assumption in SIP, based on the study of human communication, is that once gaining information about each other, communicators deploy the information to form impressions and eventually develop interpersonal knowledge and stable relations (Walther, 2012).

CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Intimacy, dominance and comment involvement. In an interactive social media environment, it is easier for participating members to self-disclose their personal information such as their feelings, cognition and mental states, and to exchange interpersonal opinions regarding this information (Tidwell and Walther, 2002). Through non-verbal text mode, the interactive environment also allows relational communication in a timely way (Walther, 2012), as such making the interaction faster compared to traditional environments (Walther, 1997). The characteristics of intimacy that self-disclose, the partner on social media community more likely to get involve in their comment activity (Chu, 2011). Therefore, we propose the hypotheses as below:

H1: The higher the perceived intimacy of social media community participants is, the higher the product comment involvement will be.

Dominance is the degree of ability a person influences or controls the behavior of another person (Perez et al, 2009; Watanabe, 2015). The messages and cues of influence and control, while through verbal, nonverbal or in CMC normally in texts, imply some elements such as comments, persuasion, aggressiveness, ingratiation, and competitiveness (Burgoon and Hale, 1987; Guerrero et al., 2013; Walther and Burgoon, 1992). The public opinions on social media, which along with supporting evidence, are more trustable, believable, competitive, and persuasive, and thus are more dominant (cf., Walther, 2012). More valuable and quality implications of these public opinions are sensed and messaged. The matter of dominance that more valuable and quality will perceive as the persuasive, which drive the engagement of social media community significantly (Lee, 2014). Based on the above-deduced logic, the second hypotheses is developed as follows:

H2: The higher the perceived dominance orientation of the participation behavior on social media is, the higher the comment involvement of participation on social media will be.

Comment involvement and product comment trust-ability. Comment involvement for the current study adopted by personal involvement. Generally, involvement was defined as the motivational construct which influenced by the antecedent factor of the person's values and needs (Zaichkowsky, 1994). Hanna (2015) stated personal involvement is one of the important factors to explain consumer behavior. According to Zaichkowsky (1985), personal involvement is a perceive of the person regarding the inherent needs, value, and interest of advertisement (Zaichkowsky, 1994), this definition cover affective and cognitive relevance. Where, effective involvement emphasize to the feeling and achievement of the person while cognitive stresses the informational processing activities individually (Zaichkowsky, 1994). The previous study state that involvement activity explains the extent of sensitivity of the person toward the attribute of activities (Racherla, 2012). The degree of involvement has an impact on the responses to external/product stimulation (Racherla, 2012). Therefore, the higher involvement tends to require more information (Racherla, 2012), then the information content will perceive more trustable. Supported social media as the tool that allowed the user has interaction immediately (Wei Shao, 2015), then it does not matter whether the conversation directly or indirectly. Thus, the third hypothesis is conducted as follow*:*

H3: The higher the involvement social media is perceived, the higher the perceived trustable the product comment on social media will be.

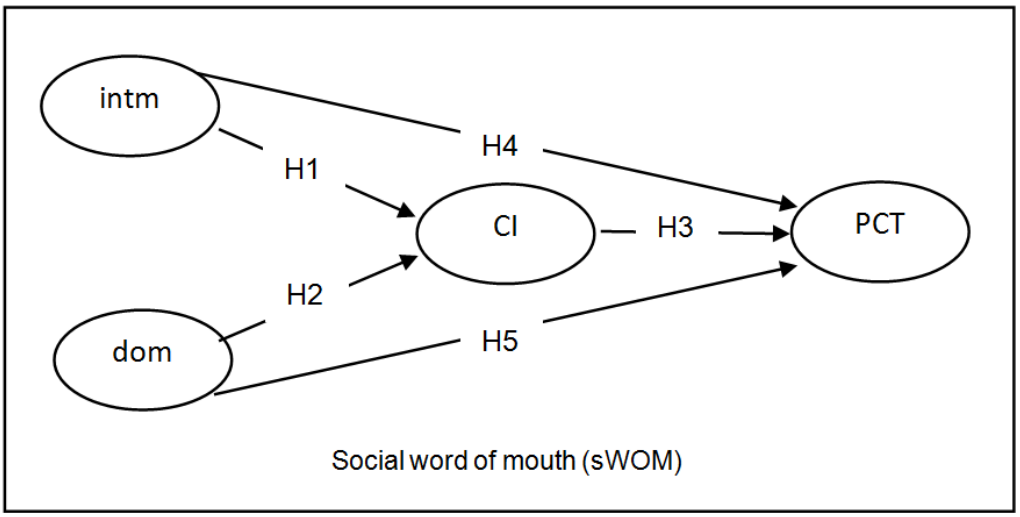


Figure 1 – Proposed construct model

Intimacy, dominance and product comment trust-ability. The characteristic of intimacy which trigger closeness feeling. Intimacy towards social media participants is thus perceived (Jiang, 2011). Once intimate relations are sensed, the immunity from the manipulation of the participating behavior of social media community members increases (Walther and Parks, 2002). Social media participation behaviors turn out to be easily inferred (Walther et al.,

2008). That is, social media community behaviors seem to become predictable and interpretable (Glen, 1979). So that, it supports to develop a further hypothesis as follow:

H4: The higher the perceived intimacy of social media community participants is, the higher the perceived product comments trust-ability will be.

In social media, the ubiquity of the Internet to jointly connect and link the public together and the self-disclosure character of Web 2.0 may form the impression of difficulty for individuals to manipulate others and override the public (Guerrero et al, 2013). Since the public also has better interpretations using various cues and thus easy to be accepted, it is, therefore, likely to signify that the public opinions are warranted more accurate. Hence, the dominance message which reflects provocative style will arouse trust-ability on product comment, this statement able to support the following hypothesis:

H5: The higher the perceived dominance of social media community participants is, the higher the perceived product comments trust-ability will be.

RESEARCH METHODOLOGY

The data were collected in Taiwan, thus a back translation technique was utilized to translate all scale items into the local official language, Chinese Mandarin. Two bilinguals were involved in the translation until no difference existed. The Mandarin version questionnaire was pilot-tested toward 11 university students. The data were collected in one national university and one private university with systematic sampling technique. By 500 questionnaires were distributed, while 470 were received and 408, including 201 and 207 from the national and private universities respectively, were identified useable for final data analysis.

The scales used in the current research were adopted from existing literature, which measured using a seven-point Likert scale. The research framework includes two precursors, including intimacy and dominance, were measured using Burgoon and Hale's (1987) seven-, and five-item scales. The measure of comment involvement was adapted from Zaichkowsky (1994) dual-dimensional scale which includes cognitive and affective and each dimension had five items (10 items in total). The outcome variables are product comments trust-ability was operationalized by adapting the three- scale of Hsiao et al. (2010). Also, the adopted related scales from Burgoon and Hale (1987), Walther (1990, p.109), Glen (1979), and Zaichkowsky (1994) have been frequently applied or modified in literature, such as Ramirez et al. (2007), Ramirez (2007), Walther and Burgoon (1992), Burgoon and La Poire (1999), Lowenthal and Dunlap (2010), Car and Walther (2014), Tidwell and Walther (2002), Racherla (2012), and Hanna and Shalom (2013). These scales, with good applicability evidenced in literature, were deemed suitable for the current research.

DATA ANALYSIS AND RESULTS

Sample characteristics. The respondents of the survey had some characteristics as described in Table 1. Among 408 participants, females were dominant with 53.7%. The majority of respondent were adolescent aging less than or equal to 25 (i.e., 96.0%). More than 90% of them had an average disposable income of less than 9, 000 NTD (New Taiwan Dollar). Regarding education levels, undergraduate students occupied the most, at 67.2%, followed by post-graduates of 31.1% and the rest of 1.7% was doctorate students. With respect to the experience of using Facebook, a big portion of respondents (69.6%) had used Facebook more than three years while more of them (33.6%) spent from one to two hours per day for playing such social media.

Scale accuracy. The composite reliability (CR) and average variance extracted (AVE) of the studied dimensions and constructs were tested for reliability assessment. Then, the final results showed the CR values ranged from .754 to .948, all above the commonly suggested threshold of .7. With a marginally acceptable case of .48 which was retained for content validity concern, the other obtained AVEs were higher than the recommended value of .5 (see table 2). Both results demonstrated an acceptable and satisfactory reliability for all

variables. For convergent validity assessment, three items of intimacy and three items of involvement which had a loading value to its corresponding dimension to be less than the stipulated threshold of .5 was removed. Then, all the remaining loading values exceeded the cut-off value. Therefore, every scale was of good convergent validity.

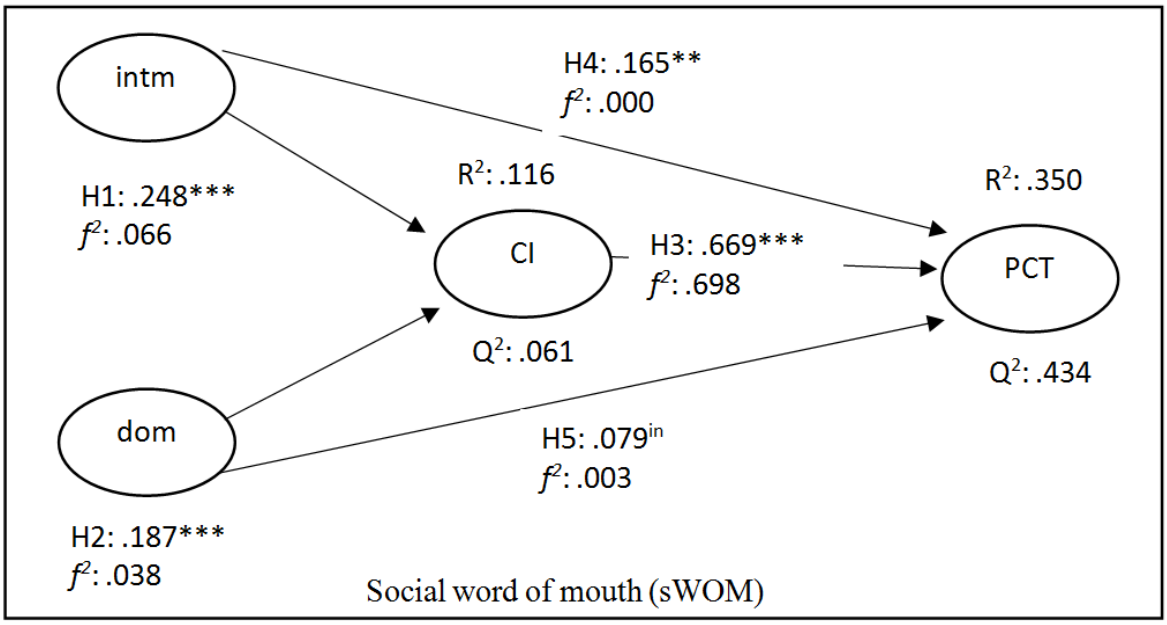
Table 1 – Sample characteristics

Gender	**Freq.**	**%**	**Education Background**	**Freq.**	**%**
Male	189	46.3	Undergraduates	274	67.2
Female	219	53.7	Post-graduates	127	31.1
Total	408	100.0	Doctorate students	7	1.7
Age	**Freq.**	**%**	**Total**	408	100.0
≤20	196	48.0	**Age of Facebook Users**	**Freq.**	**%**
21-25	196	48.0	≤ 1 year	11	2.7
26-30	13	3.2	<1-2 years≤	23	5.6
>30	3	0.7	<2-3 years≤	90	22.1
Total	408	100.0	>3 years	284	69.6
Monthly disposable Income (NTD)*	**Freq.**	**%**	**Total**	408	100.0
≤$6, 000	186	45.6	**Facebook Usage per Day**	**Freq.**	**%**
<$6, 000-$9, 0000≤	190	46.6	≤1 hours	103	25.2
<$9, 000-$12, 000≤	21	5.1	<1-2 hours≤	137	33.6
>$12, 000	11	2.7	<2-3 hours≤	92	22.5
Total	408	100.0	>3 hours	76	18.6
*New Taiwan Dollars; exchange rate: $1 NTD = $0.03 USD			**Total**	408	100.0

Table 2 – Scale accuracy analysis result

Research construct	AVE	Composite reliability
Intimacy	0.480	0.754
Dominance	0.596	0.880
Comment involvement	0.580	0.906
Product comment trust-ability	0.860	0.948

Structural model. A t-test calculated from the bootstrapping procedure of 500 samples was applied to examine the hypothesized effects, while Cohen's Indicator (f^2) was used to measure the effect sizes of the studied relationships with the values of .35, .15, and .02 to signify large, medium, and small effects, respectively (Henseler et al., 2009).



*Notes: *p<.05; **p<.01;***p<.001, in: insignificant.*

Figure 2 – The result of main direct effect testing

As showed in Figure 2, the t-test results revealed that four out of five direct hypotheses (H1, H2, H3, H4) were supported, while the effects of dominance to PCT (H4) is failed to support the hypothesis. Among the significant relationships, comment involvement exhibited a large effect size on product comments trust-ability, whereas the effect size of the other supported hypotheses ranged between medium to small levels.

For further analysis regarding mediating effect able to assess from main direct effect result. Following Baron and Kenny (1986) as long as the precursor significant toward the mediator, then the mediator significant toward the outcome, it able to conclude that any mediating relevancy. Therefore, for a case of the current study able to conclude that CI success as the mediator between both of the precursor (intimacy and dominance). Since H5 failed to supported means CI as the perfect mediator of the relationship between dominance and PCT. While CI as the partial mediator between the relationships of intimacy toward PCT.

DISCUSSION OF RESULTS

The current research explores the precursors of product comment trust-ability in the sWOM context. Driven by the SIP theory as the principle scholarly ground, two precursors are introduced, including intimacy, and dominance which affect the trust-ability through the intervening factors of comment involvement. While the field study is conducted in Taiwan, there is one finding insignificant with anticipation. The current findings show, in a social media community, dominance does not affect the perceived trust-ability of product comment. It occurs, since dominance that reflects of the aggressiveness of message characteristics, sometimes make the person feel doubt with the content truth. If the message extreme dominance, it more likely fraudulence. In fact, dominance on social media shouldn't be extreme since the richness information on social media encourages the user to more selective when seeking the information (Shalom, 2015). By doing so, the variable dominance should involve the mediator of CI to reach the PCT, it is called as the perfect mediating relevancies.

Research implication. Theoretically, the findings lend empirical evidence in Taiwan to the applicability of the SIP theoretical concept in the studied subject. The presences of mediating roles clarify the dynamics of the proposed framework for the linkages from the predicting antecedents to the outcome variable. Such a demonstrated theoretical mechanism provides critical insight into and broadens the body of the extant knowledge of sWOM product comments from the perspective of interactive and relational communication. However, since the prior applications of the SIP theory are mainly in developed Western cultures and Japan (e.g., Walther and Burgoon 1992; Farer and Gavin 2009; Lam and Mayer 2014) and the current research refers to a baseline as an initial verification of the SIP theory in sWOM, the occurrence of some unsupported hypothesized relationships may suggest to fine tune the SIP theory if applied around the globe and across sectors, in particular in various contemporary proliferated virtual environments. Caution should be paid for its theoretical applications in contingencies and diverse settings, rather than taking a generalized viewpoint for its application.

Practically among the information exchange precursors, intimacy is the most effective approach to boost up the perceptions of the trust-ability of product comment posted on social media communities. Strategies can thus be made such as to stimulate and encourage customers to interact with social media communities using a receptive and equal way through a closeness tone. A second strategic priority lies in the way of dominance during relational communication. More persuasive communicative fashions in an aggressive manner should be used, as such getting approval from social media community members. However, it should be mentioned that the ineffective without the role of comment involvement. Thus, besides using the dominance style, it should encourage the other involvement to reach the trust-ability of product comment on social media. Such a conclusion might infer that other types of social media such as YouTube, a content site specifically for video sharing, rather than Facebook, mainly for social relationship building, might be more suitable platforms for sWOM to product comment purpose.

CONCLUSION

As previous studies, the current empirical research inherits several limitations from the nature of the research which provides fruitful and promising avenues for future research. The current research focuses on investigating the two studied relational communication factors as the antecedent precursors of subsequent outcomes. However, one studied mediating R^2 value is relatively weak in terms of its variance explanation. This might suggest further exploration of other antecedent variables, in particular, other relational communication variables such as relaxation and immediacy (see Burgoon and Hale (1987) for a more thorough review of these communication variables) as additional driving forces, as such increasing the variance explanation of research moderators. Another inherited limitation is that the field study is conducted in Taiwan in a Facebook context without considering specific product offerings.

Since introduced and as noted implicitly above, social media have proliferated (e.g., for social networking or content community purposes) and each type presents some unique characteristics and provides specific benefits to surfers (also see Bergh *et al*., 2011; Kaplan and Haenlein, 2010). For example, Facebook is a social networking site in which individuals share all types of content with others for networking and relationship-building/maintaining, while YouTube, a content community site, concentrates on specific content sharing and content searching. The unique characteristics in various social media proliferations exhibit different crucial implications in online social media communication and resultant conducts. Future research can seek to answer this call for duplicating the current research in other types of, rather than Facebook, social media contexts.

Furthermore, product types can affect purchase motivations and decisions (Yoon, 2013), and as a consequence, is likely to produce different impacts on the proposed relationships. It is thus worthwhile to observe and differentiate the results of the proposed hypotheses from various product category aspects. Last but not least, prior empirical studies indicate that the product comment trust-ability have an effect on purchase intention and actual shopping decisions (e.g., Hsiao *et al*., 2010; Xu and Yao, 2015). A more comprehensive conceptual framework incorporating these purchase conducts in the current study can be empirically tested, thus providing a more synthesized solution for drawing the communication-shopping hierarchical relationship in the social media environment.

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THE INFLUENCE OF MOTIVATION AND ISLAMIC LEADERSHIP ON LECTURER'S PERFORMANCE AT PRIVATE UNIVERSITIES IN THE PROVINCE OF WEST SULAWESI

Ahmad Tri Sulkarnain*, **Basalamah Salim**, **Gani Ahmad**, **Lamo Mochtar**
Faculty of Economy and Business, University of Islam Indonesia, Makassar, Indonesia

*E-mail: trisulkarnainahmad@ymail.com

ABSTRACT
This research is aimed to: (1) analyze the influence of motivation on lecturer's performance at private universities in the Province of West Sulawesi; (2) to analyze the influence of Islamic leadership on the lecturer's performance at private universities in the Province of West Sulawesi. This study employed primary and secondary data involving 173 lecturers as the sample of total lecturers at the private universities in the Province of West Sulawesi. The lecturers listed in the database of General Directorate of Higher Education are 434 people. The survey was conducted from September to December 2016, and the data were analyzed using Strucural Equation Modeling (SEM) program. The results of this study show that: (1) motivation has positive but not significant influence on the performance of the lecturers; and (2) Islamic leadership has significant and positive impact on the performance of the lecturers.

KEY WORDS
Motivation, Islamic leadership, performance.

For higher education institution, one of the most crucial parties who play strategic role in improving the progress and quality of the institution is the performance of the lecturers. In line with the statement, Tung Yao Khoe in Achmad Sanusi and Uwes Sanusi in Muhardi (2004) states that "lecturers are the key factor of success on efforts to improve the quality of education services". The same opinion was expressed by Abdurrahman and S. Marten Yogaswara in Muhardi (2004:34) stating that "the value of educational success is highly dependent on the quality of teaching. Lecturers are the people who are very instrumental in teaching and learning process."

Lecturers should have some qualifications that are very important for the implementation of their profession, given the profession as lecturers is different with other professions. In addition, this profession requires special sciences and expertise to convey their knowledge to the students. Motivated and competent lecturers with good quality are able to facilitate the delivery of sciences and technology to the students so that teh materials can be accepted and developed in accordance with the student's ability to study based on their major. In terms of commitment, lecturers should be committeed to attending regurlarly at work, as well as having a sense of responsibility for the education they teach to the students.

In improving the performance of the lecturers, carrying out the duties and responsibilities as a lecturer and educator, in particular the implementation of the three basic duties of higher education is largely determined by their motivation to work.

Motivation is very influential on the performance of a lecturer. In general definition, motivation is such encouragement that arises in a person either consciously or unconsciously to act with a certain purpose while the desire is craving something (inclination or impulse) with strong heart to do anything either good or bad. The concept of motivation in the Islamic perspective has wider scope because every action should be committed as an effect of motivation must be based on good intentions, as well as the purpose of the action or activity should meet the needs of both physical (material) and spiritual in order to achieve happiness in this world and also the salvation hereafter.

Motivation to pursue achievement is an encouragement to the characteristics of a person doing a good job and high performance. The need for high achievement is an encouragement that may arise in a person's attempt to achieve the targets set, working hard

to achieve success and having the desire to do something better than before.

Motivation at private colleges, however, seems not yet provided the encouragement for the lecturers to perform well.

The core of motivation is the existence of desire to achieve something related to the needs of human life. One of the prominent theories is the motivation theory proposed by Abraham Maslow called Maslow's Hierarchy of Needs that divides the needs of over five levels, namely: (1) physiological needs, (2) safety and security needs, (3) social needs, (4) esteem needs, and (5) self-actualization needs.

According to Hasibuan (2007), motivation comes from the Latin word *movere* which means encouragement or something as leverage. In professional context, motivation focuses on how the power and potential direct the subordinates to cooperate productively managing to reach and realize the objectives that have been determined optimally. The motive is a simultaneous desire and leverage to the willingness to work; the motif of someone has different purpose.

Kartini Kartono through her book "*Leaders and Leadership*" defines a leader as a person who has the skills and strengths, in particular expertise and skills in one field, so he or she is able to influence others together to perform certain activities, in order to achieve one or multiple objectives. It can be concluded that as a leader who has one or more advantages as predisposition (innate talent), and this becomes the needs in one situation, so he or she has the power and authority to direct and lead his subordinates. He may also gain recognition and support from the subordinates to move towards specific destination.

In the perspective of Islam, leadership is considered as a group or collective responsibility. Therefore, Islam takes the issue of leadership in an attempt to maintain the existence of the group that as an organization should have objectives. Furthermore, the position of leadership position in the organization will not only strengthen the activities of the members, but also will meet and ensure the individual and collective purposes that exist within the organization.

After the death of Prophet Muhammad, based on historical facts in Islam, Muslim communities were divided as the debate about leadership in Islam, especially regarding the process of selection of leaders in Islam—who should be entitled to the leadership in Islam. Thus, the definition and meaning of leadership and authority should be implemented with the principles outlined Quran. Men as the leader should have the ability to influence other people to achieve the goal.

One Prophetic leadership is applied and followed by the Caliph Abu Bakr Shidiq to always maintain his dignity, Umar Ibn Khattab with the firmness, honesty and justice, Ustman bin Affan with the generosity, and Ali Ibn Abi Talib with visions and courage.

Moh. Ali Shahab (2010) through his the research found that the Islamic leadership is positively influential positive and significant to the employee's job satisfaction at *Maal Wa Tamwil* in the Province of Central Java. Furthermore, the Islamic leadership has significant positive effect on the job performance of the employees. Islamic job satisfaction also has positive and significant effect on the performance of the employees. Based on quantitative and qualitative analyses, it can be structured in an integrated way that leadership, Islamic job satisfaction and Islamic performance have positive impact on the organization. A leader should always be fair and become the role model or example for the subordinates; in other words, leadership is the ability to realize all the will of Allah.

The leadership of lecturers can be identified from the academic rank they have as to have leadership positions in the higher education, academic positions become one of the basic considerations to appoint the officials at universities.

The definition of performance by Payaman Simanjuntak (2005) is suggested as the level of achievement of results as the implementation of certain tasks. The company's performance is the level of achievement in order to realize the goals of company. Performance management is the overall activities undertaken to improve the performance of the companies or organizations, including the performance of each individual and group work at the company.

In essence, the performance is the result of work achieved by a person in performing

their duties in accordance with the standards and criteria set for the tasks. Performance is a function of motivation and capabilities.

According to Steers (1991), there are three basic factors that may affect the performance:

1. Capability, personality, and willingness to work,
2. The certainty and reception of the tasks or workloads assigned to the individual, and
3. The level of work motivation.

According Cash and Fisher (1987) performance is also considered a result, which means that anything that has been produced by the individual worker. The results are influenced by the performance of the organization whose components consist of organizational development compensation structure, policies and procedures.

Based on some opinions about the work performance can be concluded as the notion containing work achievement by someone. In short, job performance could be said as the reflection of the results achieved by an individual or group. There is a close relationship among individual performance, institutional performance, and corporate performance. In other words, if the employee's performance (individual performance) is good, it is most likely the performance of the company is good as well.

From the data and phenomena discussed above, to determine the relationship between competence, motivation, and Islamic leadership on the job satisfaction and performance lecturer at private universities in West Sulawesi, the research would be in the area of the influence of motivation and Islamic leadership on the performance of the lecturers at private universities in the Province of West Sulawesi.

LITERARY REVIEW

Work motivation is processes in which human beings are encouraged to perform the activity as the results of the needs that should be met; in line with the idea that employees will be able to carry out certain tasks faithfully when they are assigned particular encouragement in accordance with their needs.

According to Stoners (1992), motivation is the condition of human psyche and the mental attitudes that may energize and galvanize actions, directing or channelling behaviors towards achieving satisfying desires or reducing the imbalance. Handoko (2003) defines motivation as a state in the person of someone who drives the individual desire to undertake certain activities to achieve the objectives of the activities.

According Sterr (1991), the motivation has the power that an individual tends to engage in activities which leads to certain target in relation to job satisfaction, and also the feeling of more pleasure or willingness to work in order to achieve the goals. To achieve effectiveness of motivation, it is necessary motivational theories from several experts as the reference to discuss motivation. The theories of motivation as listed by Robbins (2008) are as follows:

1. Hierarchy of Needs Theory:

Hierarchy of Needs theory is the most popular theory of motivation formulated by Abraham Maslow. The hypothesis says that inside every human being, there are five levels of needs, as follows:

a. Physiological needs. These are human needs that are physical. Such as: hunger, thirst, protection (clothing and housing), sex, and other physical needs.
b. Security needs. These are the human needs that arise after the physical needs have been met, namely safety and protection against physical and emotional damages.
c. Social Needs. These are human needs that arise because of the social interactions between one person with others, and between individual and groups. These needs include compassion, a sense of belonging, a sense of receiving and friendship.
d. Recognition Needs. These are human needs that are more related to personal interests or ego. These needs are likely related to internal factors including awards such as, self-esteem, autonomy, and achievement, as well as external factors such awards, social status, recognition, and attention.
e. Embodiment or Self-actualization Needs. These are human needs for someone to be

the appropriate human skills, namely the growth, achievement of certain potential, and self-fulfillment.

2. Theories X and Y:

The theory of motivation by Douglas McGregor has developed two real views about humans, namely: the first is essentially negative called Theory X and the other is basically positive called Theory Y. McGregor concludes that the views of a leader of human nature should be based on certain assumptions groups that they tend to form their behavior towards the employees based on these assumptions.

According to Theory X, there are four assumptions belong to leaders as follows:

a. Employees basically do not like the job and as much as possible try to avoid it.
b. Because employees do not like the job, they should be coerced, controlled, or threatened with punishment to achieve the objectives.
c. Employees will avoid responsibilities and seek formal command whenever possible.
d. Most employees put security above all other factors associated with jobs and show little ambition.
e. In contrary to the negative assumptions above, McGregor makes four positive assumptions called as Theory Y as follows:
f. Employees consider their job as something fun just as the rest or play.
g. Employees will be trained to control themselves and emotions to achieve various objectives.
h. Employees will be willing to learn to accept and even learn to be more responsible.
i. Employees are able to make innovative decisions circulated to the entire population, not just for those who occupy the management positions.

The conclusion of this theory is that Theory X assumes that needs lower level is trying to dominate the individual, while Theory Y assumes that the needs of a higher level dominates individual. McGregor himself believes that the assumptions of Theory Y are more valid than Theory X.

Subject of Islamic leadership has already existed and been evolving, particularly after the death of Prophet Muhammad. The discourse related to the leadership has arisen because there is no longer prophecy after the death of Prophet Muhammad, as stated in Quran that this prophecy is final and cannot be amended anymore, meaning that Prophet Muhammad is the last messenger and the finisher of the previous treaties.

The basic characteristic of the leadership by Prophet Muhammad who became exemplary all Muslims by nature lie in his personality. Prophet Muhammad is a human being with all of the attributes of humanity, and as a human being, he was born with clear offsprings as normal person; he played, learnt, worked, got married and had children. He also felt what was perceived by other human beings in general, such as hope and fear, poor and rich, airy and hard, aloof and society. As a leader, he was like other; he stood together and sat together before the law, gained the victory and power, and experienced defeat as well as sadness.

In terms of intelligence (Arab: *fathonah*), Prophet Muhammad has obtained the integrity of self-knowledge and maturity with unwavering principles and learned from experiences. Muhammad is known to have high integrity, be committed to what is said and being able to build a strong team such as in military expeditions. He also has a high ability to assume the prophecy with all extraordinary risks and courage. He is also smart in mastering changes as shown through his decision of migrating to Medina from Mecca, and it was initiated by Prophet Muhammad; this migration is believed as the influential to the maps and directions modern global civilization. He is believed to also have initiation to peacefully conquer Mecca, and it was the proof of the success of the leadership of Muhammad. He also often invited his companions for the opinions in relation to strategic issues, for example in determining the strategy of war and social affairs.

Furthermore Antonio (2008) presents three holistic leadership traits as shown by Prophet Muhammad, namely the ability to develop leadership in various fields and these are accepted, leadership which is recognized more than 1.3 billion people and proven; and the leadership has been proven since The 15th Century ago, and it is still relevant and applied to

this day.

The process of crystallization of the characteristics of Prophet Muhammad was as a leader who is generous, patient, loving, forgiving, promoting human values, faithful and sincere, and devoted to God Almighty (Allah). These leadership traits give real picture, as loud, assertive, and straightforward characteristics as the representation of his desire to humanize the humans before the God.

Exemplary by Prophet Muhammad is reflected in his characteristics consisting of four main properties that truthful (Arab: *siddiq*), trustworthy (*amanah*), smart (*fathonah*) and transparent to deliver (*tabligh*) (Waffa, 2012), and these are the core leadership characteristics of the Prophet Muhammad.

CONCEPTUAL FRAMEWORK OF RESEARCH

This conceptual framework describes the relationship among the variables of this research. The relationship among the variables of this research is based on the theory of motivation, leadership, and performance. Based on the relationship among variables based on relevant theories and previous research, the conceptual framework of the study was formulated.

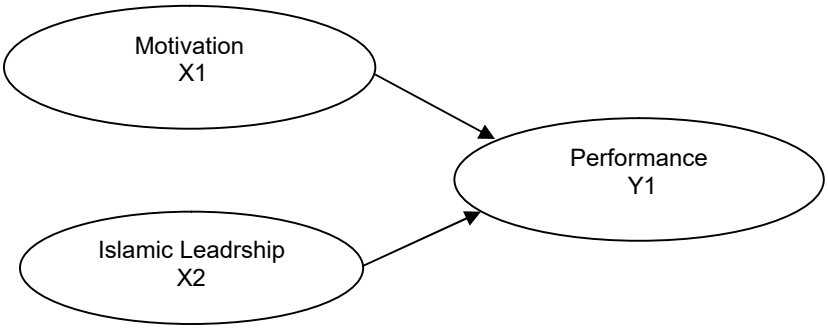

Figure 1 – Conceptual Framework

Research Hypotheses. Referring to Handoko (2003) defines motivation as a state in the person who encourages the desire of individuals to undertake certain activities to achieve the objectives. The Hierarchy of Needs theory of motivation is the most prominent by Abraham Maslow. The hypothesis says there are five levels of needs inside every human being.

In relation to the previous studies, the researchers who examined the relationship between motivation and the performance were including Suseno Pradja (2010), Kwelju Jonah (2009), Hidayat Pontoh (2012), Fahri Ahmad (2012):

H1: Motivation is positively and significantly influential on the performance of lecturers.

Characteristics of Islamic leadership has been shown by referring to the leadership of Prophet Muhammad based on his personality which, according to Al-Maliky (2007: 252) characteristics which are good morality (Arab: *karimah*), modesty (*qonaah*) and consistent (*istiqomah*).

Islamic leadership may affect the job satisfaction and performance which is supported by a group of researchers from Ohio University, United States (in Yukl, 1994) and Moh. Ali Shahab (2010). Based on the theoretical and research study, the research framework of human resources can be simplified or formulated to explain the influence of motivation and Islamic leadership on the performance of the lecturers at private universities in the Province of West Sulawesi.

H2: Islamic leadership is positively and significantly influential on to the performance of the lecturers.

Operational Definitions:

Motivation Variable (X1). In this context, motivation is a strong desire that comes from

within of the lecturers to carry out activities until the implementation or three basic duties of higher education that have been the bases for the academic schedule, and the indicators are as follows:

1. Process of being happy at work;
2. Process of willingness to work;
3. Process of sense of belonging;
4. Process of achievement;
5. Process of creative desires.

Islamic Leadership Variable (X2). Islamic leadership is attitudes and behavior that correspond to the characteristics of Islamic leadership as performed by the lecturers and has the following indicators:

1. Truthful (*shiddiq*);
2. Trustworthy (*amanah*);
3. Smart (*fatonah*);
4. Transparent to deliver (*tabligh*).

Performance Variable (Y1). Performance in this context is the performance of the lecturers as the activities or the abilities of the lecturers in implementing academic programs related to the duties of three basic duties of higher education, which has the following indicators:

1. Quality of work
2. Capability
3. Initiative
4. Communication
5. Punctuation

METHODS OF RESEARCH

The research was conducted at private universities across the Province of West Sulawesi. The duration of this study was over three months (September to December 2016). The data in this study were analyzed through SEM (Structural Equation Model) by using AMOS (Ghozali, 2008: 18), and the data analysis was conducted through quantitative analysis approach.

FINDINGS AND DISCUSSION

Hypothesis 1: There is positive and significant influence of the motivation of the performance of the lecturers at private universities in the Province of West Sulawesi.

The results of this study support the previous study conducted by Eva Kris Diana Devi (2009), Kwelju Jonah (2009), and Mamik (2008). In addition, this study is empirically to support the theory by Robbins (2003), that to identify the behaviors of individual or an organization, internal environment or external causes should be understood and examined.

The appproach to nature and the environment to work motivation in the research carried out by Zainie Nur Hassan Abd Hamid and Narehan (2015) found that the working environment has weak relationship with teh performance of the employees. Through the improved work environment, however, the employees will be more motivated to work harder, which is as the realization of employee's satisfaction. As the result, ultimately they will improve their performance. Teh condition of work environment, the nature, remuneration policy, the type of work assigned and supervision of a leader are to include as the element of extrinsic motivation (*hiegiene* factor in Herzberg's theory). If the elements have not been inadequate, they may cause dissatisfaction among teh employees. If the condition of the elements are accommodated by the management, they will eliminate dissatisfaction; this condition even improves the satisfaction of the employees.

Hypothesis 2: There is positive and significant influence of Islamic leadership on the performance of the lecturers at private universities in the Province of West Sulawesi.

Islamic leadership is positively and significantly influential on the performance of the

lecturers. The findings of this study are in line with the results of previous studies conducted by Moh.Ali Shahab (2010) that the Islamic leadership significantly influences the performance of the employees.

In addition, according to Rafik I. Beekun (2012) in its publication entitled *Character-centered leadership: Muhammad* (p) *as an ethical role model for CEOs*, he said that the leadership of Prophet Muhammad stems from the character (morality) The model of leadership by Prophet Muhammad has been applied to a number of previous social and religious area. Islamic leadership based on morality is the first attempt to explain the Quranic values on the aspects of the role model (*khuluqin azeem*). As this aspect is fully elaborated, it is likely to offer an alternative role model based on the virtues and implemented into transactional leadership model and also transformational leadership approaches upon relevant relativistic virtues. Some publications and studies have revealed that the transactional and transformational leadership has been proven to affect the employee's performance. The same thing was stated by Yasir Majeed, Zulqarnain Khalid and Mohammad Aslam Khan (2011) in the Islamic study entitled *the impact on organizational leadership Objectives*. They found that the Islamic leadership is performed through consultation (Arab: *al shura*), justice, trust, and trustworthy (*al shidq*). The research was conducted in Malaysia, and it found that the factors forming the Islamic leadership have influence on the employee's performance. The results are consistent with the findings of research conducted in other countries, especially in Malaysia.

Limitation of the Research. The research area is very limited, only in the Province of West Sulawesi. The research should have covered the entire regional coordination of private universities in Sulawesi. As conducted in wider coverage, the generalization can be done through more comprehensive and more accurate results.

CONCLUSION

Motivation has a positive and significant impact on the job satisfaction of the lecturers. In relation to the performance of the lecturers at the private universities in the Province of West Sulawesi, however, motivation has positive effect but not significant. This means the motivation of the lecturers at the private universities in West Sulawesi is still low, so the passion to achieve satisfactory performance is low as well. However, as the motivation has positive correlation with the performance, if the motivation of the lecturers would be improved, their performance will be increasing as well.

Islamic leadership has positive and significant impact on the job satisfaction of the lecturers. The implementation of Islamic leadership should be maintained and even increased in the future.

SUGGESTIONS

It is important to maintain the motivation to work of the lecturers at the private universities in the Province of West Sulawesi, especially the intrinsic motivation including the initiative to achieve and desire to carry out the tasks being appointed. By enhancing the intrinsic motivation, the teachers will be motivated to improve their performance.

It is suggested that the application of the Islamic leadership intensively in the future because it affects the job satisfaction and performance of the lecturers.

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ГЕНЕРАЦИЯ НАПРАВЛЕНИЙ НАУЧНЫХ ДОКТРИН В ОБЛАСТИ УПРАВЛЕНИЯ ТЕРРИТОРИАЛЬНЫМ РАЗВИТИЕМ НА ОСНОВЕ ЛАБИРИНТНОГО СИНТЕЗА

GENERATION OF SCIENTIFIC DOCTRINES' TRENDS FOR MANAGEMENT OF TERRITORIAL DEVELOPMENT ON THE BASIS OF LABYRINTH SYNTHESIS

Вертакова Ю.В., доктор экономических наук, профессор
Vertakova Y.V., Doctor of Economic Sciences, Professor
Клевцова М.Г., **Бабич Т.Н.**, кандидаты экономических наук, доценты
Klevtsova M.G., Babich T.N., Candidates of Economic Sciences, Associate Professors
Юго-Западный государственный университет», Курск, Россия
Southwest State University, Kursk, Russia

*E-mail: vertakova7@yandex.ru

АННОТАЦИЯ
В статье предложена методика генерации направлений научных исследований методами морфологического анализа и синтеза. Установлено, что основой процесса управления являются управленческие решения, которые должны быть обоснованы и рационально выбраны. В этом процессе важную роль играют альтернативы. Причем выбор альтернатив управленческого решения должна сопровождаться их оценкой с точки зрения эффективности и реалистичности. При этом любое эффективное решение считается таковым, если при его разработке были сформированы альтернативы, обеспечивающие целесообразность и осознанность их свободного выбора.

ABSTRACT
The paper proposed a method of generation of the areas of research methods of morphological analysis and synthesis. It is established that the basis of the management process are the management decisions that must be justified and rationally selected. In this process an important role is played by alternatives. Moreover, the selection of alternatives, management decisions must be accompanied by their evaluation from the point of view of efficiency and realism.

КЛЮЧЕВЫЕ СЛОВА
Оптимальные решения, выбор альтернатив, морфологический анализ и синтез, алгоритм лабиринтного синтеза.

KEY WORDS
Optimal solutions, choice of alternatives, morphological analysis and synthesis, algorithm of labyrinth synthesis.

В настоящее время в практической управленческой деятельности остро встает вопрос разработки оптимального решения. Для этого часто необходимо осуществлять выбор возможных вариантов. Альтернативы в данном случае являются ключевым компонентом рационального решения. Причем эффективность решения во многом зависит от того, из какого количества альтернативных вариантов был осуществлен выбор принятого решения.

Часто на практике из-за ограниченности ресурсов (например, времени, трудовых ресурсов), а также неспособности обработки значительного объема информации лицо, принимающее решение, обычно осуществляет выбор одного варианта из совокупности альтернатив, которых редко набирается более десяти. Причем выбор альтернативы зависит от опыта, интуиции специалиста, поэтому они, как правило, не могут считаться лучшими из всех возможных вариантов. Следовательно, выбранный вариант является

только самым лучшим из набора рассмотренных им вариантов, а не оптимальным вариантом.

Таким образом, возникает проблема именно в генерации вариантов, а не в отборе методов выбора альтернатив. Поэтому формализация методов генерации решений является актуальной и практически важной задачей. В практической деятельности не всегда можно сгенерировать и определить все возможные варианты, однако неоспоримым остается факт, что чем больше количество генерируемых вариантов, тем выше вероятность получить оптимальное решение задачи.

Также следует подчеркнуть, что на оптимальность решения конкретной проблемы также влияет и метод генерации альтернатив. Одним из методов, прошедшим апробацию и подтвердившим свою результативность, является метод морфологического анализа и синтеза.

Исторически появление метода морфологических матриц как синонима морфологического анализа относят к средним векам. Так, термин «морфологический анализ» связывают с Раймондом Луллием (1235 - 1315 гг.). Считается, что именно он выдвинул идею «Великое искусство», в которой путем систематической комбинации относительно небольшого числа принципов возникает возможность разрешить все проблемы философии и метафизики.

Следующей значительной вехой является современная интерпретация морфологического подхода, согласно которой данный метод нашел более эффективное свое применение. Этот вариант использования был предложен швейцарским астрономом Ф. Цвикки в 30-е годы прошлого столетия [11], а в дальнейшем развит рядом исследователей, например, В.М. Одриным и С.С. Картавовым [6,7] и другими учеными. Причем данные исследования подробно рассматривали именно первую часть морфологического подхода – анализ.

Нами уже неоднократно рассматривалось использование метода морфологического анализа и синтеза [2-5, 8-10]. Данная методика нами апробирована на примере генерации новых направлений научных исследований в области управления территориальным развитием и развитии существующих подходов в рамках экономической научной школы, созданной на базе одного из университетов России.

Суть морфологического подхода заключается в поиске оптимальных решений путем расчленения конкретной системы на подсистемы и элементы, формирования определенных альтернатив виде конкретных вариантов реализации каждой подсистемы, комбинирования вариантов решения системы из предложенных альтернатив, выбора наилучших вариантов. Таким образом, метод морфологического исследования реализуется в два этапа.

Первый этап – это анализ, заключающийся как раз в расчленении системы, получении описания всех подсистем, принадлежащих к исследованию, и их классифицирование. В качестве системы авторами были рассмотрены диссертационные исследования, которые подготовлены в рамках функционирования одной из научных школ России за ряд лет. Основными классификационными признаками предлагалось рассматривать тему работы, объект, предмет и научную новизну диссертационного исследования. На этом этапе также был сформирован морфологический ящик и структурно-логическая схема научных исследований экономической школы. Далее были предложены критерии, на основе которых проведена экспертиза рассмотренных диссертаций.

Второй этап – это синтез направлений научных исследований. В общем виде суть этапа заключается в генерации подсистем, которые максимизируют значение целевой функции. Для этого необходимо сформировать поисковое задание, выбрать определенный вид целевой функции, провести оценку описаний подсистем и затем осуществить их выбор. Авторами статьи морфологический синтез научных исследований осуществлен с помощью критериев элементной и комбинационной новизны, а также качественных критериев. В результате определены новые и развиты уже существующие направления исследований экономической научной школы [4,10].

Синтез научных исследований как поиск вариантов может основываться на

следующих известных алгоритмах: лексикографическом; древовидном синтезе; лабиринтном синтезе; блочно-лабиринтном синтезе.

В данной статье рассмотрим применение метода морфологического анализа и синтеза научных исследований с помощью алгоритма лабиринтного синтеза. Подробно методика данного алгоритма рассмотрена в различных источниках [1].

Таблица 1 – Лабиринтный синтез (ведущее исследование по одному из направлений)**

Этапы алгоритма	4, 1	Оптимальный вариант		Резервный вариант	
I вариант (продолжение ряда)					
Этап 1	Концепция развития региона, комплексное развитие региона	S_1 S_3 S_4		S_1 S_3 S_5	
	Социально направленные исследования	S_1 S_{21} S_5		S_1 S_{21} S_{27}	
Этап 2		$S_1 S_3 S_4 S_{21}$	$S_1 S_3 S_4 S_5$	$S_1 S_3 S_5 S_{21}$	$S_1 S_3 S_5 S_{27}$
		$S_1 S_3 S_4 S_{27}$			
Этап 3	Инвестиционный климат, инвестиционные и другие ресурсы	S_{10} S_{12} S_{16}		S_{10} S_{12} S_5	
		$S_1 S_3 S_4 S_{21} S_{10}$	$S_1 S_3 S_4 S_{27} S_{10}$	$S_1 S_3 S_5 S_{21} S_{10}$	$S_1 S_3 S_5 S_{27} S_{10}$
		$S_1 S_3 S_4 S_5 S_{10}$	$S_1 S_3 S_4 S_{21} S_{12}$	$S_1 S_3 S_4 S_{27} S_{16}$	
		$S_1 S_3 S_4 S_{21} S_{16}$	$S_1 S_3 S_4 S_{27} S_{12}$		
II вариант (замена элемента ряда)					
Этап 1	Управление с использованием критериев, индикаторов			S_1 S_6 S_{27}	
Этап 2		$S_1 S_6 S_4$	$S_1 S_3 S_{27}$	$S_1 S_3 S_{27}$	$S_1 S_6 S_5$
Этап 3	Регулирование социально-экономической асимметрии	S_6 S_7 S_5			
		$S_6 S_3 S_4$	$S_1 S_7 S_5$	$S_6 S_3 S_5$	$S_1 S_7 S_5$
Этап 4	Отраслевой комплекс. Агропромышленный комплекс	S_{14} S_{19} S_{15}		S_{14} S_{19} S_{17}	
		$S_{14} S_3 S_4$	$S_1 S_3 S_{15}$	$S_{14} S_3 S_5$	$S_1 S_3 S_{17}$
		$S_1 S_{19} S_4$		$S_1 S_{19} S_5$	

Источник: разработано авторами.

** Расшифровка варианта исследования см. в предыдущих работах, например, в [3]*

*** Нами предлагается в данном случае ограничиться выбранными сочетаниями, чтобы избежать «загромождения» исследования.*

Коротко опишем данный алгоритм. Метод морфологического синтеза с использованием лабиринтного алгоритма является модифицированным (методом с корректировкой) древовидным методом. Отличие лабиринтного синтеза заключается в том, что результатом поиска каждого этапа алгоритма является не одна альтернатива, а *n* самых качественных сочетаний альтернатив. При этом самый оптимальный вариант из этих сочетаний используется на следующем этапе, а остальные (*n*-1) - резервируются. Таким образом, алгоритм реализуется в несколько этапов:

1 этап - осуществляется полный перебор альтернатив первых двух по значимости обобщенных функциональных подсистем, что дает в итоге шесть парных сочетаний альтернатив, среди которых отбираются два наиболее рациональных варианта, причем менее эффективный вариант отмечается как резервный, а с другим дальше продолжается работа по согласованию его с исходными требованиями на

проектирование. Здесь возможны два варианта: 1) наличие такого соответствия, тогда процедура синтеза продолжается на втором этапе; 2) отсутствие соответствия приводит к уточнению исходных требований и состава морфологической таблицы. 2 и 3 этапы - синтез осуществляется по тем же правилам, что и на этапе 1. Варианты результатов: 1) находится хотя бы один вариант, который будет удовлетворять исходной цели проектирования, то процедура синтеза заканчивается; 2) при их отсутствии аналогичные мероприятия будут осуществлены на четвертом этапе и т.д. Если такое соответствие есть, то процедура синтеза заканчивается, в противном случае процесс синтеза продолжается. При исчерпании всех резервных вариантов, зафиксированных на втором этапе, работа по поиску решения задачи продолжается с извлечения очередного резервного варианта на первом этапе. Далее процесс повторяется в соответствии с ранее представленным алгоритмом.

Достоинствами синтеза с использованием лабиринтного метода по сравнению с древовидным является рост вероятности получения наиболее эффективного варианта системы, удовлетворяющего требованиям проектировщика. Что обусловлено итерационной процедурой возврата к пространству меньшей размерности.

Следует отметить, что на каждом этапе рассмотренного выше алгоритма осуществляется выбор наиболее эффективного и резервных вариантов на основе многокритериального принятия решений. Здесь возможны несколько вариантов, например, можно использовать метод анализа иерархии т. Саати или метод, основанный на теории нечетких множеств.

Авторами в статье использовался первый вариант - метод анализа иерархий. Также следует отметить, что нами лабиринтный синтез предлагается проводить в 2-х вариантах: с продолжением ряда и модифицированный - с заменой элементов ряда. Практическая реализация данного предложения представлена в таблице 1.

После этого авторами статьи предлагается осуществить генерацию новых направлений научных разработок на основе лабиринтного метода (табл. 2).

Таблица 2 - Синтезированные варианты по одному из направлений

Варианты	Элементы объекта / предмета исследования	Синтезированные направления исследования
1 вариант		
S_1 S_3 S_4 S_{21} S_{10}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); рынок социально значимых услуг; инвестиционная привлекательность;	Регулирование рынка социально значимых услуг (товаров) с учетом инвестиционной привлекательности региона Оценка инвестиционной привлекательности социально значимой отрасли региона
S_1 S_3 S_4 S_{27} S_{10}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); малое предпринимательство; инвестиционная привлекательность;	Регулирование малого предпринимательства на конкретных рынках товаров Анализ инвестиционной привлекательности отдельных товаров для малого предпринимательства
S_1 S_3 S_4 S_5 S_{10}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); инвестиционная привлекательность;	Регулирование инвестиционной привлекательности региона по отдельным направлениям
S_1 S_3 S_4 S_{21} S_{12}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); рынок социально значимых услуг; оборотные активы;	Регулирование оборотных активов на рынке социально значимых услуг
S_1 S_3 S_4 S_{21} S_{16}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); рынок социально значимых услуг; развитие отдельной отрасли;	Регулирование развития отельной отрасли

Продолжение таблицы 2		
S_1 S_3 S_4 S_{27} S_{12}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); малое предпринимательство; оборотные активы;	Управление оборотными активами в малом предпринимательстве региона
S_1 S_3 $S_5$$S_{21}$$S_{10}$	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; система транспортного обслуживания региона (СТОР); рынок социально значимых услуг; инвестиционная привлекательность;	Регулирование инвестиционной привлекательности системы транспортного обслуживания населения региона
S_1 S_3 S_4 S_{27} S_{16}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара); малое предпринимательство; развитие отдельной отрасли;	-
S_1 S_3 S_5 S_{27} S_{10}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; система транспортного обслуживания региона (СТОР); малое предпринимательство; инвестиционная привлекательность;	Регулирование деятельности алого предпринимательства в системе транспортного обслуживания региона
2 вариант		
S_1 S_6 S_4	Элементы СЭС региона; комплекс индикаторов; торговые марками (товар, производство конкурентоспособного товара)	Формирование комплекса индикаторов оценки конкурентоспособности товара
S_1 S_3 S_{27}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; малое предпринимательство;	Регулирование развития алого предпринимательства в регионе с учетом отдельных элементов СЭС
S_1 S_6 S_5	Элементы СЭС региона; комплекс индикаторов; система транспортного обслуживания региона (СТОР);	Регулирование системы транспортного обслуживания на основе комплекса индикаторов
S_6 S_3 S_4	Комплекс индикаторов; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара)	-
S_1 S_7 S_5	Элементы СЭС региона; социально-экономическая асимметрия; система транспортного обслуживания региона (СТОР);	Регулирование региональной асимметрии СТОР
S_6 S_3 S_5	Комплекс индикаторов; состояние и перспективы развития региональной СЭС; система транспортного обслуживания региона (СТОР);	Регулирование СТОР на основе комплекса индикаторов
S_{14} S_3 S_4	Отношения между производителями и переработчиками; состояние и перспективы развития региональной СЭС; торговые марками (товар, производство конкурентоспособного товара)	Регулирование производственных отношений на конкретных рынках
S_1 S_3 S_{15}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; развитие инфраструктуры региона	Регулирование развития инфраструктуры региона
S_1 S_{19} S_4	Элементы СЭС региона; развитие отдельных рынков; торговые марками (товар, производство конкурентоспособного товара)	Управление развитие конкретных рынков Прогнозирование развития конкретных рынков товаров и услуг
S_{14} S_3 S_5	Отношения между производителями и переработчиками; состояние и перспективы развития региональной СЭС; система транспортного обслуживания региона (СТОР);	Рационализация СТОР с учетом организационно-производственных отношений
S_1 S_{19} S_5	Элементы СЭС региона; регулирование отдельных рынков; система транспортного обслуживания региона (СТОР);	Регулирование отдельных направлений СТОР
S_1 S_3 S_{17}	Элементы СЭС региона; состояние и перспективы развития региональной СЭС; факторы конкурентоспособности продукции	Повышение эффективности развития СЭС региона с учетом фактора конкурентоспособности

Источник: разработано авторами.

Аналогичное исследование было проведено и по другим направлениям, что позволило синтезировать альтернативные варианты проведения научных исследований, проводимых в рамках экономической научной школы.

Таким образом, в статье рассмотрен процесс разработки управленческого решения. Причем акцент сделан не на инструменты выбора альтернатив, из которых затем формируются оптимальные решения, а именно на процесс генерации этих альтернатив. Авторами предлагается использовать метод морфологического анализа и синтеза. Достоинствами данного методического аппарата является то, что он по своей сути реализует творческое комбинационное мышление, к которому призывал И. Шумпетер с целью достижения экономического развития. При этом данный метод также позволяет каждый конкретный элемент рассматривать как отдельный объект, разделив его на свои функциональные элементы, и построив для каждого свою функциональную схему, что позволяет формировать дополнительные конструктивные функциональные схемы для последующего рассмотрения. Авторы неоднократно рассматривали возможности использования морфологического анализа и синтеза. В данной статье рассмотрена именно апробация данной методики на примере лабиринтного синтеза, что позволило сформировать новые, определить наиболее перспективные исследования и их развить в рамках научной экономической школы, созданной на базе Юго-Западного государственного университета.

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THE EFFECT OF CULTURE AN BEHAVIOR OF LEADERS TOWARD EMPLOYEE PERFORMANCE: A STUDY ON SAVINGS AND LOAN COOPERATIVES IN PAPUA, INDONESIA

Sarminanto*, **Hadiwidjojo Djumilah**, **Djumahir**, **Rahayu Mintarti**
Faculty of Economy and Business, University of Brawijaya, Indonesia

*E-mail: sarminanto65@gmail.com

ABSTRACT
Cooperatives in Papua are not only facing competition at the local level, but also facing competition with economic institutions at the global level. In order to compete as a modern economic institution, the performance of cooperatives needs to be improved in order to successfully become globalized economic institutions. The decline in the performance of cooperatives in Papua is thought to be caused by a factor of organizational culture and behavior of cooperative leaders. This study aims (1) to test and analyze the influence of organizational culture on employee performance and (2) to examine and analyze the effect of behavior of leaders on employee performance. This study was conducted at some research sites in five (5) regencies and one (1) city in the Province of Papua. The sampling technique sampling used was area sampling. The population was all employees of cooperatives. These employees have been actively working for more than five (5) years. There were as many as 252 employees in 120 cooperatives. Since the total population was only 252 people, the study used a saturated sample technique or population research. Quantitative analysis method used was Structural Equation Modeling (SEM). The results of the study are as follows. First, culture directly and significantly affects employee performance. Second, the behavior of leaders directly and significantly affects employee performance.

KEY WORDS
Culture, behavior, leader, employee, performance.

For such a long time, cooperatives have been considered unimportant. They are seen merely as a collection of people who are completely weak. People tend to think that cooperatives do not play any roles, compared to medium and even large private business. This is completely wrong, yet the thought has long stayed in our mind. In Indonesia, some cooperatives actually have had large and diverse business units and have grown into a large-scale business dominating the life of many people in various areas of commercial enterprises. Cooperatives turnover has reached billions of rupiah per month. However, as Bung Hatta said, “Despite the great business, cooperatives which have not been able to prosper the life of the members cannot be said as a real cooperative; cooperatives shall work for the interests of the members.” In the Province of Papua, there are 2,483 cooperatives nowadays. However, only 1,460 cooperatives or about 58% are active, while the remaining 1,023 or about 42% of cooperatives are inactive needing to be addressed so as not to close down (Tempo, July 18, 2013). In general, the growth of cooperatives in Papua from the aspect of quantity increases, but the number of cooperatives facing problems is also increasing.

Article 3 Law Number 25 of 1992 states that the purpose of cooperatives is to promote the welfare of members in particular and society in general as well as to help build national economy in order to realize an advanced equitable and prosperous society based on Pancasila and the Constitution of 1945. The results of the preliminary study showed that the performance of cooperatives in Papua was still not optimal. Data released by Tempo on July 18, 2013 proved that as many as 42% of cooperatives in Papua were inactive. This data can be interpreted as the sign of low performance of many cooperatives in Papua. The assumption built from the results of preliminary study is that the low performance of

cooperatives in Papua is due to the performance of managers of cooperatives, in this case is the leaders and employees of cooperatives in Papua. The decline in the performance of cooperatives in Papua is thought to be caused by the presence of organizational culture, as well as the behavior of the leaders and employees. It has been assumed that cooperative organizational culture in the form of creative work culture, culture of learning, and work ethic have not been practiced as expected and eventually have led to low employee performance. Behavior of cooperative leaders in the form of care to employees, communication with employees, participation in performing tasks, and spirit to succeed in managing the cooperative is still low so the motivation and performance is also low.

The view above shows that cooperatives need to have an organizational culture that supports the achievement of organizational goals. Organizational culture within cooperatives refers to the basic patterned assumption found, explored, and developed by a group of people as the experience to solve problems, adapt to external factors and internal integration (Schein 1992). Strong organizational culture supports its members to understand how to carry out tasks and give stability to the organization (Robbins and Judge, 2007). Organizations are intimately associated with leadership behavior. Leadership has become one of the key factors in organizational life. Organizations need a leader to carry out the tasks that focus on common goals (Hadari and Martini, 2006). The behavior of the leaders will be a role model for employees, because employees see how the behavior of the leaders could fit in with their plans to work and contribute to the organization.

Based on the background and reasoning as described above, then it is important and useful to analyze and examine whether organizational culture and leadership behaviors can improve employee performance in the savings and loan cooperatives in the Province of Papua.

LITERATURE REVIEW

Wilson (2009) examines the influence of organizational culture on employee performance. The study is conducted at a company having employees more than 5000 people. In this study, the performance of employees becomes the dependent variable and organizational culture becomes the independent variable that is determined by the interaction of internal and external forces. Internal forces consist of a sense of achievement of development and advancement, nature of work, and recognition. While external forces consist of company policy and supervision.

Van den Berghe (2004) conducts a study to reveal the influence of behavior of leaders on employee motivation at Toyota Kijang insurance. The study involves 104 respondents owners of Toyota Kijang. The study has found a positive and significant relationship between leadership behavior and motivation of employees.

Research by Wilson (2009) shows that the performance of employees is affected by organizational culture. The result indicates that internal forces, which consist of a sense of achievement of development and advancement, nature of work, and recognition, affect performance. While external forces, which consist of company policy and supervision, also affect performance. Compared with Wilson's study (2009), this study is different in the form of the three indicators used. Wilson's study uses (1) a sense of achievement of development and advancement, (2) the nature of work and (3) recognition as the indicators, while this study uses (1) creativity, (2) learning and (3) ethics as the indicators. Besides, Wilson's study (2009) uses organizational culture as an independent variable, and employee performance as the dependent variable.

Luthans (2006) and Hellriegel (1998) argue that organizational culture has a number of important characteristics as follows: (1) routine behavior when members interact; (2) the norms adopted by the working group throughout the organization; (3) the dominant values held by members of the organization; (4) the direction of organization's policy for employees and customers; (5) the rules to build relationship among colleagues in the organization that must be received by employees; and (6) feelings or climatic delivered in an organization with the physical layout and the way in which members of the organization interact with external

parties.

Fiedler (1967, in Vromm and Jago (2007) also explains that leadership is basically a pattern of relationships between individuals using the authority and influence of the group of people to work together to achieve goals. This opinion is also supported by Pfiffner (1977), which states that leadership is the ability to coordinate and motivate people and groups to achieve the desired goals. In line with the two opinions above, Davis (1977) defines leadership is the ability to invite others to achieve the stated goals vigorously.

Sutrisno (2011) suggests that performance is the result of work that can be achieved by a person or group of people in an organization, in accordance with the authority and responsibilities of each, in an effort to achieve the goals of the organization legally and in accordance with moral and ethics. Wirawan (2009) sees performance as the output produced by functions or indicators of a job or a profession in a given time.

CONCEPTUAL FRAMEWORK

This conceptual framework describes the relationship between the study variables. Relationship between variables is based on the theory of organizational culture, behavior of leaders, and employee performance. The results of research is related to the relationship between the theory of organizational culture and leadership behavior toward performance. Based on the relationship of variables based on theories and previous research, the conceptual framework of the study is then prepared.

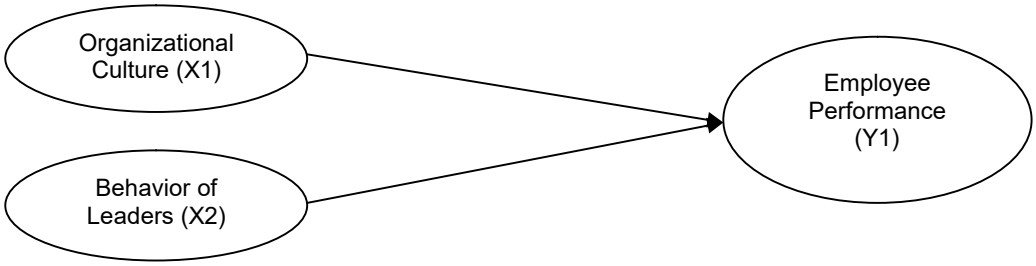

Figure 1 – Relationship between Variables

Research Hypotheses. Research conducted by Maran (2010), Inamete (2009), Fritzsche (1994), Tziner (2011), and Pinder and Harlos (2001) find the positive and significant relationship of organizational culture and employee performance. Organizational culture and behavior of leaders can have various effects on employee performance. Employees work harder to achieve the goals of the organization if they think of themselves as part of the organization and its culture. Different cultures in one organization may also affect the performance of employees; this indicates a real gap, so the first hypothesis of the study is as follows:

H1: Organizational culture is able to influence employee performance.

The basic underlying this hypothesis is the theoretical study conducted by Abasi (2012), Atmojo (2012), and Eagleson et al. (2000). The studies have found the positive and significant relationship between behavior of leaders and employee performance. Organizations use strategic reward system to motivate employees and improve their performance. Thus, the second hypothesis of the study is as follows:

H2: The behavior of leaders is able to influence performance of employees.

Operational Definition:

Organizational Culture(X1). Organizational culture as a variable (X1), is then given a code (BO), refers to the interaction of traits and habits that affect groups of people in their environment. Habits that support the organizational culture are creative culture, willingness to learn from the success of others, ethics or manners, and traditions in an organization. This statement is supported by the previous studies of Maran (2010), Inamete (2009), and Fritzsche (1994). From the above statement, the indicators proposed in this study are as

follows: creativity, learning, and ethics.

Behavior of Leaders (X2). Behavior of leaders as a variable (X2) is then given a code (PP), refers to real action done by a leader. In doing actions, leaders cannot be separated from their behavior (Almansour, 2012; Kumar, Anjum, and Sinha, 2011). Indicators of behavior of leaders that are used in this study are based on the statement put forward by Al Mansour (2012), Kumar, Anjum, and Sinha (2011). From the above statement, the indicators proposed in this study are as follows: reward to employees, communication, participation, and achievement.

Employee Performance(Y1). Employee performance as a variable (Y), is then given a code (KJ), refers to the level of achievement and the understanding on the positive and negative impacts of an operational policy (Wright, 2002). Employee performance indicators used in this study are based on the concept proposed by Bernardin and Russel (1993), Armstrong (2004), Bass (2003), and Kasali (2001). The indicators used are as follows: the quality of work, the quantity of work, and the mental attitude of work.

METHODS OF RESEARCH

The study took places in five (5) regencies and one (1) city in Papua, namely (1) the City ofJayapura, (2) the Regency of Jayapura, (3) the Regency of Jayawijaya, (4) the Regency of Timika, (5) the Regency of Biak Numfor, and (6) the Regency of Merauke. The sampling technique sampling used was area sampling. The population was all employees of cooperatives. These employees have been actively working for more than five (5) years. There were as many as 252 employees in 120 cooperatives. Since the total population was only 252 people, the study used a saturated sample technique or population research. Quantitative analysis method used was Structural Equation Modeling (SEM) to examine the causal relationship between variables. Solimun (2008) states that SEM consists of Measurement Model and Structural Model analyzed using AMOS 10.4 (Analysis of Moment Structure).

RESULTS AND DISCUSSION

Hypothesis 1: Organizational culture is able to influence employee performance.

The results of analysis show a positive correlation with a parameter coefficient of 0.57 and significant correlation between organizational culture (X1) and employee performance (Y) because the t statistic (4.201) is greater than t table (1.960). It can be concluded that there is a positive and significant influence of cultural organization (X1) on employee performance (Y). Positive sign means that the stronger cultural organization (X1), the higher the employee performance (quantity, quality, and professional attitude) will be; in other words, the more powerful creative communication, learning, and cooperation will be. The level of confidence of the relationship is (100% - 0%) or equal to 100%. In the context of research on savings and loan cooperatives in the province of Papua, organizational culture refers to perceptions of employees and how the perception creates a pattern of beliefs, values, and expectations, as has been said by Schein (1992). The results of this study also confirm the opinion of Gibson *et al.* (2012) which states that organizational culture is the perception of employees and how their perceptions pattern form beliefs, values, and expectations; thus, organizational culture has a number of important characteristics as stated by Luthans (2006) and Hellriegel (1998).

Hypothesis 2: The behavior of leaders is able to influence performance of employees.

The results of the analysis show a positive and significant correlation between behavior of leaders and employee performance, with alpha of 5%. Positive sign means that the stronger behavior of leaders (X2), the higher the employee performance will be. The level of confidence of the relationship is (100% - 0%) or equal to 100%. This study can explain that behavior of leaders has an important role, as it is an example for employees of cooperatives. The existence of the good example provides encouragement for employees to follow the example given in carrying out the work. Leadership is an effort to use the kind of influence rather than coercion to motivate people through communication in order to achieve certain goals (Gibson

et al., 2012). This study supports the opinion of Gibson *et al*. (2012). Leadership is also interpreted as the ability to influence a group to achieve certain goals (Robbins and Judge, 2007); this opinion is also evidenced in this study. Based on this study and compared with previous studies, it can be affirmed that behavior of leaders has an influence on employee performance. The behavior of leaders in cooperatives in Papua has been appropriate to have a good impact on employee performance. The behavior of the leaders playing the biggest role in affecting employee performance is achievement - the leaders are able to establish a good relationship with the employees, so employees are willing to run the job happily, and therefore could produce better performance.

Limitation. The study took places in five (5) regencies and one (1) city in Papua, while Papua has 20 cities and regencies and has about 600 savings and loan cooperatives. The subjects of this study were only 240 respondents, so it does not reflect the overall population, as there are more than a thousand respondents in all savings and loan cooperatives in Papua. Further studies must be done by increasing the number of research sites in locations that have not been studied.

Conclusion

The results of this study indicate that organizational culture by cooperatives Papua can bring an impact on employee performance. The organizational culture that plays the biggest role is learning, where learning for employees need to be developed so cooperatives in Papua can develop even faster and better.

The behavior of leader in cooperatives in Papua can bring an impact on employee performance. The behavior of leaders that plays the biggest role in supporting employee performance is achievement, i.e. the behavior of leaders that can provide challenges, seeks improved performance, emphasizes on performance, and shows confidence that employees will achieve high standards.

SUGGESTIONS

Organizational culture, despite being able to promote employee performance, still needs to be improved, especially with regard to ethics. Cooperative management needs to improve employee ethics, i.e. the values and norms of employees in the work. Cooperative management can regularly conduct trainings or regular meetings to establish the values of good work for employees. Cooperative management may also send employees to attend trainings to improve the ethics of employees in the work.

The behavior of the leaders still needs to be improved, as leadership in cooperatives in Papua is still not strong enough. Leadership of cooperative management still needs to be improved, and this can be done by sending cooperative managers to attend leadership training conducted by government agencies and universities. Cooperatives may also propose to the provincial and city governments to conduct leadership training for cooperative managers.

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THE INFLUENCE OF SERVICE QUALITY DIMENSIONS ON CUSTOMER SATISFACTION IN BANK JATIM, SURABAYA, INDONESIA

Kurniawan Gogi
STIE «YAPAN» Surabaya, Indonesia
E-mail: gogi.indo@gmail.com

ABSTRACT
Service quality dimensions are able to motivate customers in Bank Jatim Surabaya to establish a strong association with the services, which in turn is expected to provide a customer satisfaction. This study aims to analyze the influence of service quality dimensions which consist of reliability, responsiveness, and empathy towards customer satisfaction in Bank Jatim, Surabaya. This study also uses a sample of 60 respondents (customers) which further tested by using a multiple linear regression analysis with F-test and t-test. Moreover, the results of this study indicate that the variable of reliability, responsiveness, and empathy have a positive and significant impact on customer satisfaction. While partially, the reliability, responsiveness, and empathy could give a positive and significant effect towards customer satisfaction. On the other hand, responsiveness is the variable which has the most dominant and significant effect on customer satisfaction. This means that these 3 dimensions of service quality have an important role in helping the needs and desires of customers to receive the best service.

KEY WORDS
Service, quality dimensions, customer, satisfaction.

In everyday life, a person cannot be separated from the fulfilment of goods and services particularly those which are related to service provision. What is meant by services here are the services in the field of banking. If you pay attention to the current banking system, its presence needs to be laid out in such particular condition along with the increasing competition of service provision in society. According to Zeithaml *et al.* (2002), service is an overall impression of the customer towards the inferiority or superiority of the organization and the services offered. Meanwhile, Cronin and Taylor (1992) stated that there is still no objective study concerning this matter, however, measuring the performance of the services received by the customer is usually performed in order to estimate the quality of an organization or a company.

Therefore, service quality is a form of customer ratings of the perceived service towards the expected service. Service quality is generated by the banking operation and the success of this operation is determined by many factors such as the employees, systems, technology, as well as customer engagement. Parasuraman et al. (1991) have suggested a model of service quality that highlights some of the main requirements to provide the expected service quality. Furthermore, it is emphasized that service quality is a mismatch between the expectations or desires of the customer with a customer perception. He also added that service quality has many different characteristics so that it's difficult to be defined or measured by using these service quality dimensions. This also includes a wide range of issues related to service quality, namely: tangibles, reliability, responsiveness, assurance, and empathy. However, the problems which are chosen to be examined in this study are the issue on the dimensions of reliability, responsiveness, and empathy in concern with the service quality and customer satisfaction in Bank Jatim, Surabaya.

From the description above, it is clear that service quality provides a motivation to the customers to establish a strong association with services like banking services. Nevertheless, the quality of service that is delivered to banking customers is closely linked with customer satisfaction. Anderson *et al.* (1997) in his research said that many researchers agree that satisfied customers tend to be more loyal to its organization. While according to

Mudie and Cottam (1972), quoted by Tjiptono (2007), a total customer satisfaction cannot be fully achieved even only for a while. This means that the better the service quality, the higher the satisfaction felt by customers. When a higher satisfaction is received by the customer, it can create such benefits for the company. In other words, satisfied customers will continue to make purchases at the company but if the relation is performed without any satisfaction, this certainly can lead the customers to move to another product. Customer satisfaction is a function between the perceived performance and the expectation (Kotler, 2009).

Therefore, in a long-term condition, this kind of association will allow the service to carefully understand customer expectation. Thus, the existence of services which in this term is banking, requires the development and progression of better service quality so as to give a satisfaction to customers. Related to that, the framework that is outlined in this study is at least identical to the system applied in Bank Jatim, Surabaya. However, the results which were obtained are considered to be less optimal in concern with the customer expectation. Then, this thing becomes the background of Bank Jatim in their expectation and reality that is delivered as service where it is judged differently by the customers. In the context of customer satisfaction, the expectation is the estimation or beliefs of what they will receive; their expectations are formed by their first buying experience, friends' comments as well as the promise of the organization. Customer expectations will keep growing from time to time along with the increasing level of customer experience. By that, a satisfied or dissatisfied customer is the response of customer to the evolution of disconfirmation that is perceived between prior expectations and actual performance. It is felt that in this increasingly fierce competition, more banking services have involved in fulfilling the needs and desires of the customers. Of course, this makes each bank to put their orientation on customer satisfaction as a primary goal, for example, with the increasing number of services in business area which have a commitment to customer satisfaction in the mission and promotion (Tjiptono, 2007).

According to the academicians, customer satisfaction is a construct that stands alone and influenced by the quality of service (Oliver, 1980). The research on Quality, Service, Perceived Value, Customer Satisfaction, Company's Fame, and Loyalty has already been done by Hu and Juwaheer (2009) to the hotel guests in Mauritis in concern with the application of high-quality service and the creation of superior customer value. This can lead to high customer satisfaction so that it could affect the company's fame where it ultimately leads to customer retention. In accordance with the previous research of Wahyuningsih (2002), there is a significant influence on service quality and customer satisfaction, and in this context, the aspect of reliability from service quality dimensions has the most dominant influence on customer satisfaction. Meanwhile, Junaidi (2002) indicated that empathy is an inspiration and attention intended personally to the customer, for example, the ability to give special attention to the customer, the willingness to provide time for the customers in addressing issues, personal approach, and paying attention to the interests and needs of customers. Next, according to the customers of BNI Taplus Surakarta, empathy is the variable which considered as the most important and the most significant thing which can affect the company to improve customer satisfaction. Besides that, the variable of reliability, responsiveness, and assurance are the variable that can be considered to have an important and significant influence to improve satisfaction. As for the tangibles variable, unfortunately, this has not been assessed as an important and significant influence to improve satisfaction. Therefore, this study aims to: 1) analyze the influence of service quality dimensions which consist of reliability, responsiveness, and empathy simultaneously to customer satisfaction in Bank Jatim, Surabaya, 2) examine the effect of service quality dimensions including reliability, responsiveness, and empathy partially to customer satisfaction in Bank Jatim, Surabaya, as well as to analyze one factor among the service quality dimensions such as reliability, responsiveness, and empathy that has a dominant influence on customer satisfaction in Bank Jatim, Surabaya.

METHODS OF RESEARCH

This research was carried out by using a correlation study in order to examine the effect or correlation between several research variables (Munir, 2013). The design was used either to test or to confirm the relationship or influence between the variables. The study was conducted in Bank Jatim, Surabaya from November to December 2013. Moreover, the sampling technique was performed by census method due to limited research time, and there were 60 respondents (customer) chosen. Furthermore, the analysis was done by using multiple linear regression analysis with the F-test and t-test.

RESULTS AND DISCUSSION

The simultaneous test results can be seen in this following table:

Table 1 – F-test Analysis

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	152.936	3	50.979	80.085	.000[a]
	Residual	35.647	56	.637		
	Total	188.583	59			

Source: Results of regression analysis.

Based on Table 1 above, the result of F-test analysis shows a number of 80,085 with a significance level of 0,000 < 0,05. The results of the overall analysis of the three independent variables (reliability, responsiveness, and empathy) have a positive and significant impact on customer satisfaction in Bank Jatim, Surabaya. This means that Ho is rejected and Ha is accepted. On the other hand, the partial test results are illustrated as follows:

Table 2 – T-test Analysis

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	(Constant)	-.843	.913	-.924	.359
	Reliability (X1)	.312	.056	5.587	.000
	Responsiveness (X2)	.358	.045	8.037	.000
	Emphaty (X3)	.619	.119	5.207	.000

Source: Results of regression analysis.

As we can see, Table 2 indicates that: Reliability has a positive and significant impact on customer satisfaction in Bank Jatim, Surabaya with the coefficient of 0,312 and t-test analysis result by 5,587 at a significance level of 0,000 < 0,05. This means that Ho is rejected and Ha is accepted.

Responsiveness is able to give a positive and significant effect on customer satisfaction in Bank Jatim, Surabaya with the coefficient number of 0,358 and t-test analysis result by 8,037 at a significance level of 0,000 < 0,05 (Ho is rejected and Ha is accepted).

Empathy could influence customer satisfaction positively and significantly in Bank Jatim, Surabaya with the coefficient of 0,619 and t-test analysis result by 5,207 at a significance level of 0,000 < 0,05. This shows that Ho is rejected and Ha is accepted.

Then, the test of dominant influence on one variable has resulted in this table below:

Table 3 – Dominant Test Analysis

Model		Standardized Coefficients
		Beta
1	(Constant)	
	Reliability (X1)	.387
	Responsiveness (X2)	.481
	Emphaty (X3)	.362

Source: Results of regression analysis

Table 3 shows that responsiveness has a dominant and significant influence (most influential) towards customer satisfaction in Bank Jatim, Surabaya, with the results of standardized coefficients (beta) by 0,481 in which it means that Ho is rejected and Ha is accepted.

Furthermore, the results of this study stated that the 3 variables such as reliability, responsiveness, and empathy are considered as an important variable which has a significant influence on customer satisfaction in Bank Jatim, Surabaya. Thus, the results of this customer satisfaction test are able to be a monitoring indicator for the service quality in Bank Jatim Surabaya so that the expectations of the customers will be well received. The results of this study are similar to the study of Wahyuningsih (2002), Junaidi (2002), as well as Cahyadi (2003). Similarly, the results of the analysis also indicated that each service quality dimension has an important role that could affect customer satisfaction in Bank Jatim, Surabaya. By that, the result of this dominance and significance test could show a high achievement and as an improvement in giving their best to the customers so that customer expectations can be obtained in accordance with the real perception in demonstrating its service quality. The results of this test are consistent with the results of Lai & Babin (2009) and Hu & Juwaheer (2009).

CONCLUSION

From the result and discussion above, we can pull out a conclusion such as: The results of the overall analysis of the 3 independent variables (reliability, responsiveness, and empathy) have a positive and significant impact on customer satisfaction in Bank Jatim, Surabaya. This means that the higher the service quality provided, the higher the satisfaction received by customers.

The results of the analysis of each dimension such as reliability, responsiveness, and empathy show a positive and significant impact on customer satisfaction in Bank Jatim, Surabaya. This result is related to the service quality improvement of the human resources or employees at Bank Jatim, Surabaya in assisting and responding the needs and desires of customers with a fast and reliable response.

Responsiveness has a dominant and significant effect on customer satisfaction in Bank Jatim, Surabaya because it is proven as an important thing which has the highest impact on the service provision.

SUGGESTIONS

After what we have discussed previously, the suggestions for Bank Jatim, Surabaya are as follows:

The party of Bank Jatim, Surabaya is expected to pay more attention and to retain the service quality dimensions especially in terms of the employees. This means that employees must provide accurate information and be responsive in dealing with complaints from customers as well as provide hospitality which complies the requirements of the customers.

It is also assumed that Bank Jatim need to improve the service quality so that it would be a better service. With excellent service quality, the customer will be satisfied so that it could enhance the positive image in the eyes of the customers in which it will ultimately create a customer’s loyalty.

The success of Bank Jatim in responding customers indicates that Bank Jatim has already understood the customer so that it needs an improvement to increase the quality. This is due to responsiveness variable that has a strong influence on customer satisfaction in which it is expected to be the attention in the future.

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ANALYSIS OF FACTORS AFFECTING THE DECISION TO ADOPT INFORMATION TECHNOLOGY AND ITS IMPACT ON BUSINESS PERFORMANCE: STUDY ON MICRO, SMALL AND MEDIUM ENTERPRISES (SMES)

Widyaningrum Hening Asih*, **Raharjo Kusdi**, **Nuzula Nila Firdausi**
Department of Business Administration, Faculty of Administrative Sciences,
University of Brawijaya, Indonesia

*E-mail: heningasihwidianingrum@gmail.com

ABSTRACT
Micro, Small and Medium Enterprises (SMEs) is a business unit that provides a positive contribution to the economy of the State. However, it does not necessarily give SMEs the ease and smoothness in running the business. SMEs still have problems that continue which become a challenge for the progress of its business units. Lack of skilled labor, low education levels, sources of funds, and government regulations is a problem that has long faced by SMEs. However, the biggest challenge facing SMEs is how they can maintain their position in the industry. This study aims to identify and explain the context picture technology (TECH), the context of the organization (ORG), the context of the environment (ENV), the adoption of information technology (AIT), and business performance by SMEs in Malang; knows and identifies the influence of technology on adopt Information Technology, Organization on adopt Information Technology, Environment on adopt Information Technology and adopt Information Technology on Business Performance by using the theory of Technology, Organization, and Environment (TOE), which introduced by Tornatzky and Fleischer (1990). This research uses explanatory research with questionnaires as the primary data. Primary data were obtained from questionnaires distributed to the SMEs in Malang who has a website. The sampling technique is random sampling with 50 SMEs. Analysis of the data in this study uses the Smart PLS 3.0. The results of the analysis in this study shows that technology (TECH) have a positive influence and significant impact on the adoption of information technology (AIT), organization (ORG) also has a positive influence and significant impact on the adoption of information technology (AIT), and environment (ENV) has positive and significant impact on the adoption of information technology (AIT), furthermore, the adoption of information technology (AIT) has a positive and significant impact on business performance.

KEY WORDS
Technology, organization and environment (TOE), adoption of information technology, business performance, micro small medium enterprises (SMEs).

Small Medium-sized Enterprise (SMEs) is a business unit that provides a positive contribution to the economy of the State. SMEs contribute Rp. 5,440 billion to national GDP in 2013. In addition, SMEs also greatly contribute to employment and investment. Data from the Ministry of Cooperatives and SMEs shows that SMEs provide employment for 114.14 million and Rp. 1655.2 trillion investment with a total of 57.8 million units of business. Data ideas indicate that SMEs are an important pillar in the economy of this state.

Many challenges that faced by SMEs in business. Lack of skilled labor, low education levels, sources of funds, and government regulations is a problem that has long faced by SMEs. However, the biggest challenge facing SMEs is how they can maintain their position in the industry. It is often seen are not many SMEs can continue to run their business smoothly in a long period of time. It can be seen from the turnover of SMEs is high. Data from Bank of Indonesia shows the development of SMEs in 2012 of 10.5% is much improved from the previous two years which was only 2%, in 2013 the development trend of medium enterprises decreased by 6% and back up in the next year to 14%.

The data indicates that it is difficult for SMEs to maintain their efforts in the industry compared to create a new kind of business. Therefore, SMEs need assistance from government and academia in order to solve the problems of SMEs, so that their businesses can continue to survive in the industry for today and for the future. Moreover, the presence of the ASEAN Economic Community (AEC) which creates a free trade area, make the huge number of competitors and the greater challenge for SMEs.

One solution that could help SMEs is able to continue to survive in the industry with high competitiveness in information technology. The government through the ministry of cooperatives and SMEs also realize the importance of information technology, so they make MSME based program of science and technology (science and technology) which expected to be a solution for solving the problems toward SMEs. Moreover, in this globalization era of technology, the rapid development of information technology is expected to provide a positive impact for SMEs when they can use it properly.

The problems that arise are still in low level of information technology adoption by SMEs. Ministry of Development of SMEs BI revealed that the low level of use of information technology (website and e-mail) by SMEs compared with large businesses, only 10% of SMEs that have used the website for their business activities, while more than 40% of large businesses have used the website. Based on these data it can be seen that the SMEs knowledge on information technology is likely to be low. It is a challenge for the government and other interested parties, how to create a favorable situation for SMEs by applying information technology-based environment.

Based on the background of the problems that have been described, the researcher is interested to assess how the rate of adoption of information technology by SMEs and the impact on the business performance of SMEs as well as the factors that can influence the adoption of information technology by SMEs. This study uses the theory of The Technology, Organization, and Environment (TOE), which was introduced by Tornaztky and Fleischer (1990). The theory reveals the adoption of innovations at the organizational level is influenced by three contexts namely technological context, the context of organizational, and environmental context.

THEORETICAL REVIEW

Characteristics of SMEs. Micro, Small and Medium Enterprises (SMEs) is a business unit which continue to develop until today. Micro, Small and Medium Enterprises (MSMEs) in Act No. 20 of 2008 states that micro, small and medium aims to foster and develop the business in order to build a national economy based on fair economic democracy. In Indonesia itself, there are many different views on the definition of SMEs, it is seen as a different point of total assets / capital or number of employees. Under the Law No. 20 in 2008 and the Central Statistics Agency (BPS) characteristics of SMEs can be summarized as belows:

Table 1 – Characteristics of SMEs

n/n	Total net assets / year		Number of employees
Micro	< IDR 50.000.000	< IDR 300.000.000	< 3 people
Small	IDR 50 – Rp. 500 million	IDR 300 million – Rp. 2,5 billion	5 – 9 people
Medium	IDR 500 million – Rp. 10 Billion	IDR 2,5 billion – Rp. 50 billion	20 – 99 people

Source: Law No. 20 Th. 2008 and Central Bureau of Statistics (2017).

Information Technology. IT (information technology) is a result of the convergence of computer and communication technology. Information technology is a combination of computer technology (hardware and software) to process and store information communication technology to transmit information (Martin et al., 2005 in Suyanto 2005). Information technology is growing with the support of the Internet network, so that today, business world of information technology has evolved. E-business, e-commerce and m-commerce is some form of development of information technologies which utilize the

Internet. McLeod (2008) defines e-commerce is the use of communications networks and computer to execute business processes. Kadir and Triwahyuni (2005) argues that e-commerce is any form of activity of buying and selling, marketing products, services and information which done electronically, organizations can provide e-commerce in the form of a website used to promote and distribute their products / services.

Adoption of IT. Adoption is as an appointment or acceptance of anything. Adoption of information technology means the removal or acceptance of information technology that have not previously owned or used. Tan et al. (2009) defines that the adoption of information technology as application of information and communication technology (ICT) tools including computer hardware, software, and networks required for connecting the internet. Adoption of information technology in an organization will be implemented if the organization felt need and have that information technology. Ghobakhloo (2011) mentions the other forms of e-commerce are generally adopted by SMEs consists of internet, extranet / VPN, website, electronic data inchange (EDI) and electronic funds transfer (EFT).

The Technology, Organization and Environment (TOE). Tornatzky and Fleischer (1990) in Arpaci (2013) developed a framework for adoption to the organization based on the theory of contingency organization. This framework consists of three key context that can influence the adoption of an organization, technology, and environment (TOE). TOE context can be explained as follows:

Technology (Technology). Technology can be understand into the characteristics and availability of the technology within the organization. Its main focus is on how the technological characteristics can affect adoption. Technological characteristics that may influence the adoption of information technology described by Roger (1983) which states some of the characteristics of the technology consists of relative advantage or a relative advantage which be the level of excess of an innovation (in the study of information technology), are better than before or on the things are usually done. Maduku, et al. (2015) define the relative advantage as profit expectations by SMEs deriving from the adoption and the use of mobile marketing.

Second compatibility, Roger defining compatibility is the extent to which an innovation is considered consistently with existing values, experience and needs of the organization, so that owners / managers of SMEs will adopt an information technology if they see a lack of compatibility between technology and information with their business. Third complexity defined by Roger (1983) as a level of complexity of a technology to be adopted. Hassle defined it as how far the information technology to be understood by the adopter. Lin and Ho (2011) states that a technology that has a high level of complexity will be a lot of tacit knowledge contained, so it will be difficult to comprehend, understand and share. Based on these explanations, the hypothesis in this study are:

H1: Technology affect positively and significantly to the adoption of information technology.

Organization (the Organization). Tornatzky and Fleischer's (1990) organizational context consists of two things namely the characteristics (size, structure managerial) and resources (human resources and of resource slack). The organizational context in this study is based on Tornatzky and Fleischer (1990) which refers to the first of three indicators of top management support. It s an indicator that has an important role in the adoption of information technology, because the top management is controling the activities of the organization. The decision on the adoption of information technology and communications to employees is an important role of top management (Maduku, et al., 2015).

Both employee capability is the availability of competent employees in an organization which able to support for the adoption of information technology. Lin and Ho (2011) states that the competent employee is one of the keys to success for adopting information technology. Employees are able to use and communicate with both information technology which become an important aspect in adoption. Third financial support or financial budget is a necessary aspect in the adoption of information technology to finance the funding requirements during the adoption of information technology. Thus, the hypothesis that can be developed are:

H2: Organizational affect positively and significantly to the adoption of information technology.

Environment. Environment is an element that is outside from organization that may affect the operation of the organization. Ghobakloo et al. (2013) revealed that the shift towards the adoption of information technology can be a form of response or reaction to an event or change that originated from external environment. The first indicators of environmental context in this study is the pressure from competitors. SMEs realize that their businesses require the adoption of information technology to strengthen their competitive position within the industry in order to continue to compete with other businesses. MacKay, et al. (2014) and Pearson and Grandon (2006) agrees that SMEs will consider the adoption of information technology is a must so that their businesses remain competitive and innovative products to the sustainability of their businesses.

Another indicator is the pressure from customers that the degree of pressure from customers perceived by SMEs. Customers as those associated with the SMEs have the power to encourage the adoption of information technology by SMEs. Relationships such as commitment, encouragement and coercion that comes from customers, trust and interdependence between customers and SMEs is a customer role in encouraging the adoption by SMEs (Rui 2007 in Maduku, et al., 2015).

The last indicator is the external IT vendors, the existence of external IT vendors can influence the adoption of information technology by SMEs. SMEs have limited skilled human resources and financial resources to support the adoption of information technology. Thus, the presence of external IT vendors provides an opportunity for SMEs to be able in adopting information technology, since SMEs need an expert and experienced to understand and study information technology which will adopt them.

Based on these explanations, then the hypothesis can be developed as follows:

H3: Environment influence positively and significantly to the adoption of information technology.

Business Performance. Business performance is a measure of success or achievement by an organization or business entity after the various activities. Wu, et al. (2003) revealed that business performance can be measured through efficiency, sales performance and customer satisfaction. Some studies state that the adoption of information technology influence the business performance. Setiowati, et al., (2015) said that the adoption of ICT (Information and Communication Technology) have an effect on the ability of marketing and business performance by SMEs in Indonesia. Wu, et al. (2003) study revealed that the intensity of e-business adoption have effect on business performance. Thus, the hypothesis that can be developed in this study are:

H4: Adoption of Information Technology in a positive and significant effect on business performance.

METHODS OF RESEARCH

This study consist of five variables study, namely technology, organization, environment, adoption of information technology, and business performance. Each variable composes several indicators, measured by relative technological advantage, compatibility and complexity. Organizations are made up of top management, financial support, and the ability of employees and measured by the external environment IT vendor, competitor pressure, and pressure customers. Adoption of information technology are measured through communication and order taking. Business performance consist of efficiency, selling performance and customer satisfaction. Overall, indicators measured through some items that builds upon previous studies that have been validated and associated with the adoption of information technology, using a Likert scale ranges from the most negative to the most positive (scale 1-5).

This type of research is the explanation / explanatory quantitative approach. The study population was SMEs that have used information technology in particular websites which are in the city of Malang. Mechanical sample selection was conducted using random sampling

with 50 samples studied, the target respondents are owners / managers of SMEs. Source of the data obtained in this research comes from the primary data. The primary data obtained directly based on respondents' answers to questionnaires to SMEs. Questionnaires were obtained from SMEs as a whole have been met and in accordance with the needs of research, so it deserves to be continued to the level of data analysis. The following research framework:

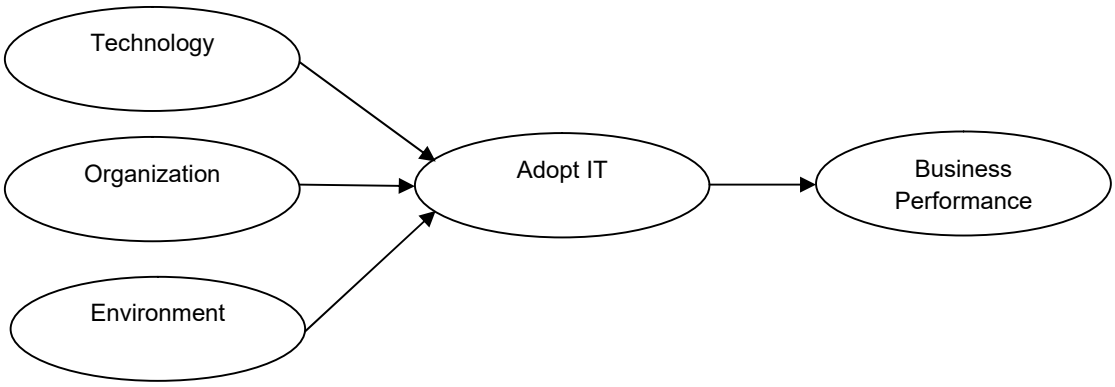


Figure 1 – Research Framework

RESULT AND DISCUSSION

Data analysis techniques in this study using partial least square (PLS) analysis tool SmartPLS 3.0. Analysis of the data by PLS consists of two stages of the evaluation of the measurement model (outer model) and the evaluation of the structural model (inner model).

Evaluation of Outer Model. Evaluation of outer model consists of three criteria: convergent validity, discriminant validity and reliability of composite. In the calculation of convergent, the minimum criteria of validity is 0.50, (Chin in Ghozali, 2014). Discriminant validity was measured by comparing the square root of AVE for each construct with the correlation between the constructs in the model. Discriminant validity was good that the square root of the AVE for each construct is greater than the correlation between the constructs in the model. If the root value AVE is higher than the correlation between the constructs, then good discriminant validity has been reached. The next test for analyzing outer reliability models is to look construct latent variables are measured by two criteria: reliability and Cronbach alpha compositing of block indicator that measures the construct. Constructs is claimed reliable if the value of composite reliability and Cronbach alpha values are above 0.70. Here are the results of composite output reliability and Cronbach alpha:

Table 2 – Composite Reliability and Cronbach Alpha

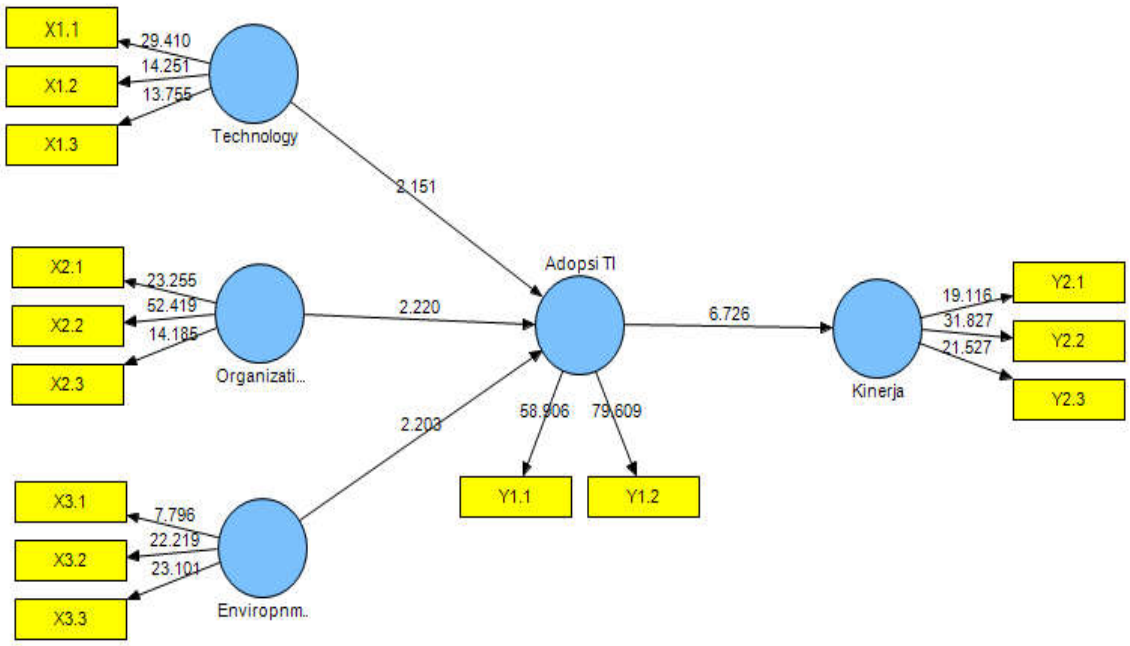
Variable	AVE	Composite Reliability	Cronbachs Alpha
X1	0.5992	0.9504	0.9424
X2	0.596	0.9414	0.9309
X3	0.5867	0.9337	0.921
Y1	0.762	0.9504	0.9368
Y2	0.678	0.9545	0.9471

Source: PLS (2017).
Information: X1= technology, X2= organization, X3= environment, Y1= adopt of IT, Y2= business performance.

Based on the table above, it can be seen that the outer models have met the criteria of discriminant validity which proper with AVE value above 0.5 and construct claimed reliable, because it has met the composite value of reliability and Cronbach alpha above 0.70.

Evaluation of inner models. Testing inner structural model or models made to look at the relationship between constructs a significance value and R-square of the research

model. Structural models were evaluated using R-square to construct dependent t test and significance of the coefficient parameters of structural lines.



Source: SmartPLS (2017).

Figure 2 – Structural model (Inner Model)

Tests on the structural model is done by looking at the value of R-square is a test for goodness-fit model.

Table 3 – *R-Square*

Variabel	*R-Square*
Y1	0.7969
Y2	0.5126

Source: PLS (2017).

Table 3 shows the R-square value for the variable of IT Adoption at 0.7969. R-square value indicates that 79.69% variable of IT Adoption (Y1) can be affected by variables of Technology (X1) Organization (X2), and environmental (X3). While the remaining 20.31% influenced by other variables outside studied. R-square value of 0.5319 indicates business performance variable (Y2) is influenced by the technology variables (X1), Organization (X2), the environment (X3) and adoption of IT (Y1) amounted to 51.26%, while the remaining 48.74 % influenced by other variables outside studied.

Further evaluation is done by the PLS model predictive relevance Q2 is used to measure how well the observed values generated by the model and parameter estimation. Q2 predictive value relevance can be obtained by the equation:

$$Q^2 = 1 - [(1-R^2)\ (1-R^2)] = 1- [(1-0,7969)\ (1-0,5126)] =1- 0,09899 = 0,9010$$

Based on these calculations, shows the model has predictive relevance for Q2 obtained value> 0, ie 0.9010 and includes powerful category (Ghozali 2014).

In the PLS statistical testing every relationship hypothesized done using simulations carried out by the bootstrap method to the sample. Testing with bootstrapping is also intended to minimize the problem of abnormalities of research data. The test results with bootstrapping can be seen in Table 4:

Table 4 – Path Coefficient

Variable	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STERR|)
X1 -> Y1	0.1958	0.091	2.1514
X2 -> Y1	0.3801	0.1712	2.2197
X3 -> Y1	0.3778	0.1715	2.2035
Y1 -> Y2	0.716	0.1064	6.7262

Information: X1= technology, X2= organization, X3= environment, Y1= adopt of IT, Y2= business performance.

The significance of the estimated parameters provides very useful information about the relationship between the variables of the study. The bases used in testing the hypothesis is the value contained in the output result for inner weight. Hypothesis testing can be done by comparing the t-statistic with t-table. T-table can be obtained from 50 respondents who eventually obtained amounted to 1,960 t-table. It can be concluded that the analysis of hypothesis testing is H1, H2, H3 and H4 accepted.

Hypothesis 1 states that technology (X1) has a positive and significant impact on the adoption of information technology (Y1) with a path coefficient value of 0.1958 and 2.1514 for the t-statistic greater than t-table (1,960) or p ≤ 0, 05%. This indicates that the better technology, the faster adoption of information technology by SMEs. The results showed that the characteristics of the technology which consist Relative advantage, compatibility and complexity are factors that influence the decision of SMEs for the adoption of information technology. The creation of new opportunities such as the expansion of markets, improvement of service quality, suitability of information technology with business needs a high impact factor that is found coming from technological context. In addition, although the owners / managers of SMEs realize that the level of complexity of information technology is quite high, but it does not become an obstacle to their efforts to keep adopting information technology. The results of this study are consistent with Ramdani, et al. (2013) which states that the technology has a significant influence on the adoption of enterprise application (EA).

Hypothesis 2 states that the organization (X2) has a positive and significant impact on the adoption of information technology (Y1) with a path coefficient value of 0.3801 and the value of t-statistic of 2.2197 is greater than t-table 1.960 and significant or p ≤ 0.05%. The statistical results indicate that the better the organization, the faster adoption of information technology by SMEs. The results of this study confirmed the results of previous studies which stated that the organizational context influence the decision of adoption of information technology (Maduku, et al., 2016; Rahayu and John Day, 2015; Ramdani, et al., 2013; Ghobakhloo, et al., 2011) , Top management, financial support, and employee capability is a factor of the organizational context found influential in information technology adoption decision. Top management is a factor that was found to have a strong influence in the adoption, it because top management is the key holder control over decision-making in business. This study found that the adoption decision of information technology is faster when the technology of *top management* constantly encourages business and employees to adapt with the development of technology.

Hypothesis 3 states that the environment (X3) has a positive and significant impact on the adoption of information technology (Y1). Statistical analysis showed the path coefficient value of 0.3778 with a t-statistic value of 2.2035 which is greater than t-table 1.960 and p ≤ 0.05%. These results indicate that the higher pressure and encouragement from the environment is the faster adoption of information technology by SMEs. The results of this study are consistent with previous studies that reveal the context of an environment consisting of external IT vendors, competitive pressure and customer pressure which influence the decision of information technology's adoption (Kurnia, et al., 2013; Maduku, et al., 2013; Ramdani, et al., 2015; Ghobakhloo, et al., 2011). The results of this study indicate that the indicator of competitive pressure has a strong influence on the decision on information technology adoption by SMEs. Intense competition in the industry will provide SMEs concern at the seizure of their customers by competitors. It became an enormous boost for SMEs to adopt information technology as a form of a strategy to retain customers.

In addition, the information technology SMEs can meet the demands and needs of their customers.

Hypothesis 4 states that the adoption of information technology (Y1) has a positive and significant impact on business performance (Y2). It can be known based on the statistical analysis that shows the path coefficient value of 0.716 and the t-statistic of 6.7262 which greater than t-table 1.960 and significant or $p \leq 0.05\%$. These results indicate that the better adoption of information technology is the better the performance of business generated. The results of this research found that the website owned by SMEs have a broad scope. Website used by SMEs have been able to fulfill the functions of marketing, which is the SMEs through the website has been able to make buying and selling and servicing customers directly, so that SMEs have a website that is not only as a tool for product promotion. The intensity of the adoption of the website is a good effect on business performance, cost efficiency, increase sales performance and increasing customer satisfaction is the impact of the adoption of information technology by SMEs. Through the website of SMEs, we could see the market expansion and increased sales volume from the previous. The results are consistent with research Setiowati, et al. (2015) which states that the adoption of ICT by SMEs in Indonesia influence marketing capabilities and the impact on performance improvement and financial performance.

CONCLUSION

Based on the analysis of research either descriptively or by calculation using the Smart PLS described in the previous chapter, we can have some conclusion as below:

Relative advantage, compatibility and complexity found as factors of technology that can affect the adoption of information technology by SMEs. Relative advantage is an indicator which becomes a factor that had much effect on IT adoption. It felt the creation of opportunities, improvement of service quality and the image perceived by SMEs' benefit from information technology. However, there are something interesting founded by the researchers in this study ; the first prominent thing is the assessment of SMEs to the technology which compatibile for the information technology to the needs of SMEs.

Organization in this study was measured by the top management, financial support, and employee capability. The results of the research organization have a strong influence in the adoption of IT. Based on the analysis and discussion conducted found that top management encouragement to adopt information technology to businesses and employees, as well as encouragement to continue for observing the development of information technology to the business are factors that also affect the adoption of information technology by SMEs.

External IT vendors, competitive pressure, and customer pressure was found as a factor of the environment which may affect the adoption of information technology. The owners / managers of SMEs in Malang thought that pressure from competitors is a factor that greatly affects them in the adoption of information technology. The owners / managers of SMEs realize that the intense competition in the industry will allow their customers grabbed by competitors if they do not adopt a business unit of information technology.

The results of this study revealed that the majority of SMEs in Malang has adopted information technology in the form (website) very well. The intensity of the information technology's adoption by SMEs in Malang also could be categorized either. It can be seen from the scope of information technology that has been adopted. Based on the research that has been done, the researchers found that the majority of information technology adoption by SMEs has had considerable technology coverage. SMEs have been able to manage communication and transactions through information technology (website) were adopted.

Adoption of information technology in this study was found to have a positive and significant impact on business performance. This indicates that there is better information technology adoption by SMEs and better performance of business generated. This study reveals that the perception of the owners / managers of SMEs in Malang on customer satisfaction is the perceived impact of the adoption of information technology.

LIMITATION AND SUGGESTIONS

Based on the research that has been done and the results obtained, hereby some advice that can be given by researchers, among others, as follows:

This study has a sample size of 50 SMEs, the limited number of samples led to research involving SMEs with three (3) different types of industries without comparing the level of adoption in each industry. It is expected for further research can compare the level of information technology adoption among their respective industries.

This study only tested the impact of the adoption of information technology on business performance as measured by business performance proxy of marketing performance. It is expected for the next research which can analyze the performance of marketing business and financial.

This study found that there are indicators of the characteristics of the old SME adoption that may affect the relationship between the adoption of information technology with business performance. Future studies are expected to develop a conceptual model of this study in order to obtain broader results.

For SMEs, information technology is one aspect that has a very good influence for increasing competitiveness in recent's technology era. So, expect for SMEs may continue to use and upgrade of information technology that has been adopted in order to improve the competitiveness of businesses and SMEs which can continue to survive in the industry.

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DETERMINANTS OF PRODUCTIVITY OF SMALLHOLDER FARMERS SUPPLYING CASSAVA TO STARCH PROCESSORS IN NIGERIA: A BASELINE EVIDENCE

Ojiako Ifeanyi A.[1]*, **Tarawali G.**[2], **Okechukwu R.U.**[2], **Chianu J.**[1]
[1]African Development Bank, Abidjan, Cote d'Ivoire
[2]International Institute of Tropical Agriculture, Ibadan, Nigeria

*E-mail: iojiako2008@live.com

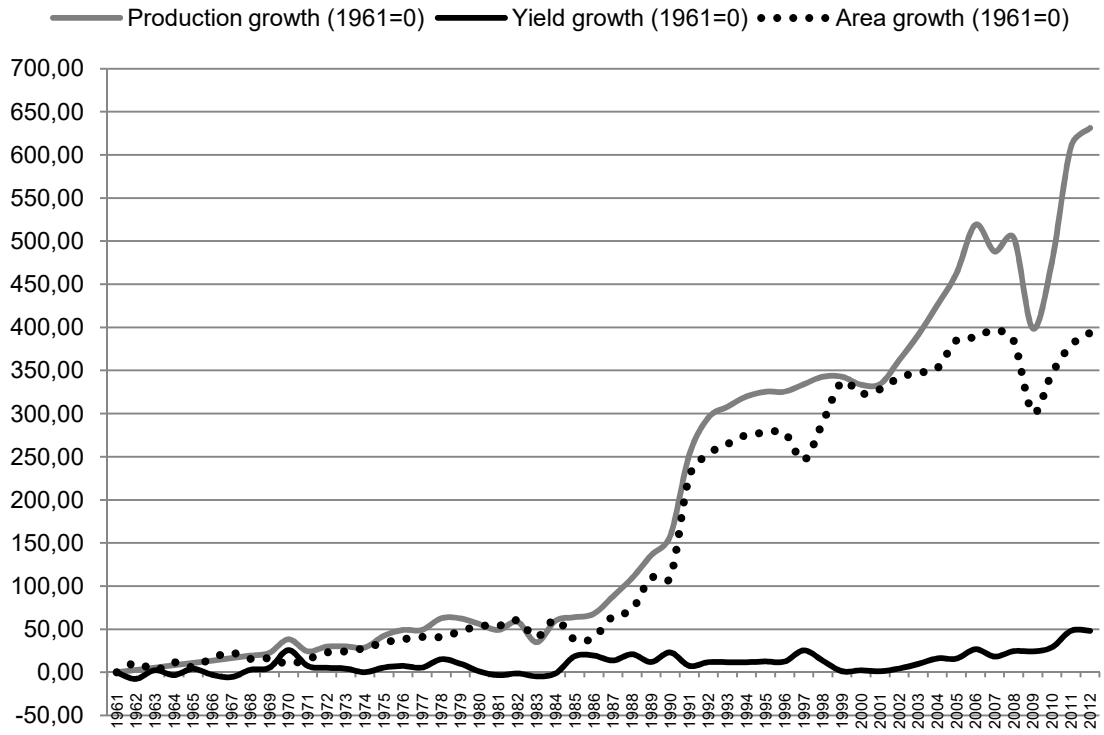
ABSTRACT
The influence of socioeconomic and other household characteristics on the productivity of smallholder farmers supplying cassava to the major commercial starch processors in Nigeria were examined. A multi-stage random sampling technique was used to select 96 farmers working in clusters in selected eight cassava producing states. Data were analyzed using a combination of descriptive and inferential statistics, and multivariate regression techniques. Results revealed the calculated average yield to be 12.39 t/ha thereby leaving an average yield-gap of 7.61 t/ha when compared with an average of 20 t/ha being promoted for farmers under the project. Use of improved varieties ($p<0.01$) and full-time farming ($p<0.05$) had significant positive influence on productivity. Also, training, credit use and marital status of farmers influenced productivity positivity at $p<0.10$ levels. Productivity increased with increase in the variables, but the degree of responsiveness was inelastic in each case. Together the included variables explained 72.1% of the variation in the productivity model. The use of improved cuttings should be accompanied by rigorous but appropriate capacity enhancement programmes to update farmers on modern issues on cassava production and farm management. Empowerment of farmers through linkage to sources of soft loan and other microcredit facilities was recommended, but such efforts should be targeted more on the married and full-time farmers for greater impact.

KEY WORDS
Farmers' characteristics, cassava productivity, yield-gap, full-time farmer, starch processors, Nigeria.

Cassava (*Manhihot esculenta* Crantz) is a reputable food security crop in tropical Africa. In Nigeria, it ranks high among the major perennial root crops and, in fact, has been described as the third important staple after rice and maize. The cassava plant grows best in well-drained loamy soils and where the annual rainfall ranges of 1,000 mm -1,500 mm and temperature from 25^{o} C - 29^{o} C (Onwueme, 1978). On the nutritional value, cassava is very rich in carbohydrate providing about 70% of the total calorie intake for more than one-half of the Nigerian population (Ikwelle *et al*., 2003; Nweke *et al*., 1995). Apart from providing food for Nigeria's dense urban, semi-urban and rural populations, cassava and cassava-based businesses provide income, employment, and raw materials for agro-based micro-, small- and medium-scale enterprises (MSMEs). Included in the industrial cassava products are starch, high-quality cassava flour (HQCF), glucose syrup, chips, and ethanol.

Nigeria ranks first among world's producers (UNIDO, 2006). Also, Phillips *et al*. (2004) wrote that the country's production capacity was one-third more than the production of Brazil and almost double the potentials of Indonesia and Thailand. In the same vein, Nigeria's cassava production was deemed higher in comparison to the production of other African countries, including the Democratic Republic of the Congo, Ghana, Madagascar, Mozambique, Tanzania and Uganda (Phillips *et al*., 2004). The country's actual production for 2008 was put at over 44.5 million metric tonnes (MT) (FAO, 2012). However, this figure dropped by 17.30% to 36.8 million in 2009 before rising further to 42.5 million MT in 2010 and 54.0 million MT in 2012. But, as revealed by the available FAO time series data[6] (FAO, 2012), the recorded growth trend in production was more reflective of increase in land area

cultivated rather than increase in productivity. The graphical presentation of the growth patterns in Nigeria's cassava production, area cultivated and yield is presented in Figure 1 for 1961-2012.



** Growth rate with 1961 as base year (%)*

Figure 1 – Growth trends in cassava levels of output, area and yield, 1961-2008

The Figure shows that there was a similar growth trend for production and area cultivated. However, the growth pattern for yield was observably different. On the average, a growth of 171.5% was recorded for output level between 1961 and 2008. The average growth in area cultivated was 144.8% while that of yield was mere 8.6%. Between 2008 and 2012, although the output had increased by 21.12% from 44.5 to 54.0 million MT, there was a less than corresponding increase of 18.9% in the yield during the same period. During the entire 1961-2012 period, the calculated correlation coefficient for growth rates in production and cultivated area was high at r=0.98 and statistically significant ($p<0.01$) as against r=0.68 for growth in production and yield, which was also significant ($p<0.01$). The inference from the observed trend is that land area rather than productivity increase had had more influence in driving the growth in output levels overtime. Thus, efficiency was still very far from being attained as the average yield had remained at a very low level. Suffice this to say that the rallying point of any pro-poor policy and programs in the form of interventions and investments in the cassava value chain, should be to address the challenges of low yield and low productivity of smallholder farmers.

To press this further, it will be justifiable to seek and have a better understanding of the factors that drive the productivity of the smallholder cassava farmers. Much may have been documented already on the influence of the climatic variables, like temperature, sunshine, rainfall, relative humidity, air, and wind, as well as agronomic variables of soil type, soil fertility and typology, fertilizer, planting materials, planting time, quantity and timing of herbicides, among others, on cassava productivity (Ojiako, et al., 2014; FAO, 2013; Aina et al., 2007). But, in addition to these, it has been concisely argued that knowledge of the socioeconomic and other personal characteristics of the farmers enables planners and policy makers to appreciate and develop more user-friendly policies and strategies that will enhance productivity (Ajah and Ajah, 2014; Ajewole and Aiyeloya, 2004).

Consequently, the following questions may be pertinent: What are the personal socioeconomic and demographic characteristics of smallholder cassava farmers that influence their farming outcomes? What is the nature and magnitude of such influence? The general objective of this study is to analyze the productivity of the smallholder cassava farmers supplying roots to starch processors in southern area of Nigeria. The specific objectives are to determine the yield of smallholder cassava farmers; identify the farmers' personal and socio-economic characteristics that influence their farm productivity; and analyze the responsiveness of yield to changes in the determining factors. It is expected that the result of the study will serve as an enviable policy tool for government agricultural ministries, departments and agencies (MDAs), extension personnel, development agencies and partners, non-governmental organizations (NGOs), community development organizations (CDOs), and other stakeholders in the cassava value chain promotion business.

LITERATURE REVIEW

Smallholder farmers' characteristics have been distinguished among the factors influencing their capability and on-farm productivity. Literature is rich with past works aimed at explaining the type and nature of these influences. Among the measures of productivity that had been used include the smallholder's farm income (as in Schreinemachers *et al*., 2016; Ibitoye and Onimisi, 2013), yield (as in Adeniyi and Ogunsola, 2014; Adesoji and Farinde, 2006), farm produce or output levels (as in Olukunle, 2016; Anigbogu *et al.*, 2015; Ayoola *et al*., 2011; Simonyan *et al.*, 2011); Onemolease and Ataraire, 2005), and profitability (as in Olukunle, 2016). Different crops and value chains had attracted the investigators' interests. Among these are cocoa (Adeniyi and Ogunsola, 2014; Oluyole and Sanusi, 2009), rice (Ajah and Ajah, 2014; Ayoola *et al*., 2011), maize (Simonyan *et al*., 2011), cassava (Olukunle, 2016), poultry (Ibitoye and Onimisi, 2013), guinea corn (Onemolease and Ataraire, 2005), and vegetables (Schreinemachers *et al*., 2016). The list is not in any way exhaustive. However, there were other studies that were not based on any specific value chain, but rather investigated the causality for a basket of crops. For example, Adesoji and Farinde (2006) analyzed determinants of agricultural productivity of a basket of popular arable crops that included maize, cowpea, yam, rice and cowpea in Osun State, Nigeria while Obasi *et al*. (2013) conducted similar analysis for arable crop farmers in Imo State, Nigeria. Yet in another, Anigbogu *et al*. (2015) investigated the cooperative farmers in Anambra State, Nigeria in a study that measured productivity based on the farmers output levels.

The efforts had led to mixed conclusions. Among the factors that were variously identified for their positive influence on productivity are farmer's age (Anigbogu *et al*., 2015; Adeniyi and Ogunsola, 2014; Ayoola *et al*., 2011), education, training and demonstrations (Schreinemachers *et al*., 2016; Anigbogu *et al*., 2015; Ibitoye and Onimisi, 2013; Simonyan *et al*., 2011; Adesoji and Farinde, 2006), farming experience (Anigbogu *et al.*, 2015; Obasi *et al*., 2013; Ayoola *et al*. 2011), full-time farming (Onemolease and Ataraire, 2005) income (Anigbogu *et al*., 2015), marital status (Simonyan *et al*., 2011), and farm size (Olukunle, 2016; Obasi *et al*., 2013; Oluyole and Sanusi, 2009). Other positive determinants were extension contact (Obasi *et al*., 2013; Simonyan *et al*., 2011), fertilizer use, including chemical and organic fertilizer (Anigbogu *et al*., 2015; Adeniyi and Ogunsola, 2014; Ajah and Ajah, 2014; Obasi *et al*., 2013; Simonyan *et al*. 2011), improved seeds/planting materials (Anigbogu *et al*., 2015; Ajah and Ajah, 2014; Obasi *et al*., 2013), household size (Simonyan *et al*., 2011), credit access and use (Simonyan *et al*., 2011), and labour – household or hired (Adeniyi and Ogunsola, 2014; Obasi *et al*., 2013). Among the variables found to be inversely related to farmers' productivity included age of the farmers (Olukunle, 2016; Ajah and Ajah, 2014; Obasi *et al*., 2013; Ayoola *et al*., 2011), gender (Anigbogu *et al*., 2015), marital status (Ayoola *et al*. 2011), labour (Olukunle, 2016; Adeniyi and Ogunsola, 2014), planting materials and chemical fertilizer (Obasi *et al*., 2013).

In their study of cocoa in Osun State, Nigeria, Adeniyi and Ogunsola (2014), in addition to identifying the climatic variables of rainfall, sunshine and temperature also argued that the

ageing cocoa tree, prevalence of pest and disease, age of cocoa farm, and extra hours spent by farmers after rain, were among the key variables that significantly affect cocoa yield in the area. They recommended use of policies that can mitigate the adverse impact of climate variations in the short-run and education and training of farmers on safety and best practices for the prevention of climatic adversities as a long-term remedy. Also, gender dimension had been brought into the discourse. For example, Ayoola *et al*. (2011) examined the socio-economic factors influencing rice production among male and female farmers in Northern Guinea Savanna zone of Nigeria and found that land, variable inputs, and experience had significant and direct influence on productivity for both male and female farmers, but age influenced it negatively, implying that the older rice farmers had less virility for farming. They also found the coefficient for marital status to be negative for women. They attributed that to the fact that married women within reproductive age were more likely to be constrained in their production by their multiple household roles, as well as cultural practices that often prevented them from participating in direct field production activities.

METHODOLOGY OF RESEARCH

Study area. The study was conducted in eight cassava-growing states that were participants in the cassava starch value chain project implemented on behalf of Nestlé Foods Plc by the International Institute of Tropical Agriculture (IITA) from 2011-2015. Five of the states were classified into the south-east (SE) axis and the remaining three into the south-west (SW) axis. The SE axis comprised of Abia, Anambra, Delta, Enugu and Imo States. Abia State is located at latitude 5.41667^{o}N and longitude 07.5000^{o}E. It had a land area of 6,320 square kilometre, seventeen Local Government Areas (LGAs), and a population of 2,845,380 (50.27% male and 49.73% female) based on the 2006 National Population Census. The administrative headquarter of Abia was in Umuahia. Anambra State, located at latitude 6.33333^{o}N and longitude 07.0000^{o}E, had twenty-one LGAs, a land area of 4,844 square kilometres, and a population of 4,177,828 (50.70% males and 49.30% females. The administrative headquarters of Anambra State is in Awka. Delta State with administrative headquarters at Asaba is located at latitude 6.2000^{o}N and longitude 6.7300^{o}E. It had a land area of 17,698 square kilometres, twenty-five LGAs, and a population of 4,112,455 (50.32% males and 49.38% females. Enugu State with administrative headquarter in Enugu is located at latitude 06.5000°N and longitude 07.5000° E. It had seventeen LGAs, a land area of 7,161 square kilometres, a population of 3,267,837 (48.84% males and 51.16% females), and an rainfall range of 1520–2030 mm/annum. The fifth state, Imo, is located at latitude 5.4800°N and longitude 07.0300°E. It had administrative headquarter in Owerri, twenty-seven LGAs, a land area of Imo State is 5,100 square kilometres, and a population of 3,927,563 (50.32% male and 49.68% female). The SW axis comprised of Ekiti, Ondo and Osun States. Ekiti State with administrative headquarter in Ado-Ekiti is located at latitude 7.6200°N and longitude 05.2200°E. The state had a land size of 6,353 square kilometres, sixteen LGAs, and a population of 2,398,957 (comprising of 50.67% male and 49.33% female. Ondo State is located at latitude 07.2500°N and longitude 5.1900°E. It had an area size of 15,500 square kilometres, eighteen LGAs, and a population of 3,460,877 people (consisting of 50.42% male and 49.58% female). Its capital and administrative headquarters was in Akure. The third SW State is Osun with capital city and administrative headquarters at Osogbo. Osun is located at latitude 7.7500^{o}N and longitude 4.5610^{o}E. It had a population of 3,416,959 (50.75% male and 49.25% female), thirty LGAs, and a land area size of 9,251 square kilometres.

One common feature of the Project States is that they had fertile lands that were good for the production of several foods and cash crops. Cassava and yams, maize, plantain and banana, cocoyam, and sweet potatoes are some of the food security crops produced in these states. Among the common cash crops are palm produce, kolanuts, and cocoa. In addition, these states are endowed with many other natural resources like rivers, lakes, coal, limestone, lead, zinc, fine sand, limestone and petroleum, which can be spotted moving from one state to another. These project locations fell within at most 150 kilometres to the processing centres they were being targeted to service under the project.

Sample and data collection. This survey was conducted in the 8 project States, which were chosen because of their cassava growing status and involvement in the IITA- Nestlé Foods cassava starch project in Nigeria. The sample comprised of farmers selected from the farmers' clusters using a multi-stage random sampling technique. A cluster was made up of an average of 10 to 20 members and three clusters were randomly selected from each state. Four members were randomly selected and interviewed from each cluster. In all, 96 farmers were interviewed using a structured and pre-tested questionnaire. Data were collected on farmers' characteristics, farming practices, including fertilizer use status, harvesting methods and season and yield. The collected data relate to the 2010/2011 production season.

Analytical techniques. Descriptive and inferential statistics were combined with multivariate regression techniques. The the ordinary least square estimation of the relationship between the endogenous variable and two or more exogenous variables usually produces estimators of the standard error and a coefficient of multiple determination. Suppose a variable (y_i) assumes some values determined by values assumed by other set of variables (x_i). In implicit form, the statement that y_i is associated with the x_is is given as

$$y_i = f(x_1, x_2, \ldots, x_k) \quad (1),$$

where: y_i is the dependent variable, and x_i (for i=1,…k) is a set of k explanatory variables.

The coefficient of multiple determination measures the relative amount of variation in the dependent variable (y_i) explained by the regression relationship it has with the explanatory variables (x_i). The F-statistics tests the significance of the coefficients of the explanatory variables as a group, that is, the null hypothesis of no evidence of significant statistical regression relationship between y_i and the x_is against the alternative hypothesis of evidence of significant statistical relationship. The critical F-value has n and n-k-1 degrees of freedom, where n is the number of respondents and k is the number of explanatory variables. The standard error is the measure of error about the regression coefficients. The z-statistics is used in testing the null hypothesis that the parameter estimates are statistically equal to zero against the alternative hypothesis that the parameter estimates are statistically different from zero. If the computed z-value exceeds the critical value, we reject the null hypothesis and conclude that the parameter estimates differ significantly from zero.

Empirical model. An empirical model of cassava productivity of the smallholder farmers supplying cassava to the starch processors, was specified as

$$\begin{aligned} PROD_i = {} & \beta_0 + \beta_1(FAGE_i) + \beta_2(FSZE_i) + \beta_3(VART_i) + \beta_4(TRAN_i) + \beta_5(PRCR_i) + \\ & \beta_6(HSEA_i) + \beta_7(FERT_i) + \beta_8(GEND_i) + \beta_9(HHSZ_i) + \beta_{10}(FERT_i) + \\ & \beta_{11}(TMDE_i) + \beta_{12}(MRST_i) + \zeta_i \end{aligned} \quad (2)$$

where: $PROD_i$ = dependent variable, farmer's productivity is defined as the average yield of cassava, given in tonnes/ha. In this study, it is hypothesized that the yield was related to some exogenously determined farmer's characteristics, which were selected on basis of theory and literature evidence; β_0 = constant and intercept of the equation; $FAGE_i$ = Age of the farmer, measured in years; indeterminate sign (positive or negative) is predicted for farmer's age (b_1>0 or b_1<0); $FSZE_i$ = farm size, land area cultivated by respondent during the period (in hectares); a negative sign is predicted for farm size (b_2<0); $VART_i$ = variety type planted by farmer (dummy): 1=improved, 0=local or quasi-improved; a positive sign is predicted for VART (b_3>0); $TRAN_i$ = exposure to training (dummy): 1=farmer had been exposed to training, 0=farmer had not been exposed to training; a positive sign is predicted (b_4>0); $PRCR_i$ = processor credit support to farmer during the season under study (dummy): 1=farmer received credit, 0=farmer did not receive credit; a positive sign is predicted (b_5>0);

$HSEA_i$ = harvesting season (dummy): 1=rainy season, 0=dry season; a positive sign is predicted for harvesting season because there exists higher probability of root loss due to hardness of the soil during dry season harvest than it will be harvesting at rainy season (b_6 >0); $GEND_i$ = gender of farmer (dummy): 1=female, 0=male; a negative relationship is predicted for gender (b_7 <0); $HHSZ_i$ = household size, number of people resident in the farmer's household; indeterminate sign (positive or negative) is predicted for household size (b_8 >0 or b_8 <0); $FERT_i$ = fertilizer application status of farmer (dummy: 1= fertilizer applied, 0=fertilizer not applied); a positive sign is hypothesized for fertilizer application status (x_9 >0); $TMDE_i$ = farmer's time devoted to farming (dummy: 1=full-time, 0=part-time); a positive sign is predicted for time devoted to farming (x_{10} >0); $MRST_i$ = farmer's marital status (dummy: 1=ever married, 0=otherwise); a positive sign is hypothesized for the marital status of the farmer (x_{11} >0); and ζ_i = stochastic error term.

All estimations of the regression parameters relating to the cassava productivity model of equation (2) was done using the Standard Eviews software. All the functional forms were experimented but the linear model was reported because it produced the best fit based on the estimated values of the coefficient of multiple determinations (R^2) and F-statistics.

RESULTS OF RESEARCH

Descriptive statistics of variables. The descriptive statistics and coefficients of correlation of the variables are presented in Table 1.

The average age of the farmers is 48.06 years with a standard deviation of 9.53. The observed average age of 48 years is slightly on the high side compared with the average age of 42.9 years found by Ojiako *et al*. (2015) for rural cassava farmers that received loan in Ogun State, Nigeria and 45.7 years found by Rahman *et al*. (2016) for leaf farmers in the Teknaf Peninsula, Bangladesh. Also, the averages for farming experience, farm size and household size are 15.88 years, 3.16 ha and 7.41 persons with standard deviations of 10.51, 2.95 and 3.20 respectively. Majority of the other variables presented in Table 1 were measured as dummies, meaning that their averages should be interpreted as proportions. For example, it can be read from the Table that 23% of the farmers were women, 89% were married and 54% reported that they applied fertilizer on their farms during the period under study.

Analysis of farmers' yield. The average on-farm yield obtained from sample harvesting of selected fields in each of the project States was presented in Figure 2.

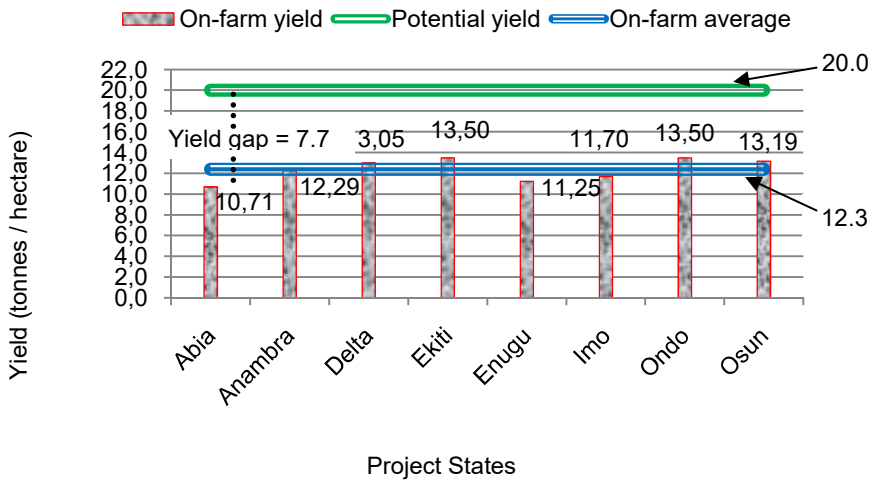


Figure 2 – Comparing farmers' on-farm yield with potential yield of improved varieties

Table 1 – Descriptive statistics and correlation matrix of variables

Variables	Descriptives (n=96)		Pearson coefficients of correlation (2-tails)													
	Mean	Std. dev.	EXPR	EDUC	FMSZ	VART	TRAN	PRCR	HSEA	GEND	HHSZ	FERT	TMDE	MRST	RACC	HMTH
FAGE	48.06	9.53	0.627***	0.033	0.088	0.191**	-0.113	-0.133	-0.158	0.082	0.596***	0.240**	-0.023	-0.050	-0.023	-0.060
			(0. 000)	(0.749)	(0.393)	(0.062)	(0.272)	(0.195)	(0.124)	(0.427)	(0.000)	(0.019)	(0.849)	(0.681)	(0.849)	(0.615)
EXPR	15.88	10.51	–	-0.169	-0.050	0.252**	-0.313***	-0.063	-0.285***	0.079	0.560***	0.187*	-0.126	-0.094	-0.126	-0.089
				(0.102)	(0.625)	(0.013)	(0.002)	(0.543)	(0.005)	(0.445)	(0.000)	(0.068)	(0.291)	(0.437)	(0.291)	(0.457)
EDUC	2.87	0.85	–	–	0.094	0.016	0.215**	0.039	0.014	0.036	0.119	-0.135	0.033	-0.159	0.033	-0.063
					(0.364)	(0.878)	(0.037)	(0.710)	(0.894)	(0.730)	(0.255)	(0.191)	(0.784)	(0.187)	(0.784)	(0.604)
FMSZ	3.16	2.95	–	–	–	-0.053	0.211**	-0.002	0.281***	0.209**	0.023	0.106	-0.209*	-0.158	-0.209*	-0.066
						(0.606)	(0.039)	(0.985)	(0.0060	(0.041)	(0.822)	(0.305)	(0.078)	(0.187)	(0.078)	(0.585)
VART	0.21	0.41	–	–	–	–	-0.021	-0.132	-0.060	0.036	0.250**	0.214**	-0.094	-0.189	-0.094	-0.094
							(0.836)	(0.198)	(0.561)	(0.731)	(0.015)	(0.036)	(0.430)	(0.114)	(0.430)	(0.432)
TRAN	0.72	0.45	–	–	–	–	–	-0.030	0.343***	0.100	-0.069	0.029	-0.167	-0.028	-0.167	-0.049
								(0.772)	(0.001)	(0.333)	(0.505)	(0.779)	(0.161)	(0.819)	(0.161)	(0.683)
PRCR	0.06	0.24	–	–	–	–	–	–	0.022	-0.064	-0.047	-0.022	0.098	-0.057	0.098	-0.029
									(0.835)	(0.536)	(0.650)	(0.835)	(0.415)	(0.634)	(0.415)	(0.812)
HSEA	0.46	0.50	–	–	–	–	–	–	–	0.104	-0.337***	0.175*	-0.204*	-0.086	-0.204	-0.120
										(0.315)	(0.001)	(0.088)	(0.085)	(0.476)	(0.085)	(0.317)
GEND	0.23	0.42	–	–	–	–	–	–	–	–	0.204**	-0.054	0.127	0.104	0.127	0.101
											(0.047)	(0.602)	(0.286)	(0.386)	(0.286)	(0.398)
HHSZ	7.41	3.20	–	–	–	–	–	–	–	–	–	0.107	0.016	-0.081	0.016	0.093
												(0.304)	(0.894)	(0.506)	(0.894)	(0.440)
FERT	0.54	0.50	–	–	–	–	–	–	–	–	–	–	-0.096	-0.303**	-0.096	-0.009
													(0.421)	(0.010)	(0.421)	(0.938)
TMDE	0.32	0.47	–	–	–	–	–	–	–	–	–	–	–	-0.005	0.998***	0.260**
														(0.959)	(0.000)	(0.010)
MRST	0.89	0.32	–	–	–	–	–	–	–	–	–	–	–	–	-0.005	0.148
															(0.959)	(0.153)
RACC	0.32	0.47	–	–	–	–	–	–	–	–	–	–	–	–	–	0.260**
																(0.010)
HMTH	0.03	0.17	–	–	–	–	–	–	–	–	–	–	–	–	–	–

FAGE=age of respondent; EXPR=years of (farming) experience; EDUC=level of education; FMSZ=farm size; VART=variety type (dummy); TRAN=training (dummy); PRCR=processor credit support (dummy); HMTH=harvesting method (dummy); HSEA=harvesting season (dummy); RACC=road access (dummy); GEND=gender of respondent; HHSZ=household size; MRST=marital status, and TMDE=farmer's time devoted to cassava farming. Exchange rate of the naira (Nigeria local currency) to the USA dollars was US$1/₦150.

***.= significant at 1%; **.= significant at 5%; *.= significant 10%

The average yield was calculated to be 12.3 t. The average yields for the states were calculated as follows: Abia (10.7 t/ha), Anambra (12.3 t/ha), Delta (13.0 t/ha), Ekiti (13.5 t/ha), Enugu (11.2 t/ha), Imo (11.7 t/ha), Ondo (13.5 t/ha) and Osun (13.2 t/ha). It follows that on-farm yield was lowest in Abia and highest in Ondo and Ekiti States. Further investigations were conducted to ascertain the possible cause of relativity in yields among the States. It was discovered that the SW States of Ekiti, Ondo and Osun had previously benefitted from out-growers scheme arrangements under different projects. Among these were the cassava value chain projects sponsored by USAID under the USAID-Nigeria Maximizing Agricultural Revenues and Key Enterprises in Targeted Sites (MARKETS) and the USAID-Nigeria Maximizing Agricultural Revenues and Key Enterprises in Targeted Sites II (BtM2) projects implemented from 2009-2011 seasons under an out-growers scheme with MATNA Foods Company, a commercial starch processing factory located in Akure, Ondo State. Part of the strategies used under the schemes was empowerment and capacity building of the enlisted farmers by way of providing improved cassava stems, training on improved farm management practices, and linkage to sources of micro-credit.

Notwithstanding, Figure 2 still shows the existence of a yield gap of 7.7 t/ha when the calculated yield is compared with the expected minimum yield of 20 t/ha, which was being promoted under the IITA- Nestlé Foods cassava value chain project. This means that there was still much room for improvement of the farmers' yield performances. One of the expectations of this Nestlé Project was to close the existing yield gap by raising the farmers' on-farm yield to at least 20 t/ha so as to be able supply efficiently to the processors to boost their starch production and supply capacity to Nestlé Foods Plc. Also the higher yields would result to increased income and improved welfare for the cassava farming households.

Determinants of productivity among farmers. The regression output is presented in this section. It should be noted that not all the farmers characteristics examined in the previous section could were used for the regression analysis. The choice of included variables was based on relevance and empirical evidence from literature. The regression output is presented in Table 2.

Table 2 – Determinants of productivity among cassava farmers

Variable	Code	Coefficient	Std. Error	t-Statistic	Prob.
Constant	CON(β_0)	6.567***	1.916	3.428	0.001
Age of farmer (years)	FAGE	-0.039	0.045	-0.871	0.386
Farm size (area planted) (ha)	FSZE	-0.003	0.073	-0.048	0.961
Variety type (0, 1)	VART	13.018***	1.549	8.404	0.000
Exposure to training (0, 1)	TRAN	1.810*	1.087	1.666	0.099
Processor credit received (0, 1)	PRCR	1.106*	0.575	1.924	0.057
Harvesting season (0, 1)	HSEA	0.455	0.659	0.690	0.491
Gender of respondent (0, 1)	GEND	-0.706	0.941	-0.749	0.455
Household size (numbers)	HHSZ	0.265	0.164	1.616	0.109
Fertilizer use by respondent (0, 1)	FERT	0.392	0.641	0.611	0.542
Time devoted to farming (0, 1)	TMDE	1.236**	0.618	2.000	0.048
Marital status of respondent (0, 1)	MRST	1.493*	0.866	1.724	0.088
R-squared		0.754	Mean dependent variable		12.33
Adjusted R-squared		0.721	S.D. dependent var		6.417
S.E. of regression		3.388	Akaike info criterion		5.396
Sum squared residuals		952.585	Schwarz criterion		5.718
Log likelihood		-244.301	F-statistic		23.112
Durbin-Watson stat		1.780	Prob (F-statistic)		0.000

Note: Estimates are heteroskedatic-consistent with Newey-West HAC Standard Errors & Covariance.
****.= significant at 1%; **.= significant at 5%; *.= significant 10%.*

The dependent variable is yield of cassava, given in tonnes/ha. The regression output has revealed the model to be highly significant [F-value = 23.11 ($p < 0.01$); Adjusted R^2 = 0.721]. This implies that the included variables explained 72.1% of the variations in the estimated yield model.

This coefficient of determination is by far higher than 47.2% obtain by Adesoji and Farinde (2006) in their investigation of the influence of farmers' socioeconomic variables on

the yield of arable crops in Osun State, Nigeria. The use of improved cassava variety (VART) and time devoted to farming (TMDE) were statistically significant at 1% and 5% levels respectively, making them very conspicuous among the factors explaining variations in the yield. Three other variables were also significant at 10% levels, including exposure to trainings (TRAN), use of credit facility from processor (PRCR) and marital status (MRST) of the farmer.

All the significant variables had the predicted positive signs, meaning that cassava yields increased with positive changes in these determinants. The other variables with positive signs although not significant were harvesting season (HSEA), household size (HHSZ), and fertilizer application (FERT). The remaining variables, namely, age of the farmer (FAGE), farm size (FSZE) and gender (GEND) returned negative signs, but were also not statistically significant.

Responsiveness of yield to changes in the variables. The responsiveness of yield to changes in the explanatory variables were calculated as coefficients of elasticity and presented in Table 3. Although elasticity was calculated for all variables, only the significant ones will be discussed.

Table 3 – Yield responsiveness to changes in variables

	Variable	Elasticity coefficient
Age of farmer (years)	FAGE	0.152
Farm size (area planted) (ha)	FSZE	0.001
Variety type (0, 1)	VART	0.222***
Exposure to training (0, 1)	TRAN	0.106*
Processor credit received (0, 1)	PRCR	0.005*
Harvesting season (0, 1)	HSEA	0.017
Gender of respondent (0, 1)	GEND	0.044
Household size (numbers)	HHSZ	0.159
Fertilizer use by respondent (0, 1)	FERT	0.017
Time devoted to farming (0, 1)	TMDE	0.032**
Marital status of respondent (0, 1)	MRST	0.108*

****.= significant at 1%; **.= significant at 5%; *.= significant 10%.*

The coefficient of elasticity was 0.222 for use of improved variety, 0.032 for time devoted to farming, 0.106 for attendance to training, 0.005 for use of processor's credit facility and 0.108 for marital status. This means that a 10% increase in the proportion of farmers who could access and use the improved variety would result to about 2.22% increase in cassava yield other factors remaining constant. A similar 10% increase in the proportion of farmers who are into full-time farming, or attended to training, or received credit facility, or were married as against being single, would result to an increase in cassava yield by 3.3%, 1.06%, 0.055 and 1.08% respectively. It can be inferred from the result that the degree of responsiveness of cassava yield to changes in each of these significant explanatory variables was inelastic.

DISCUSSION OF RESULTS

Part of the findings of this investigation is the significant positive influence of use of improved cassava varieties to boost yield outcome. So much benefits are associated with the use of improved planting materials causing their inclusion in the recommended package of practices (PoPs). The improved varieties of cassava were cloned to be high-yielding, early maturing, and resilience to attacks of pests and diseases. Their use gives the farmer a good value for money, while the consequence of farmers' continued use of the local varieties is low yield performance, low output, low income and waning welfare. This finding is corroborated by Anigbogu *et al*. (2015) whose investigation of the socioeconomic factors influencing agricultural production among cooperative farmers in Anambra State, Nigeria, found that the planting materials (seedlings) obtained through cooperatives were among the factors with significant influence. Membership of cooperative groups has been encouraged among

farmers as instruments of social and economic transformation (Ijere, 1992). Among other things cooperatives have served as channels through which technology dissemination to farmers could yield maximum results. Also, Obasi *et al*. (2013) analyzed the factors affecting agricultural productivity among arable crop farmers in Imo State, Nigeria and among other things recognised the influence of planting materials and consequently, recommended the use of high yielding planting materials to boost farmers' productivity.

Findings from this study also revealed that full-time farming had a significant influence on productivity. This is not surprising given that full-time farmers devote more time, energy and resources to get the best out of their farms compared with part-time farmers who share their time and resources pursuing so many things at the same time. It could have resulted from the fact that full-time farmers were bound to be more efficient through continuous learning from day-to-day experiences, demonstration of best practices to improve on their performance, and fashioning out ways of conducting their farming activities better, given that they were not prepared to trade-off their time and resources by going into other livelihood options. Onemolease and Ataraire (2005) in an investigation of the influence of household and farm-related characteristics on farm enterprise productivity in the guinea corn value chain in Okene and Kogi Local Government Areas of Kogi State, Nigeria also found that full-time farming was significant and impacted positively to farmers' productivity. Contrarily, however, Lien *et al*. (2008) in their examination of determinants of part-time farming and its effects on on-farm productivity and efficiency, could not establish any systematic difference in farm productivity and technical efficiency between the part-time and full-time farmers.

Training was also found to have a positive influence on cassava farmers' productivity. In their investigation of the influence of farmers' socioeconomic variables on the yield of arable crops in Osun State, Nigeria, Adesoji and Farinde (2006) also found that training and demonstrations attended by farmers had significant positive influence on yield performance of arable crops. In the same vein, Ibitoye and Onimisi (2013) analyzed the effect of training programmes on farmers' productivity in poultry production in Kogi State, Nigeria and found that both extension training and formal education were significant positive contributors to productivity, which they measured as farm income. In this study, although both training and formal education have positive signs only training was significant in explaining productivity. This finding underscores the need to incorporate and sustain regular training, field days, and regular extension support services among the package of practices being delivered to farmers to enhance their yield outcomes.

Marital status of farmers was also a significant determinant. Positively related to productivity, the result suggested that productivity was more for farmers living with their spouses than it was for farmers not with spouses. This finding underscores the benefit derivable from complementary roles of male and female farmers in promotion of cassava value chain. It has been succinctly argued that the activities of cassava production, marketing, and processing in most rural Nigerian communities were jointly performed by men and women, who had complementary obligations for providing food for the Nigerian rural household (Ezumah and Di Domenico, 1995; Das, 1995; Anyakoha and Ozoh, 1999). Elsewhere, Simonyan *et al*. (2011) assesed the productivity of maize farmers in Essien Udim Local Government Area of Akwa-Ibom State, Nigeria, in terms of assessing efficiency and its determinant on gender basis. With respect to the male farmers, the study identified marital status among the variables with significant positive influence, although it was not significant with respect to female farmers. But in another study, Ayoola *et al*. (2011) found that the effect of marital status of married women's on rice productivity was negative, implying that they were more likely to be constrained in their production of rice in view of their multiple roles and the cultural practices that prevent women from direct field production activities.

Generally, the use credit facility to support farmers has been advocated because credit plays an enviable role in economic transformation and rural development (Ojiako *et. al*., 2015; Ojiako and Ogbukwa, 2012). Defined as the process of having control over the use of others' money, goods and/or services in the present in exchange for a promise to repay at a future date (Adegeye and Dittoh, 1985), agricultural or farm credit was a crucial input required by the smallholder farmers to establish and expand their farms with the aim of

increasing agricultural production, enhancing food sufficiency, promoting household and national income, and augmenting the individual borrower's ability to repay (Ojiako and Ogbukwa, 2012). No doubt, the limitations of self-finance, uncertainties associated with the levels of output, and time lag between inputs acquisition-cum-use and output realization, provide justification for the request for and use of farm credit (Kohansal and Mansoori, 2009). Therefore, it is not surprising that the impact of farmer's access to the processor-provided credit facility could be overwhelming in its contribution to yield and productivity performance of cassava farmers. Whether received in the form of cash or input-credit, such facility provides additional empowerment thereby boosting the smallholder farmers' capacity to use improved planting materials, apply fertilizer and herbicides and pay for labour services. Depending on the nature and timing of the credit facility, it could also assist the farmer to mechanize some of the pre-planting tedious activities of ploughing, harrowing and ridging. In addition to saving cost, the farmer's yield would also be increased. However, in their study of arable crops in Osun State, Adesoji and Farinde (2006) found that the effect of use of credit was negative and weak, which was rather strange.

CONCLUSION

The socio-economic and other household characteristics of farmers supplying cassava roots to the two commercial starch processors in Nigeria were analyzed alongside their yield performances with a view to determining the relationship between yield and the farmers' characteristics. It was found that although over 70% of the farmers were using improved varieties, there was still a substantial yield gap, resulting from the farmers' inability to achieve the minimum expected yield from use of improved species, if they had followed the recommended best farming practices. The improved varieties' use status, engagement in full-time farming, attendance to training, use of credit, and marital status of farmers were identified as factors with positive influence on their level of productivity.

Although much has been documented on the benefits accruing from use of the improved varieties of cassava planting materials to boost yield and productivity, there is need for rigorous extension efforts at ensuring availability, accessibility, adoption, and continuous use of the improved cuttings. Findings of this study suggest that the use high-yielding cuttings was not sufficient on itself, rather it will be accompanied by rigorous but appropriate capacity enhancement programmes, including regular use of workshops, seminars, public enlightenment, and training and retraining sessions and events to get the farmers up to date with emerging issues in cassava production and farm management. In the same vein, it is needful to empower farmers through linkage to sources of soft loan and other microcredit facilities, but as finding from this study also suggests, targeting of the married and full-time farmers will be more impactful than otherwise. The aforementioned findings underscore the need for policies and programmes aimed at enhancing levels of productivity through yield increases to target the identified essential factors. The findings were definitely expected to be very useful in the successful implementation of the IITA- Nestlé Foods cassava starch project to the benefit of the farmers, processors, and other stakeholders in Nigeria's cassava industry.

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THE ROLE OF DIASPORA MIGRANTS IN HELPING COMMUNITIES TO MITIGATE THE EFFECTS OF CLIMATE IN THEIR HOME COMMUNITIES: A CASE OF CHIKOMBEDZI COMMUNITY

Madzingira Caven, **Zvinavashe Saratiel**, Researchers
Department of Psychology, Women's University in Africa, Harare, Zimbabwe
E-mail: cavenmadzingira@gmail.com, saratielz@gmail.com

ABSTRACT
This article aims to explore the relationship between the effects of climatic migration as an adaptation measure for rural communities, specifically exploring the livelihoods of agricultural depended community of Chikombedzi rural communal area in Masvingo province in Zimbabwe. Being a traditionally agricultural depended society, the community relies mainly on the eco-balance of nature. The detrimental effects of climate change have sparked the movement of the young and most energetic members of the society to explore opportunities in neighbouring countries like South Africa. These migrants are popularly known for doing petty jobs in order to support their respective family members left behind. The rural communities are increasing becoming inhabitable places, and as a result societies are left with weak members of the society who are mainly old people, women and children. The role of migrants in diaspora community is therefore crucial for the survival and adaptation of these communities as they fight the challenges posed by climate change. In exploring the impact of climate migrants to their families and communities, a qualitative research was chosen as the suitable methodological approach, with data being collected by an in-depth interview approach and key-informant interview from local communities. Leveraging on networks and local knowledge, snowballing was used as the most appropriate sampling technique, which depends mainly on community knowledge and systems. Data were collected from 30 participants from different families' volunteered to take part in this research. The findings have demonstrated the importance of the connection between families and relatives in mitigating the effects of climate change. The remittances are used to sustain and support the families' small scale agriculture in a much diversified ways, while for other families there are even diverting from traditional livelihoods to other forms of living. Households which had family members that have migrated permanently had many livelihoods challenges epitomised by a high degree of helplessness, incapacity to adapt and social vulnerability.

KEY WORDS
Climate migrants, environmental refugees, remittances, Diaspora, droughts, livelihoods.

This research focuses on the contributions of diaspora`s remittances in helping communities to adapt to the effects of climate change in the Chikombedzi rural community. It can be observed that there are numerous challenges that are facing the modern world in the face of global village, as there are increasing number of new global challenges facing the world due multiple pressing factors like cyber hacking, terrorism, cyber bullying and many others. Besides the mentioned challenging factors, there are also other two important pressing challenges of the modern society. These are human migration and climate change which are very important topical areas worth of research attention (Ellis, 2000). The global climatic conditions are said to be among the main pressing challenges to humanity in the modern. These have also sparked other challenges including poverty, poor agricultural yields, conflicts, global warming amongst many climatic outcomes (Makungwa, 2010). Environmental factors are said to be the drivers of the economic environment of the modern time, with climate change, being the top agenda of most business convention of recent times (UNFPA, 2001). Africa as a continent is one of the victim of climate change due to the fact that many countries there have no capacity to deal with climate change and other environmental challenges. In 2016 alone the continent has witnessed enormous percentage

of population displacement as people move from within and across continents. There are shocking figures of people dying in the sea trying to reach other countries for better livelihoods (Richard, 2013). Increasingly, policy makers and media sources are recognising climate change as a security issue. Despite these challenges and inherent uncertainty, the potential consequences are so severe that it is essential that further research be conducted to better understand the possible linkages between climate change and forced migration. History did demonstrate that climate change is often associated with massive movements of population and that the natural environment is probably the oldest determinant of migration and population displacement (Yanda, 2010). It is due to those earlier studies that many scholars have predicted an intensification of climate change for the forthcoming years, and its potential to compel people to move from one place to another for survival (Unganai, 1996).

The world population has significantly increased in the contemporary era but the ecosystem is seemingly not capable of supporting the figures of the population as climate change is threatening the stability of nature thereby threatening human existence (Shreffler et al, 2009). This will therefore spark massive movement of people for habitable places in the world; hence it is very difficult to draw a line between migration and climate change (Sutherland et al, 2004). Those individuals that feel more vulnerable will be compelled to migrate and this will automatically create a new group of illegal migrants which the media and environmental research named environmental immigrants (Shreffler, 2009). The depleting resources are failing to support rural life as their livelihoods are solely depended on the power of nature`s ecosystem balance, thus climate change is compelling people to migrate. The form of migration has never been eventful because climate change effects are very subtle, hence some will remain behind and the due to communalism in rural societies the link between migrants and those remained behind will continue to be intact and this we create that interdependence between the migrants and those staying behind.

Zimbabwe as a member of the global village has seen an enormous movement of people moving from rural areas which are traditionally agriculture depended to neighbouring countries for the betterment of their livelihoods. The country has witnessed a significant number of young and productive generations going to the neighbouring South Africa to improve their quality of life and that of family members left behind (IOM, 2008). As a result, such migrants seem to leave a significant number of relatives behind and most of them may be vulnerable because the traditional economic livelihoods that has been disrupted by climate change and unstable weather patterns, of which the remnants are likely to be the elderly, women and children. Therefore, there is need to explore the climate mitigation strategies adhered by members of the family who stayed in the community, specifically how they are leveraging on remittances to diversify their forms of livelihoods. Reflecting back to the Chikombedzi community in Zimbabwe, the place is one of the drought affected areas of the Southern part of Zimbabwe. This community is found in the Zimbabwean dry Seasons of region four and region five which receive cumulative unstable levels of precipitations. As a result young adults are leaving the area for better livelihoods in the neighbouring South Africa and leaving behind their families.

Furthermore, the Zimbabwean community has been so depended on remittances more than it depends on foreign direct investment, and it is due to this factor that, there has been an increase in the informal couriers who are known as Malaitshas' and these individuals are responsible for delivering goods and service on behalf of migrants (African Union, 2012).The pressure is on migrants to support families behind, failure to which can have disappointing effects on the families who livelihoods solely depends on the migrants. In other words, migration is a form of psychological contract as families of the migrants do expects migrant community to frequently send money back home as remittances. It is due to this background that this research intends to explore the role of diaspora-migrants community in helping communities to mitigate the effects of climate change in the Chikombedzi community.

This study is crucial for such remote communities mainly because the economy of such communities is wholly depended on the balance of ecosystem; hence such societies can easily be victims of climate change. The human livelihoods is at stake due to changing

climate and rural community seem to offer less options of livelihoods as their economic seem to depend exclusively on the threatened mother nature (Svotwa, 2010). Furthermore, the rural communities are lacking resources to boost adaptive mechanism to withstand the challenges of the climate change. Besides, the government basically seem to have other priorities than climate change related challenges, and this keeping themselves in power, fighting infectious diseases, deteriorating infrastructure, building investors' confidence amongst other priorities (Yanda, 2010). This would automatically leave communities in a vicious cycle of poverty which threaten their livelihoods of the rural population. The effects of climate change and the recent El Niño effects have posed so much pressure on the remote communities that has been struggling with cumulative droughts and this has made the rural areas inhabitable since the beginning of the millennium period. In response, young and energetic groups are moving from this community to South Africa for better life with the agenda of supporting the livelihoods of their community members. These individuals would go as formal and informal migrants looking for formal and informal jobs to support their families back in Zimbabwe. The fact that climate migrants are not given the legal protection than conventional refugees makes the situation of these migrants so compromising that it can be difficult for them to make ends meet in a foreign land (Unganai, 1996). Regardless of the challenges, migrant families are still sending remittances back home to support the families, but research was therefore required to dig out the extent to which the remittances are being exploited to curb the devastating effects of climate change. Many drought prone areas in Zimbabwe are susceptible to the vagaries of climate change and most people domiciled there live in abject poverty which affects their adaptive capacity (see Gukurume, 2014). As such, it becomes crucial to understand the role played by remittances in the adaptation strategies deployed by the rural people and communities.

METHODOLOGY OF RESEARCH

The research is grounded on qualitative methodological approach. The research was done in the drought-prone communal area of Chikombedzi in Masvingo Province of Zimbabwe. The environmental crisis posed by climate change in the area has influenced choice of the research site. This research was started in the mid-period of 2016 to the end of the same year (June to November to 2016). The data was solicited from the participants using in-depth interviews in triangulation with key informants' interviews. The sample of 30 participants was involved in the data collection. One of the researchers was leveraging on snowballing sampling method, where community knowledge and community reference was critical for the feasibility of the research. The experts involved in the research were agricultural experts, village heads and other community governmental agencies, and they were both identified as key informants' participants in this research. The interview instruments were checked and validated by a number of experts to meet the required research standard. Besides, various secondary sources were used in corroboration of the primary data collected. The secondary data was based on governmental publications, existing journal and information from the media. The collected data was the presented and analyses in themes using thematic analysis.

RESULTS AND DISCUSSION

The migration of people in the Chikombedzi area has changed enormously the dimension of people`s livelihoods. The traditional community livelihoods which were mainly encapsulated into a homogeneous type of agricultural livelihoods, has been diversified and evolved to suit the changing climate of the modern day. In opportunity terms, the sources of livelihoods in the community have evolved into diverse mode of survival driven by creative methods of adaption to climate change supported by the diaspora migrants' community. In other words, the migrant diaspora have supported majority of community members to cope with pressure posed by climate change. There is no clear identifiable source of livelihoods as people embark into multiple forms of survival. However, there are also some families who

have migrant's relatives who have been ignored by their migrated family members abroad. As a result these families seem to be incapacitated in terms of means of adapting to the new environment which requires new forms of survival. However, such neglected family members seem to survive as well relying on those most supported families, hence remittances are important families and communities as a whole.

The Emerging Agricultural Projects. The drought prone and semi-arid region of Chikombedzi which is a traditionally agriculture based economy is embarking on rolling numerous forms of agricultural small scale projects supported by the migrant communities in the diaspora, who occasionally send their earnings back home as remittances . This form of money is circulating in the community, and is being used by the community to sink boreholes, an artificial way of supporting traditional modes of agriculture. More often, the dams are dry due to hot temperatures; and the people cannot afford to rely on the natural cycle, specifically rain water, hence new forms of irrigation. Social influence has been noted as the push factor for many Diaspora community members to send remittances to sink boreholes to ensure water flow 365 days a year in this community. These kinds of project are also supported by other sustainable mechanisms that are meant to improve the quality of life in the community. The borehole system uses solar system to pull water from the borehole into a well-built tank designed as water reservoir and this makes sure there is clean drinking water and also water for small agro-community projects that are running in the area. The supply of water is guaranteed across seasons and communities are leveraging on that to curb the detrimental effects caused by climate change, as the community seem to face dry period more often than wet weather patterns. This has allowed small scale gardening to take place in the community.

"I have enough money for my survival through selling my garden produce, thanks to my child who remembered me, he is in South Africa"

Water melons are a farm produce that survive in a drought area, mainly because it require low amount of rainfall to produce. The community is therefore embarking on water melon growing projects aligning the crop with the weather pattern of the community. The borehole is used to irrigate water melon projects and the produce would be used by the community members to eat and sell within the community and also to sell to the urban markets. These are important income generating projects for the community. Regardless of cash shortages in the communal areas and in the country in general, remittances are allowing cash transaction to happen amongst community members. It is not only water melons that are being grown, as nutritious products like fresh maize, and vegetables are also being grown for local market and for provincial market of Masvingo. The country is currently facing cash crisis, but the community is able to cope with the situation due to those parents with family members in diaspora, hence there is fluidity in business and cash exchange. It is not only cash and carry that sustains the community but also credit system and butter trade. Those who have their relative's in diaspora are more trusted borrowers because they are expected to send money back home. In other words, the community is able to harness social capital as way of addressing the devastating effects of climate. Therefore, credit system is based on psychological contract, as one participant explained; " *I allow community members to borrow my farm produce, but I trust those who have the potential to pay, mainly those with children and relatives who are in South Africa, because I know they will send money at one point*".

The community gardens are very crucial for improving the general community quality of life and it bring sense of humanness as such community members have reported that, they command a lot of respect in the community and this is giving them more confidence and self-efficacy that they can scale up their projects for better profit returns.

Moreover, the money acquired from remittances and community projects is also of great importance for labour acquisition. In such a drought prone area, zero tillage (Digaudye) (see Gukurume et al 2010) is the most encouraged form of farming, however, the challenge with this form of farming; it is labour intensive and back breaking. *"I have enough money to hire some boys to dig for me; zero tillage is the only way for this community."* Therefore, the community members who have not migrated are also getting employed through remittances

send by environmental migrants. In other words the system of survival is seemingly in support of the whole community. Besides, sometimes environment migrants do sent remittances in terms of clothes mainly second hand cheap clothes and their families would use these resources as butter payment for people who work in their own local gardens. Therefore, although migration is not all rosy but the positive effects of migration can never be underestimated considering how this community have benefited from such a phenomenon in the face of environmental fragility.

Furthermore, credit system was also found in cooperative forms as women would create a pool of investment on rotational bases (Mukando). The money raised from farm produce would be used as source of community micro finances system, for other business to stream on. On one`s turn to receive credit money, one may be able to buy properties of substance. One woman have reported, *"I was able to buy my 7000 litres tank after receiving my money from community credit turn."* The credit system was common among women who have relatives in diaspora, hence diaspora community`s contribution cannot be underestimated considering the significant difference championed by their external input. The money circulation has also supported the traditional art of sewing and knitting which are some of the ancient projects that was ignored due to lack of financial circulation, but with various projects in the community such ancient projects are now having their own space in the community market.

DEMYSTIFICATION OF GENDER AND CLIMATE ADAPTION

Climate change has compelled women to demystify their gender roles. The population of environmental migrants involves adolescents mainly of both sex, young adults and even married couples. This means young married mothers would stay behind with children to take care, especially for those who are going to school. This created a mind and role flexibility as women are the one expected to adopt masculinity roles used to be taken by their migrant male relatives. This includes, garden ownership, ploughing in small gardens and even taking care of livestock's which are traditionally masculinity roles. In the traditional culture of the Chikombedzi community, man are the one who traditionally take responsibility for cash and family resources, however, with this new order, man in diaspora are giving women some responsibility to oversee family resources. "*I am happy that I am using my own hands in my land, some of the ideas I could not implement, I can implement them now because I have the total right to land and family projects planning."* This is giving women some confidence and creating a sense of social entrepreneurship amongst people who are traditionally dominated by the patriarchy system. This is simply because women could have access to land and retain rights of cultivation with supporting resources as given by their diaspora relatives. Therefore, climatic migration is therefore offering freedom to women rather than exposing them.

Furthermore, women have a traditional role of gathering firewood for cooking; however, due to desertification firewood is now very scarce in the community. The solar systems send from diaspora is being used for home lighting unlike traditional firewood lighting. The solar system is used for lighting and also for charging cell phones. Those families with solar system at home would then charge other communities members some money for phone charging. *"I charge $1 per phone if one wants to charge his or her own phone"* In terms of cooking some are adopting the culture of using paraffin send by their relatives in diaspora where it is cheap. "*I am also selling paraffin in the community, use paraffin stove and I am getting some few dollar...., I got it from South Africa, my husband sends it to me"* Therefore, besides changing the quality of life, migration is creating a room for small business entrepreneurs to progress in the community. Deducing from this point, climate change has forced people to move and migrate as climatic refugees, however, the effects are not all bad as remittances are playing a crucial role in mitigating the effects.

Grazing land and Cattle Fattening. The Chikombedzi region is traditionally reserved from the colonial period for cattle ranching and as game reserves. Through Diaspora remittances some community members are able to engage in cattle fattening projects,

projects that they are not traditionally familiar with in the area. This project was crucial in the promotion grazing care systems and prevention of veld fires. In other words, those scattered areas where grass could be harvested without difficult, people are supporting efforts to protect damage to such areas by fire and this I done through promotion of grazing systems that are sustainable. The community`s environmental consciousness was driven by the desire to support and sustain the projects inspired by diaspora communities.

"My husband has managed to buy two beasts for fattening, and they are looking very good, we should get at least 800 dollars each…"

On the same note, this is also another important monitory projects that generate big chunk of monitory returns that can change the community`s quality of life. Some are even using this money to open local small grocery businesses where the bigger community could buy. This demonstrate the importance diaspora community, therefore, regardless of environmental challenges the Chikombedzi area is coming with proactive methods of mitigating the effects of climate change in the area.

DISCUSSION OF RESULTS

The findings above are a clear testimony that African is facing a serious humanitarian crisis that requires collective global attention, complementing some earlier finding regarding global warming and climate change (Niasse, 2005). The movement of men and women to the neighbouring countries as environmental migrants is a clear testimony of victims of climate change. The desire of these individuals is generally to improve their community`s livelihoods. However, the challenge migrants' faces when it comes to settling in other countries is due to the fact that climatic migrants do not have legal protection than conventional migrants (Naude, 2008). This would create a state of vulnerability for migrants to be exploited by hosting countries and this narrows the opportunity for them to support families behind while working in the host country. Therefore, there is need for international lobbying in favour of rights of migrants so as to make sure that, climatic migrants are given opportunities. In Maslow's terms humans` most prioritised need is the need for physiological needs which involves food, shelter, clothes amongst other important basic needs (Santrock, 2006). It is therefore important to note that, the important human needs of communities and societies could be supported and improved by migration thereby curbing societal sense of vulnerability and helplessness, but migration needs to be formalised to ensure the system works in the context of deep sustainability. The non-governmental organisations that are operating in the country are well known for giving food; however it will be more sensible if they could provide support to such community based solutions which are driven by local knowledge. Besides, nongovernmental organisations, the government could also take a proactive role in supporting the social entrepreneurial projects that are initiated by community members.

Furthermore, the media has an important role in encouraging the interaction between the diaspora community and families left back home by environmental migrants. The diaspora champions can be ideal social model in such communities who can be supported by the media. According to the theory of social learning by Albert Bandura, human behaviour is acquired through observing others (Fernald & Fernald, 2007). The most successful migrants who are supporting great projects in their community could be celebrated as heroes in the community. This is simply because of the successes they could have achieved in diaspora and back home as well and as a result this would encourage more migrants to remember their communities of origin. In behaviouristic terms the relationship between behaviour and consequences increases the likelihood of the repetition of the behaviour. Positive reinforcement is when one`s behaviour is followed by pleasing outcomes (Gross, 2010). The most successful migrants are likely to bring joy to their families through remittances and as a result their families are likely to fully support their relatives to continue with the behaviour of exploring opportunities in the neighbouring countries, and this encourages this adaptive behavioural resolution (migration). It resonates with the study done by Davies (2012), who regarded migrants as solder serving in diaspora for the interest of

their citizens. However, this life style is less sustainable, considering the opinion that, such people do not have rights in a country they are working. The migration rules might change at any time and this could cut off the livelihoods of people in Chikombedzi. It is from this background that government together with non-profit organisations they need to join hands together to support community projects that provide sustainable solutions to the community. This would mean Zimbabwean migrants will have the reason to come back home on permanent bases as they would rely on the projects they worked for while in diaspora. Besides, government and other stakeholders can also provide talent management training programs which will improve the efficiency and the general improvement in community projects in giving sustainable solutions. In other words, the projects championed by migrants in their communities do require scaling up, and this could only be achieved through external support so that the community will not depend solely on working in other countries. The other challenge with remittances is, sometimes they fall into the wrong hands and recipients may become victims of conspicuous consumption (Asian Development Bank, 2006). In other words such valuable money could end up failing to make a significant change in the community due to conspicuous consumption, but this could be avoided by continuous community training campaigns. This would mean communities would be partner in complementing government efforts of achieving millennium development goals.

Furthermore, the movement of remittance could be co-ordinated smoothly by the department of immigration from both sides, who would then formalise the movement of remittances from host country to the mother country. This could be an opportunity for raising rural community standards at the same time bringing foreign currency in the country even though in smaller volumes at times. The success stories of the rural migrants require celebrations including in the media, to encourage other climatic migrants to remember their families left behind (Asian Development Bank, 2006). Failure to create a link between migrants and home country can prove to be costly for the nation, as some would migrate permanently or end up changing citizenship, and this would mean a loss of national human resources in the name of migration (Meze-Hausken, 2000). Therefore, if government is determined to make sure improvement in community livelihoods and sustainability of local communities, the ministry of rural and urban development should carry out research towards community initiated projects and they need to support such social entrepreneurial initiatives which would open opportunities for bottom up general community development. This is important for the development of any developing country mainly because in the bottom of the pyramid that where majority of citizens belongs.

CONCLUSION

The paper has highlighted the relationship between climate change and migration, and how these two factors coexist to mitigate community vulnerability to the devastating effects of climate change. The research have demonstrated that climate migration is very prevalent in Chikombedzi as people`s agricultural livelihoods has been badly affected by the negative effects of climate change and global warming. The most energetic members of the community are moving out of the society to seek opportunities in the neighbouring countries. The money and other material things they send back home is offering important contribution towards general community developments. The bottom line is, it has been revealed that migration is one of the climate adaptive strategies that can prove to offer sustainable solutions to the communities like Chikombedzi rural. The fact that, small scale sustainable agricultural projects can be formed and managed through diaspora support is a reflection of the importance of migrants' community in the creation of sustainable solutions. The projects are not only confined to agriculture, as diverse sources of incomes are being rolled in the community, and this is increasing livelihoods diversification, hence it is not all doom and gloomy when it comes to migration in the rural areas, as the link between diaspora members and community of origin is playing a significant role in shaping the economic direction of the community in a sustainable manner. Various societal stakeholders of the community which includes, migration department, ministry of rural and urban development, nongovernmental

organisations and other private sectors can all collaborate to come up with a support system that can complement community projects that have been initiated by these communities in dealing with the detrimental effects of climate change. Supporting community initiatives would be vital for leveraging on indigenous knowledge system in curbing the effects of climate change.

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DETERMINANTS OF RURAL FARMERS' DECISION TO ADAPT TO CLIMATE CHANGE IN GHANA

Acquah Sarah, PhD Student
New Mexico State University, Las Cruces, USA
E-mail: awiaso@gmail.com

Kendie Stephen
College of Humanities and Legal Studies, University of Cape Coast, Ghana
E-mail: stephenkendie@gmail.com

Agyenim Joseph Boateng
Institute for Development Studies, University of Cape Coast, Ghana
E-mail: jbagyenim@gmail.com

ABSTRACT
Increased variability in temperature and precipitation aggravate crop farmers' productivity especially rural farmers in developing countries where smallholder agriculture is a major source of livelihood. In an era of climate change, farm level adaptation strategy is crucial to combating food insecurity and lost farm income. To guide policy in this direction, it is important to understand the determinants of farmers' decision to adapt to climate change. Data was collected from 200 farmers randomly selected from six farming zones in the Shama district of Ghana. Binary logistic and semi-log regression models were used to estimate the socio-economic and institutional factors that determine farmers' decision to adapt to climate change, their access to credit and the size of agricultural land in production. The results revealed relevant social-economic and institutional factors that significantly determine farmers' decision to adapt to climate change, their access to agricultural loans as well as agricultural land in production. Policy decisions on farm level adaptation may focus on the relevant socio-economic and institutional factors to help farmers develop resilience to a changing climate.

KEY WORDS
Climate change, adaptation, food security, socio-economic factors.

Substantial changes in global climate are already being experienced in the form of increased drought, more intense storms, floods and other environmental stress. Trenberth, Fasullo, & Shepherd (2015) revealed that the changing climate is actually a new normal. Therefore, it is unlikely for some farmers who are currently experiencing critical drought periods to have wet periods in the future based on historical trends. In view of this, farmers need to consider adaptation and mitigation strategies to adjust to the changing climate and possible new normal.

Variability in rainfall and other climatic factors greatly affect cropping patterns, crop yield and food security efforts. Countries that depend heavily of natural precipitation may be severely affected by climate change. The absence of appropriate measures to reduce the negative impact of climate change can potentially affect the developments aspirations of many countries especially developing countries battling with adverse impacts of high population growth and the endemic poverty.

Manifestations of climate change in Ghana. In Ghana, the impacts of climate change scenarios could potentially threaten the socio-economic well-being of many people. Estimate from nationally observed climate data coupled with IPCC climate scenarios suggest a continuous increase in temperature and decrease in rainfall. On average temperature in Ghana is expected to rise by 0.6^0C, 2.0^0C and 3.9^0C in 2020, 2050 and 2080 respectively (United Nations Framework Convention on Climate Change, 2011). On the other hand,

rainfall is expected to decrease by an average estimate of 2.8%, 10.9% and 18.6% for the year 2020, 2050 and 2080 respectively. Furthermore, historical data show a sea-level rise of 2.1 mm per year for the last 30 years (Masters, Baker, & Flood, 2010). The expected changes may have serious implications for the agricultural sector and also human settlement of the coastal areas of Ghana.

The agricultural sector in Ghana account for nearly one-quarter of the country's GDP and employs more than half of the workforce which is largely small landholders (over 85% are 2 ha or less in size) (Ghana Statistical Service, 2014). Food production in the country mainly depends on precipitation and other weather patterns. Variability in rainfall patterns will impact on the quality and quantity of food produced. Cocoa is the principal cash crop grown on 40% of all cultivated land in Ghana. Millet is a staple crop in the grown in the northern regions while maize (corn) and rice are widely grown and consumed throughout the country. The above mentioned cereals are relatively vulnerable to climate change yet very important to the Ghanaian people in terms of food security. Ghana's increasing temperatures may result in low cereal yields due to a limited growing period and high water requirements.

The spin-off effects on the rest of the economy can lead to devastating consequences in the form of declining agricultural productivity, reduced farm income, increased food prices and lost livelihoods among others. It is highly likely that imports and exports of commodity crops will be affected and this is particularly important for cocoa, Ghana's principal cash crop. Any change in crops yield and distribution will affect livelihoods, particularly if yields decrease and the main crops in the region become marginal or impossible to grow due to climate change.

Previous works. Efforts to help address the problem of climate change are ongoing. Climate change initiatives in Ghana include the case of Climate Smart Landscape (CSL) planning approach which focuses on climate-cocoa partnership between Rainforest alliance and Olam. The objective of the partnership is to develop local livelihoods by promoting climate smart cocoa cultivation(Salvini, G., Ligtenberg, A., van Paassen, A., Bregt, A.K., Avitabile, V., & Herold, 2016).

Other climate change initiatives such as the Netherlands Climate Change Studies Assistance Program (NCCSAP), Climate Change and Development – Adapting by reducing vulnerability (CC-DARE) and Africa Adaptation Program (AAP) all helped to reduce the risk and vulnerabilities brought on by climatic changes. Though climate change is a physical process involving changes in climatic variables, it is influenced by social processes that relate to the way society evolves through time. Climate change will impact on social, economic, and environmental systems and shape the prospects for food, water, and health security (Adger, 1999; Christensen et al. 2007).

Although climate change is a physical process it can relate directly related to the livelihood systems of any society. Dumenu (2014) examined the vulnerability of rural communities in Ghana to climate change. His results show that socio-economic factors influencing vulnerability include household size, access to climate change information, climate sensitive occupation and diversification of income. Yet to inform policy, these results are lacking because the author failed to measure the effect of the socio-economic factors that influence climate change using rigorous statistical methods. The capacity to mitigate and adapt to climate change impacts depends on proactive measures to address the challenges climate change brings in its wake.

Gaps. Regardless of the ongoing climate change initiatives in Ghana, most of the programs are largely at the national level and does not target specific sectors such as the agricultural sector. Also previous climate change related researches are limited in scope with respect to the areas they covered and lack rigorous statistical analysis. No statistical investigations have been undertaken to understand the determinant of farmers' decision to adapt to climate change in the study area.

The need for rural farmers to adapt to climate change is relevant for food security. Understanding the impacts of climate change on farmers' productivity is crucial for the choice of adaptation strategies and mitigation policies. To address the growing challenges of climate, change that farmers face, it is important to understand the determinants of farmers'

decision to adapt to climate change. The objective of the study was to examine farmers' perceptions of climate change, their choice of adaptation strategies in response to climate change and the barriers they encounter. It also estimated the socio-economic and institutional factors that influence farmers' productivity and the decision to adapt to climate change.

MATERIALS AND METHODS OF RESEARCH

Study area. Shama district is one of the 22 districts in the Western Region of Ghana. The district was recently carved out of the former Shama Ahanta East Metropolitan Assembly. Shama district has a population of 81,966 based on projections from 2010 Population and Housing Census (Ghana Statistical Service, 2014). The district falls within coastal savannah agro-ecological classification and experiences two rainy seasons. The people are predominantly farmers with a total of about one third of the adult population in the district engaged in agriculture (Ghana Statistical Service, 2014). Farmers rely on traditional methods of farming using simple farm tools such as hoe, cutlass and depend on rainfall for cropping.

Data. The study population includes all farmers within the Shama district which was estimated to be 7100 (Ministry of Food and Agriculture, MOFA, Shama district office, 2012). Shama district is divided into six farming zones. Two farming communities were selected randomly from each farming zone. The lists of farmers in the selected communities were obtained with the help of Agricultural Extension Officers responsible for the area.

Farmers were interviewed to investigate whether they have noticed long-term climate changes. The sample size of the study was determined statistically using the equation specified below. Sample proportions based on the six farming zones were calculated as shown in Table 1. Data was collected on farmers' socio-economic characteristics, farmers' perception of climate change, farmers' adaptation measures in response to climate change and barriers to adaptation measures.

$$n = \hat{p} * \hat{q} \left[\frac{Z\alpha/_2}{d}\right]^2 \qquad (1)$$

Where: n = desired sample size; z = the critical z value = 1.96; p = the estimated proportion of farmers in the district = 0.70 (MOFA, Shama district); q = 1 – 0.70 = 0.30; d = the allowable error 5% = 0.05.

Table 1 – Sample size estimation

Farming Zones	Population	Sample	Calculated sample proportions
Shama south	1500	68	42
Shama north	1000	45	28
Asokor Asaaman	1200	55	34
Assin	1800	82	51
Beposo	700	32	20
Dunkwa	900	41	25
Total	7100	323	200

Source: MOFA, Shama district office (2012).

Methods. Both Ordinary Least Squares estimation and binary logit model were used in the data analysis. The assumptions underlying Ordinary Least Squares estimation was tested to ensure none is violated and that the model is predicting well. Binary logit is also used to determine the factors that influence the decision to adapt to climate change.

Logistic regression makes no assumption of the distribution of the independent variables. They do not have to be normally distributed, linearly related or of equal variance within each group (Agresti, 1996). The logit model as applied to this research follows a

binomial distribution. The decision variable Y_i is a binary response variable that can take on the value of 1 or 0. Mathematically expressed as shown below

$$Y_i = \{^{1\ decision\ to\ adapt\ to\ climate\ change}_{0\ otherwise}$$

Since there exist 200 independent observations, y_1, …, y_{200}, and the i-th observation is treated a s a random variable Y_i then Y_i follows a binomial distribution specified as shown below where n_i is the binomial denominator and π_i is the probability.

$$Y_i \sim B(n_i, \pi_i) \qquad (2)$$

Following that the probabilities are expressed as a linear function of the observed vector of covariates, $X_{i.}$

$$\text{Thus } \pi_i = X_i^{'}\beta \qquad (3)$$

Where: X_i … Observed vector of covariates; β ….. Vector of regression coefficients.

Assuming that the Logit of the underlying probability is a linear function of the predictions gives:

$$logit(\pi_i) = X_i^{'}\beta \qquad (4)$$

Now the odds ratio of the i-th respondent is determined as follows:

$$\frac{\pi_i}{(1-\pi_i)} = \exp\{X_i^{'}\beta\} \qquad (5)$$

Solving for the probabilities of respondent's decision in (4) takes the following steps.

$$\pi_i = \exp\{X_i^{'}\beta\}[(1-\pi_i) \qquad (6)$$
$$\pi_i = \exp\{X_i^{'}\beta\} - \pi_i exp\{X_i^{'}\beta\} \qquad (7)$$
$$\pi_i + \pi_i exp\{X_i^{'}\beta\} = \exp\{X_i^{'}\beta\} \qquad (8)$$
$$\pi_i\{1 + exp\{X_i^{'}\beta\}\} = \exp\{X_i^{'}\beta\} \qquad (9)$$
$$\pi_i = \frac{\exp\{X_i^{'}\beta\}}{[1 + \exp\{X_i^{'}\beta\}]} \qquad (10)$$

Akaike Information Criteria (AIC) provided the basis for model selection (Akaike, 1973). AIC select the model that minimises the negative likelihood penalized by the number of parameters as specified in the model. It basically finds the best approximating model to the unknown true data generating process and its applications (Akaike, 1973; Acquah, 2011).

Table 2 – Variable description

Variable Name	Interpretation	Description
Decision to adapt to climate change	Do you adapt to climate change	Dummy, takes the value of 1 if YES and 0 if NO
Age	Age of selected farmers	Continuous
Household size	Farmers family size	Continuous
Farming experience	Years of farming experience	Continuous
Years of education	Farmers years of education	Continuous
Access to labour	Do you have access to labour	Dummy, takes the value of 1 if YES and 0 if NO
Access to extension	Do you receive extension service	Dummy, takes the value of 1 if YES and 0 if NO
Access to farm equipment	Do you have access to requisite farm equipment	Dummy, takes the value of 1 if YES and 0 if NO
Access to pesticides	Do you have access to pesticides	Dummy, takes the value of 1 if YES and 0 if NO

Continue of Table 2		
Insecure property right	Does insecure property right constrain adaptation strategies	Dummy, takes the value of 1 if YES and 0 if NO
Shortage of land	Does shortage of land constrain adaptation strategies	Dummy, takes the value of 1 if YES and 0 if NO
Reduced farm size	Do you reduce farm size in response to climate change	Dummy, takes the value of 1 if YES and 0 if NO
Soil conservation	Do you practice soil conservation in response to climate change	Dummy, takes the value of 1 if YES and 0 if NO
Land ownership	Do you farm on your own farm land	Dummy, takes the value of 1 if YES and 0 if NO
Farm size	Farm size in acres	Continuous
ln(Farm size)	Natural Log of Farm size	continuous
Access to credit	Do you have access to credit	Dummy, takes the value of 1 if YES and 0 if NO

RESULTS AND DISCUSSION

Farmers in the Shama district have no doubt that climate is changing. The manifestations of climate as witness by farmers in the district are summarized in Figure 3. Farmers in the district perceived substantial decrease in rainfall, water levels in streams, vegetation cover, soil fertility, crop yields and wildlife. They have also noticed an increase in temperature. See Figures 1 and 2. In response to the above mentioned changes, farmers adapt to climate change using farm level adaptation strategies.

Climate change adaptation strategies are crucial if the long term impacts on food production are to be minimised. Farmers were interviewed to know their choice of adaptation strategies in response to climate change. The results revealed that farmers use one or more methods of adaptation. Major adaptation strategies identified in response to climate change include changing planting dates, reduced farm size, crop diversification and soil conservation. Figure 4 summarizes the above mentioned findings. Nevertheless, there are barriers to farmers' adaptation strategies. The farmers identified eight barriers to adaptation strategies in the Shama district. These barriers are presented in Figure 5.

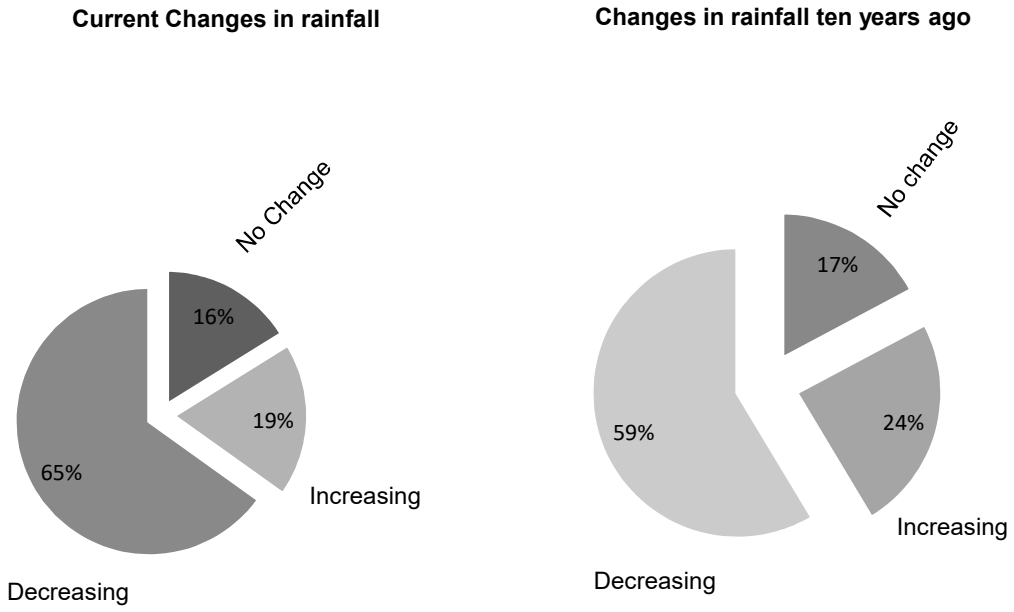

Figure 1 – Perceived changes in rainfall

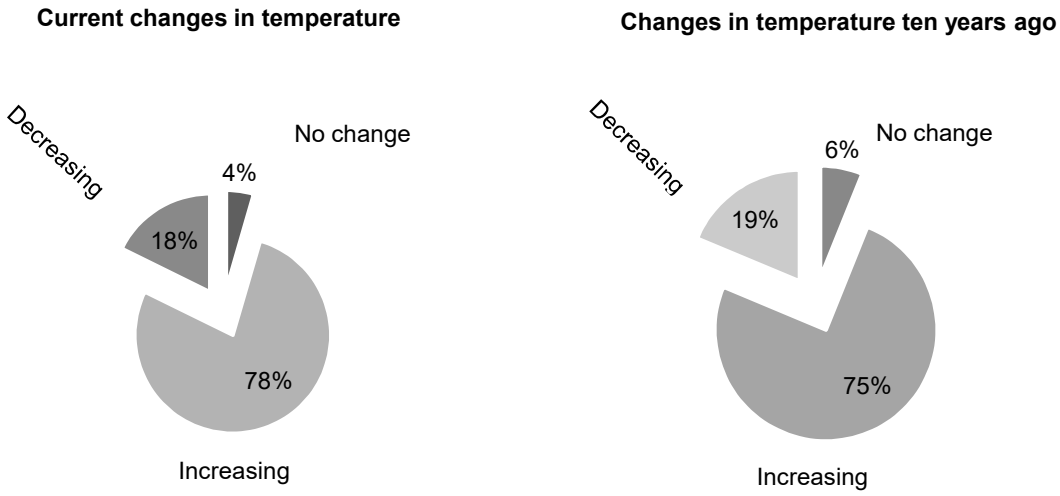

Figure 2 – Perceived changes in temperature

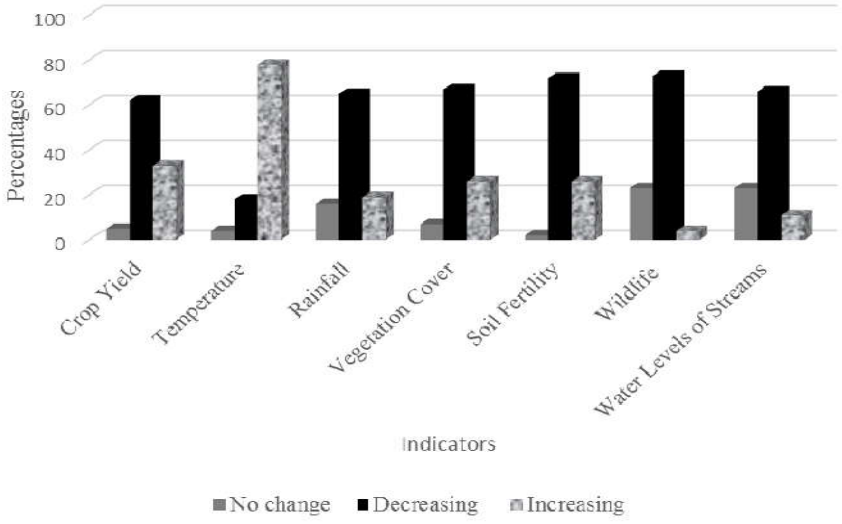

Figure 3 – Manifestations of climate change

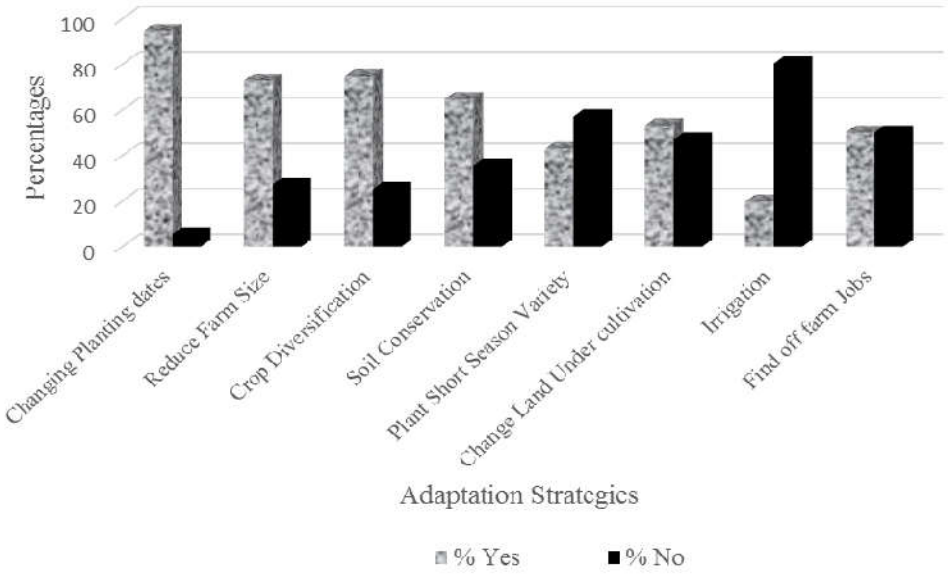

Figure 4 – Adaptation Strategies in response to climate change

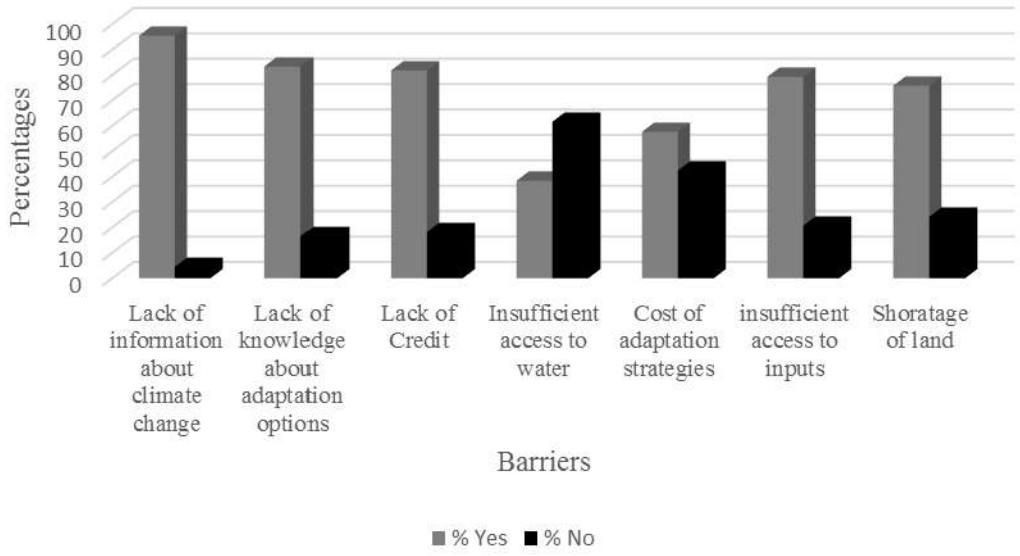

Figure 5 – Barriers to adaptation strategies in the Shama district of Ghana

Binary Logistic Regression results. Table 3 summarizes the results from the binary logit analysis. The model specification with decision to adapt to climate change as a dependent variable and household size, years of education, years of farming experience, access to extension service, access to labour, and access to requisite farm equipment as the explanatory variables provided the best fit with AIC of 111.227. Evidence from the logit regression analysis finds household size, years of farming experience, and access to requisite farm equipment as significant predictors of farmers' decision to adapt to climate change.

A unit increase in access to requisite farm equipment increases the logit of the dependent variable, decision to adapt to climate change by 2.0842 holding all other variables in the model constant. On the other hand, increasing a farmer's household size by one person is 19.4% less likely to support the decision to adapt to climate change controlling for all other variables in the model. Similarly, one-year increase in farming experience means a farmer is 1.058 times more likely to support the decision to adapt to climate change holding all variables constant. The marginal effect of each predictor on the decision to adapt to climate change was estimated. For instance, a unit increase in access to requisite farm equipment increases the probability of a farmer adapting to climate change by 14.8%. Meanwhile increasing a farmer's household size by one person decreases the probability of adapting to climate change by 1.5%. Policy decisions on farm level adaption to climate change may focus on the above mentioned factors since they make significant contributions to farmers' decision to adapt to climate change.

The inadequate access to credit presents a major barrier to farmers' decision to adapt to climate change. It is therefore relevant to know the socio-economic characteristics of farmers that can influence their access to credit from banks and other financial institutions. The logit model specification with access to credit as the dependent variable and age, years of education, years of farming experience, access to labour, insecure property right, shortage of land, reduced farm size and soil conservation as regressors provided the best model fit with AIC of 172.25. See Table 4 for the results.

The results revealed that years of farming experience, soil conservation, insecure property right and shortage of land decrease farmers' likelihood of having access to credit. For instance, insecure property right is 59.4% less likely to help farmers gain access to credit from financial institutions controlling for all other variables. This aspect of the results meets expectations because financial institutions often require land or a fixed asset as collateral for agricultural loans. Therefore, a general decline in arable land available for production or an insecure property right may potentially decrease farmers' access to credit from banks or

other financial institutions. Furthermore, the type of soil conservation mainly practiced by farmers in the district is basically allowing arable land to fallow for a few years. This practice tends to decrease farmers' land as a potential asset for agricultural loans.

On the other hand, age, years of education, access to labour and reduced farm size increases the likelihood of farmers gaining access to credit. For instance, farmers consciously reducing their farm size in response to climate change although arable land existed increases the likelihood of obtaining credit from financial institutions. A unit increase in the reduction of farm size in response to climate change increases the probability of obtaining access to credit by 22% controlling for all other variables in the model. One-year increase in farmers' age is 1.117 times more likely to increase access to credit controlling for all other variables in the model. Furthermore, one-unit increase in access to labour increases access to credit by 7.625 holding all other variables in the model constant.

Table 3 – Results from the binary logit model on farmers' decision to adapt to climate change

Dependent Variable: Decision to adapt to climate change						
Independent variable	Parameter Estimate	Standard error	Wald Chi-Square	Odds Ratio	Marginal effect	Pr> ChiSq
Intercept	2.9162	0.9232	9.9772	-	-	0.0016
Household Size	-0.2155	0.1038	4.3130	0.806	-0.0154	0.0378
Farming Experience	0.0561	0.0283	3.9148	1.058	0.0040	0.0479
Access to extension	-0.9583	0.5709	2.8178	0.384	-0.0683	0.0932
Access to labor	-0.9368	0.6180	2.2978	0.392	-0.0668	0.1296
Access to farm equipment	2.0842	0.5786	12.9744	8.038	0.1486	0.0003
AIC	111.227					
Sample size	198 farmers					
Likelihood ratio test	Chi-Square:	21.4089	Pr>ChiSq	0.0007		

Table 4 – Results from the binary logit model on access to farm credit

Dependent Variable: Access to Credit						
Independent variable	Parameter Estimate	Standard error	Wald Chi-Square	Odds Ratio	Marginal effect	Pr> ChiSq
Intercept	-5.9170	1.3489	19.2402	-	-	<0.0001
Age	0.1109	0.0295	14.1235	1.117	0.0137	0.0002
Years of education	0.1324	0.0445	8.8692	1.142	0.0164	0.0029
Farming Experience	-0.0824	0.0291	8.0095	0.921	-0.0102	0.0047
Access to labor	2.0314	0.5571	13.2971	7.625	0.2518	0.0003
Reduce farm size	1.7800	0.5476	10.5681	5.930	0.2206	0.0012
Soil conservation	-1.9082	0.5208	13.4240	0.148	-0.2365	0.0002
Insecure property right	-0.9012	0.4220	4.5600	0.406	-0.1117	0.0327
Shortage of land	-1.7660	0.5186	11.5970	0.171	-0.2189	0.0007
AIC	172.25144					
Sample size	198 farmers					
Likelihood ratio test	Chi-Square:	67.3279	Pr>ChiSq	<0.0001		

Semi-log regression results. In response to the factors that influence farmers land in production, the ordinary least square regression model (with the logarithm of farm size as the dependent variable and farmers' socio-economic variables as predictors) was estimated. The results obtained from the regression analysis revealed age of respondents, farmers' household size, years of farming experience, farming on one's own farmland, access to pesticides and access to extension services as significant predictors of land in production.

On average, one-year increase in the age of a farmer decreases land in production by 1.7 percent holding all other variables in the model constant. The negative effect of age on the size of land in production meets research expectation. Farming in Africa and specifically the study area is largely own-labor intensive. Therefore, it is reasonable for an increase in age to negatively affect farm size especially in the absence of an outside farm labor sources.

On the other hand, increasing farmers' household sizes by one person, increases land in production by 5.39 percent controlling for all other variables. This aspect of the results is theoretically correct because most farmers in the district tend to use their family as additional sources of farms labor. Likewise, a unit increase in access to extension services increase land in production by 0.47 controlling for all other variables in the model.

The assumptions underlying the Ordinary Least Squares estimation was tested to ensure that there are no violations and the predictability of the model is not impaired. Homoskedasticity which assumes that the residuals have equal variance was tested using both the White test and the Breusch-Pagan test. Generally, the null hypothesis of homoscedasticity is tested against the alternative of hetroskedasticity. The result showed no violation since p-values obtained from each test was larger than 0.05 and the null hypothesis of homoscedasticity is not rejected. Multicollinearity was not an issue by the variance inflation factor (VIF) results and the residuals were normally distributed. Table 5 presents results on the parameter estimates, hetroskedasticity, Variance Inflation Factor and normality test.

Table 5 – Results from the semi-log regression model on farmers' land in production

Dependent Variable: log of Farm Size (in acres)					
Independent variable	Parameter estimate	Standard error	t-test statistic	Pr > |t|	Variance inflation
Intercept	0.46678	0.20725	2.25	0.0254	0
Age	-0.01706	0.00590	-2.89	0.0043	2.60196
Household size	0.05396	0.01898	2.84	0.0050	1.30054
Farming experience	0.03981	0.00582	6.84	<.0001	2.30945
Own farmland	0.44420	0.09767	4.55	<.0001	1.14640
Access to Pesticides	0.29148	0.10482	2.78	0.0060	1.24601
Access to extension	0.47091	0.09900	4.76	<.0001	1.21953
F Value 30.68 Pr > F <.0001					
Sample Size	197				
R-square	0.4921				
Shapiro-Wilk test Statistic 0.99114 p-value 0.2683					
Kolmogorov-Smirnov Statistic 0.05452 p-value >0.1500					
Breusch-Pagan test Chi-Square 25.25 Pr>ChiSq 0.3924					

CONCLUSION

The results revealed several important policy conclusions:

Farmers in the Shama district believe climate is changing and this is evidence in their perceptions. Farm level adaptation strategies are used in response to climate change. However, the farmers in this area experience some challenges in adapting to climate change. Major barriers to farm level adaptation include lack of information about climate change, lack of knowledge about adaptation strategies and lack of access to credit.

When faced with the many uncertainties posed by climate change impacts, the capacity to access, use and disseminate relevant information becomes crucial for vulnerable communities in order to better cope with and adjust to new climatic conditions. Therefore, the knowledge and experiences of rural farmers should not be limited. More innovations such as educating farmers about the availability of new technology and how to use it, providing information on improved farm management techniques such as optimal farm input use, or providing forecast information about likely short- or longer-run shifts in climate should be made available to farmers.

Analysis on a farmer's lack of access to credit revealed that shortage of land, insecure property right and inadequate soil conservation practices reduce access to credit. Institutional factors such as Access to credit, Insecure Property Right and Information on climate change are key in alleviating the impact of climate change. Policy may focus on addressing issues of insecure property right as well as climate change mitigation policies such as tree planting to bring substantial land into production for increased agricultural productivity and farmer's access to agricultural loan.

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СТРАХОВАНИЕ УРОЖАЯ СЕЛЬСКОХОЗЯЙСТВЕННЫХ КУЛЬТУР И МНОГОЛЕТНИХ НАСАЖДЕНИЙ С ГОСУДАРСТВЕННОЙ ПОДДЕРЖКОЙ

INSURANCE OF AGRICULTURAL CROPS AND PERENNIAL PLANTINGS WITH STATE SUPPORT

Полякова А.А., **Сидорин А.А.**, **Дударева А.Б.**, кандидаты экономических наук
Polyakova A.A., Sidorin A.A., Dudareva A.B., Candidates of Economic Sciences
ФГБОУ ВО «Орловский государственный аграрный университет имени Н.В. Парахина», Орел, Россия
Orel State Agrarian University, Orel City, Russia
E-mail: polykova_a_a@mail.ru, sidorin_a_a@mail.ru, dudareffa@mail.ru

АННОТАЦИЯ
В статье рассматриваются перспективы развития агрострахования в России как одного из наиболее эффективных направлений государственной поддержки сельского хозяйства. Обеспечение эффективной защиты аграрных товаропроизводителей от специфических рисков позволит повысить результаты деятельности и обеспечит рост инвестиционной привлекательности отрасли.

ABSTRACT
The article discusses the prospects of development of agricultural insurance in Russia as one of the most effective directions of state support of agriculture. Ensuring the effective protection of agricultural producers from specific risks will improve the performance and ensure the growth of investment attractiveness of the industry.

КЛЮЧЕВЫЕ СЛОВА
Страхование, риски, сельхозтоваропроизводители, государственная поддержка.

KEY WORDS
Insurance, risks, agricultural producers, state support.

Обеспечение эффективного развития агропромышленного комплекса Российской Федерации является приоритетной задачей государства. В современных условиях необходимости обеспечения продовольственной безопасности, государству требуется уделять особое значение развитию всех подотраслей АПК, которые находятся в тесной взаимосвязи друг с другом. Достижение ключевых показателей обеспеченности населения продукцией сельского хозяйства, установленных в Доктрине о продовольственной безопасности РФ, не возможно без эффективной государственной поддержки АПК. В настоящее время в этих целях реализуется Государственная программа развития сельского хозяйства и регулирования рынков сельскохозяйственной продукции, сырья и продовольствия на 2013-2020 годы.

Однако в условиях вступления России в ВТО возможности по использованию значительной части инструментов государственной поддержки не возможно в полном объёме, так как условиями соглашения предусмотрены существенные ограничения по размерам финансовой поддержки АПК. Поэтому необходимо пересмотреть применяемые методы и перенаправить финансовые потоки на реализацию механизмов государственной поддержки, входящих в состав зеленой корзины и не имеющих ограничения.

Деятельность аграрных товаропроизводителей подвержена значительно большему количеству рисков, чем представители других отраслей экономики. Это связанно с тем, что результаты их деятельности существенно зависят от природно-климатических условий в которых они находятся, особенно это касается предприятий, занимающихся растениеводством. Непредсказуемость и существенная вероятность

потерь от воздействия погодных условий, оказывающих влияющие на общие результаты деятельности сельскохозяйственных предприятий, говорит об актуальности применения страхования. Поэтому, одним из механизмов государственной поддержки которое необходимо развивать и увеличивать финансирование является страхование в сельском хозяйстве. Это направление наиболее перспективное в сложившихся экономических условиях, однако, государство еще недостаточно уделяет ему внимания.

В настоящее время институциональная инфраструктура российского страхового рынка представлена взаимодействием страховых компаний, сельхозтоваропроизводителей и государства в лице Правительства.

В последние годы четких тенденций развития рынка агрострахования не выделяется. Так, в 2014 году сельскохозяйственное страхование оказалось одним из самых динамичных сегментов страхового рынка по темпам своего развития. По данным статистики ЦБ РФ и Национального союза агростраховщиков, в 2014 году рынок агрострахования России продемонстрировал темпы роста, почти в два раза превысившие темпы развития всего страхового рынка. Доля сельхозстрахования (с господдержкой и без) в общей структуре рынка РФ в 2014 году составила 1,7% от премии (по сравнению с 1,6% годом ранее). Доля сельхозстрахования, осуществляемого на условиях господдержки – 1,5% [10].

Следует отметить, что в 2015 году сектор агрострахования не смог сохранить заданные темпы развития. Доля страховых премий сократилась практически в 2 раза по сравнению с предыдущим периодом и составила 0,8% от общего объема рынка.

Первое полугодие 2016 года было отмечено ростом премий и укрупнением страховых договоров. По результатам периода январь-сентябрь 2016 года объем рынка сельхозстрахования в России составил 7,35 млрд. руб., что на 11% больше результата аналогичного периода прошлого года (6,65 млрд. руб.). Следует отметить, что порядка 87% начисленных премий приходится на договоры с господдержкой.

Проведенное исследование показало, что в настоящее время наиболее востребованным является страхование сельскохозяйственных культур с государственной поддержкой. При этом, наметилась негативная тенденция по участию товаропроизводителей в данном виде страхования. Так в 2014 году 62 субъекта Российской Федерации охвачены страхованием урожая сельскохозяйственных культур с государственной поддержкой (аналогично 2011 году) против 56 в 2015 году [3].

Следует отметить сложность данного вида страхования для страховых компаний. Так в России на конец 2015 года было зарегистрировано 326 страховых компаний и 103 брокерские фирмы, лишь 43 из них прямо или косвенно занимались сельхозстрахованием. В то время как в 2007 году сельскохозяйственное страхование с государственной поддержкой осуществляли 69 страховых организаций, в 2011 году – 54 компании.

Наибольшее количество договоров страхования в 2014 году было заключено страховыми организациями ООО «СО «Помощь»– 732, ООО СК «Еврострахование» - 532 (по состоянию на 15.01.2016г. лицензия отозвана) и ООО «Русское общество страхования «РОДИНА» – 506 договоров (по состоянию на 15.01.2016г. лицензия отозвана) [11].У ООО «СО «Помощь» в сентябре 2015 года действие лицензии было приостановлено, но после устранения предписаний Банка России с декабря 2015 года – возобновлено.

В 2015 году ТОП-5 агростраховщиков по количеству заключенных и просубсидированных договоров страхования сельскохозяйственных культур составляли: ООО СК «Полис» (10,3% от общего количества договоров), ООО «Росгосстрах» (8,2%), ООО «СК «Высота» (6,5%), ООО «РОС «Родина» (6,4%), ООО СК «Еврострахование» (5,5%). Из них по состоянию на 1 января 2016 года только ООО «Росгосстрах» имело действующую лицензию и право на осуществление агрострахования с господдержкой.

С 1 января 2016 года заключать договоры сельхозстрахования с господдержкой могут только компании – члены Национального союза агростраховщиков (НСА). На

НСА в соответствии с законом возложены обязанности по выработке единых правил и стандартов для системы агрострахования и отчету перед Банком России. Особое внимание уделяется работе с фондом компенсационных выплат, что позволит обеспечить защиту аграриев в случае банкротства страховщика. Следует отметить, что не смотря на доступность вступления в члены НСА для страховых компаний, по состоянию на 07.11.2016 года всего 25 страховщиков зарегистрированы в Союзе «Единое объединение страховщиков агропромышленного комплекса - Национальный союз агростраховщиков», при этом по состоянию на 16 марта 2016 года членами НСА являлись 19 страховых организаций, на 31 марта их стало 20. Сокращение рядов агростраховщиков было вызвано массовым уходом с рынка компаний альтернативной ассоциации «Агропромстрах», а также отзывом лицензий на право осуществления страховой деятельности. В подавляющем большинстве компании теряли лицензии по причине финансовой неустойчивости и несоблюдения требований Банка России.

Экономическая нестабильность оказывает существенное влияние на уровень спроса на рынке агрострахования. Данная зависимость хорошо прослеживается по количеству хозяйств, застраховавших свой урожай. Так в 2003 году (период начала выделения субсидий) их было 2310, в 2007 году уже 10143, тогда как в 2010 году всего 3919. Следует отметить, что за период 2011-2014 годов наблюдалась стабильная тенденция роста числа страхователей и в 2014 году договоры страхования урожая с государственной поддержкой были заключены 5827 хозяйствующими субъектами. В 2015 году происходит резкое сокращение (практически на 40%) количества хозяйств, получивших субсидии по заключенным договорам страхования урожая сельскохозяйственных культур и многолетних насаждений до 3619 единиц.

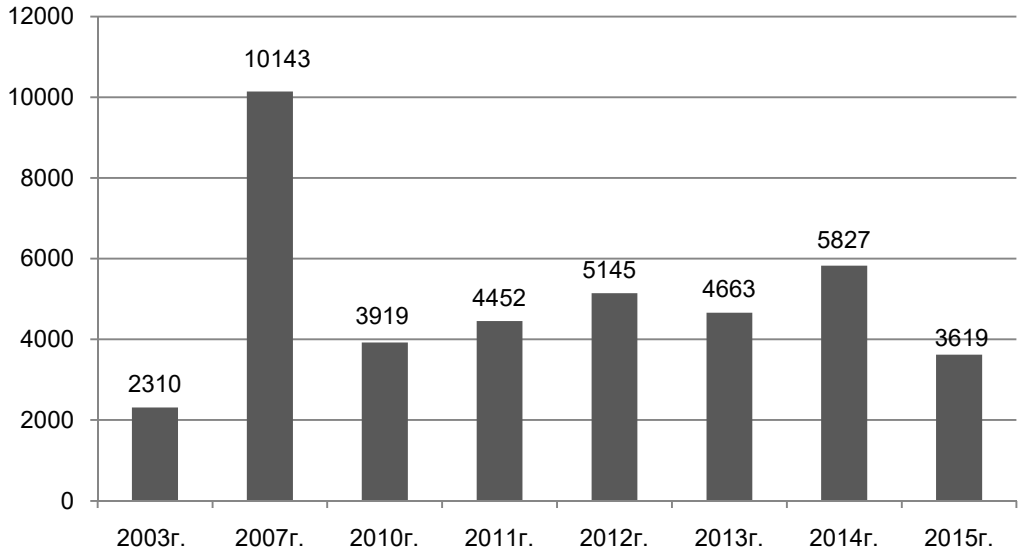

Рисунок 1 – Количество хозяйств, заключивших договоры страхования урожая сельскохозяйственных культур и многолетних насаждений с господдержкой

Агрострахование с государственной поддержкой продолжает свою ориентацию преимущественно на корпоративных клиентов. Из 3619 договоров страхования в аграрной сфере 2569 (71% от общего количества) заключено с сельскохозяйственными организациями.

Удельный вес застрахованной посевной (посадочной) площади в 2015 году составил 10,9% (застраховано 8,3 млн га),против 17,7% (12,8 млн га) в2014 году,при этом максимального значения он достигал в 2011 году – 20,1% (размер застрахованной площади – 14,2 млн га). В то время как согласно Государственной программе развития сельского хозяйства и регулирования рынков

сельскохозяйственной продукции, сырья и продовольствия на 2008-2012гг. в 2012 году эта величина должна была составить - 40% [3]. Данный показатель вряд ли будет достигнут в ближайшей перспективе.

Суммарная страховая премия по договорам сельхозстрахования с государственной поддержкой сохраняет темпы роста и увеличивается в первом полугодии 2014 года на 51,2 % по сравнению с аналогичным предшествующим периодом [10]. По размеру полученных страховых премий в 2014 году лидирующие позиции занимают ООО «Росгосстрах» – 1 591,5 млн рублей или 13% от общей суммы полученной страховой премии, ООО СК «Еврострахование» –1 002,8 млн рублей или 8% (по состоянию на 15.01.2016г. лицензия отозвана), ОАО СК «МРСК» - 986,4 млн рублей или 8% (по состоянию на 15.01.2016г. лицензия отозвана) [11].

Общая сумма оплаченных страховых премий за 2014 год по просубсидированным договорам страхования урожая сельскохозяйственных культур и многолетних насаждений составила 12265 млн. руб. В 2015 году,вследствие замедления темпов роста данного сегмента рынка,объем полученных страховых премий составил 8710 млн. руб.Из них 6081 млн. руб. (69,8%) пришлось на 11 компаний: ООО «Росгосстрах», ЗАО СК «РСХБ-Страхование», ООО СК «Полис»*, ОАО «АльфаСтрахование», ООО СК «АгроС»*, ЗАО СГ «Авангард-Гарант», ООО СК «Высота»*, ООО СК «Еврострахование»*, ООО СК «Практика»*, ОАО КСК «ПОДДЕРЖКА. ИРКУТСК»*, ООО «Балт-Страхование»* (* лицензия отозвана)

Следует отметить, что развитие указанного сегмента страхового рынка и рост объемов собранных в нем премий в значительной степени обеспечивают предоставляемые государством субсидии [6].

Таблица 1 – Субсидии на возмещение части затрат на страхование урожая культур и посадок многолетних насаждений, млн. руб.

Показатели	2008 г.	2009 г.	2010 г.	2011 г.	2012 г.	2013 г.	2014 г.	2015 г.
Субсидии из федерального бюджета РФ	3400	2494,9	3503,6	5000	4541,1	4397,1	4931,0	4279,0
Субсидии из бюджетов субъектов РФ	878,5	1101,6	792,7	889,5	766,3	686,0	1141,1	

Следует отметить, что объемы реально полученных субсидий отличаются от плановых показателей. Так в 2015 году по решению Правительства РФ на возмещение части затрат по сельскохозяйственному страхованию должно было быть предоставлено 5480,9 млн. руб., фактически было перечислено 4684,0 млн. руб., т.е. 85,5%.

Объем выплат по всем видам страхования агрострахования в 2015 году составил 2,7 млрд. руб., в том числе 0,9 млрд. руб. (33,3%) по договорам заключенным с господдержкой. По итогам 2014 года данный показатель составил 5,4 млрд. руб., из которых 2,6 млрд. – по страхованию на условиях господдержки и 2,8 млрд. руб. – по страхованию без господдержки. В 2013 г., когда выплаты составили 5,8 млрд. руб., из которых 3,5 млрд. руб. – по страхованию на условиях господдержки и 2,3 млрд. – на условиях без господдержки.Таким образом, за 3 года объем выплат сократился практически в 2 раза, в том числе по субсидируемым договорам на 74,3%, по несубсидируемым на 21,7%. [3].

Проведя анализ тенденций и закономерностей развития агрострахования за последние годы можно отметить ряд факторов, оказывающих негативное влияние на уровень его развития.

Так как страхование, с финансовой точки зрения, услуга довольно дорогая, а катаклизмы случаются не каждый отчётный период, большинство товаропроизводителей воздерживаются от данного варианта управления рисками. Низкая информативность агропроизводителей о существующей страховой защиты; недостаточная правовая грамотность; отсутствие у сельскохозтоваропроизводителей

оборотных средств на уплату страховой премии по договорам, также отрицательно сказываются на динамике рынка.

Основную долю на рынке агрострахования занимают договоры с господдержкой. Однако, данный вид страхования имеет довольно жесткие условия, снижающие его привлекательность и сдерживающие его развитие. В частности культуры, урожай которых страхуется, должны быть включены в Госреестр, т.е. у сельхозтоваропроизводителей нет возможности защитить себя от рисков при апробировании новых сортов; риски универсальны для всех регионов России, что абсолютно не эффективно с точки зрения различий в природно-экономических условиях; не учитывается качество урожая, которое оказывает существенное влияние на получаемые доходы.

Следует отметить, что страховщики продолжают сдерживать объём предложения услуг агрострахования без государственной поддержки, опасаясь частоты страховых случаев, отсутствия специализированных кадров в области оценки рисков при урегулировании убытков и недобросовестных клиентов, в связи с отсутствием единого «чёрного списка». В тоже время, по итогам 9 месяцев 2016 года ситуация изменяется в лучшую сторону, не смотря на снижение объемов страховых взносов на 5 %, так как за 2015 год наблюдалось падение данного сегмента рынка почти в 2 раза.

Сдерживает развитие страхование в аграрном секторе России недостаточность соответствующих перестраховочных ёмкостей. В 2015 году всего 12% премии было передано в перестрахование, против 20% в 2014 году. Риски в перестрахование принимали 18 страховых компаний, из которых в настоящее время к 10 применены лицензионные санкции. Для обеспечения благоприятного климата развития рынка перестрахования в условиях санкционного режима, следует стандартизировать национальные положения, рейтинговую оценку компаний в рамках Евразийского союза. Как уже отмечалось ранее, негативно отражается на темпах развития рынка агрострахования не доперечисление субсидий, задержки по их выплатам.

Таким образом, страхование в агропромышленном комплексе России в последние годы начинает развиваться. Однако этот процесс связан со значительным количеством преград и проблем. В первую очередь это связано с недостаточным количеством квалифицированных специалистов, которые разбираются не только в страховании как финансовом инструменте, но и имеют представлении о специфики работы в сельском хозяйстве. Решение этой проблемы должно быть приоритетной задачей аграрных ВУЗов России.

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IMPROVING AGRICULTURAL FARM SPECIFIC EFFICIENCY AND WHEAT PRODUCTIVITY IN PERSPECTIVE OF MICROCREDIT: IMPLICATIONS FOR FOOD SECURITY IN PAKISTAN

Rasheed Rukhsana, **Li Cui Xia**, **Ishaq Mazhir Nadeem***
College of Economics & Management, Northeast Agriculture University, Harbin, China

Latif Majid
Department of Agricultural Economics, Northeast Forestry University, Harbin, China

*E-mail: mazhir.nadeem@yahoo.com

ABSTRACT
Microcredit is considered to be an efficient tool for making direct or indirect improvements in farm production, income generation and poverty reduction. This study was conducted in four districts of Punjab province of Pakistan. The primary objective of this study was to explore the nature of relationship and the extent of influence of microcredit on farm efficiency, wheat production and food security. Primary data was gathered from field survey through a structured questionnaire. Stochastic frontier analysis (SFA), propensity score matching (PSM) technique and inefficiency effects model were applied for data analysis. Results of stochastic frontier analysis showed that in farm production, there exists substantial amount of inefficiency. Among farm inputs, fertilizer followed by irrigation and machinery were the dominating factors in explaining the variability on farm performance while labor and seed have relatively smaller effects. Outcomes of inefficiency effects model revealed that microcredit, education and farming experience help farmers a lot in efficient utilization of farm inputs. Microcredit borrowers had 1.56 percent higher level of farm efficiency as compared to non-borrowers. Results of propensity score matching confirmed a positive influence of microcredit on farm income. Average income of microcredit borrower was 8.32 percent higher than non-borrower. Overall the impact of microcredit on farm productivity and efficiency was positive which one hand improve farmers' income level and purchasing power, while one other hand, it contribute to strengthens the food security by increasing wheat supply.

KEY WORDS
Microcredit, farm productivity, efficiency performance, inefficiency effects, wheat production, food security, Punjab.

Food is the very basic need of human body. Food security can be defined as the existences of sufficient, safe and nutritious food available on sustained basis for all people in all times at prices commensurate with their income (Economist, 2012). In developing countries, the marginal and small farmers usually possess limited financial resources. To produce higher crop yield, these financial constraints restrict those farmers to use optimal level of farm inputs along with new production technologies. Such production constraints lead to lower the agriculture efficiency performance which become a reason for lower production of food crops such as wheat. Household lower income level reduce their purchasing power especially when there is less food supply (Islam and Maitra, 2012). Higher prices and inadequate stock of food in market influence the affordability of food which become a threat for food security. Therefore, planning for an efficient and sustained food production with affordability should be an imperative aspect for a long-term food security policy of any country.

Pakistan is an agriculture based economy and this sector the main supplier of food in the country. Wheat bread is the staple diet of 190 million human population of Pakistan. Food security can be attained by increasing the yield of food crops i.e. wheat and rice. Agriculture

farming in Pakistan is characterized by small and marginal farmers that hold less than 5 acres land area. These small farmers constitute 64 percent of total farms but cultivate only 19 percent of the total farm area (Economic survey of Pakistan, 2016). In order to obtain higher production of food crops, timely and adequate application of farm inputs are required which cannot be provided until farmers have sufficient funds. Hence, to perform necessary farm activities marginalized farmers need financial assistance either from formal or informal credit sources. Past studies (Stiglitz, 2000; Li, et al., 2011; Tu, et al., 2015) suggested that credit is a crucial factor to ascertain sustainable development in agriculture.

Agriculture productivity and farm performance can be enhanced by applying improved production technologies which lead to more food production and ensure food security. However, due to lack of collateral guarantee the small farmers have little access to obtain credit from institutional sources of credit i.e. commercial banks and agricultural banks. In Pakistan, group lending approach is practiced for providing small loans to the marginal or landless farmers. These small loans are collateral free and in case of loan default the members of a group are held responsible for each other. The conceptual framework developed for microcredit to act as developmental tool is displayed in Figure 1.

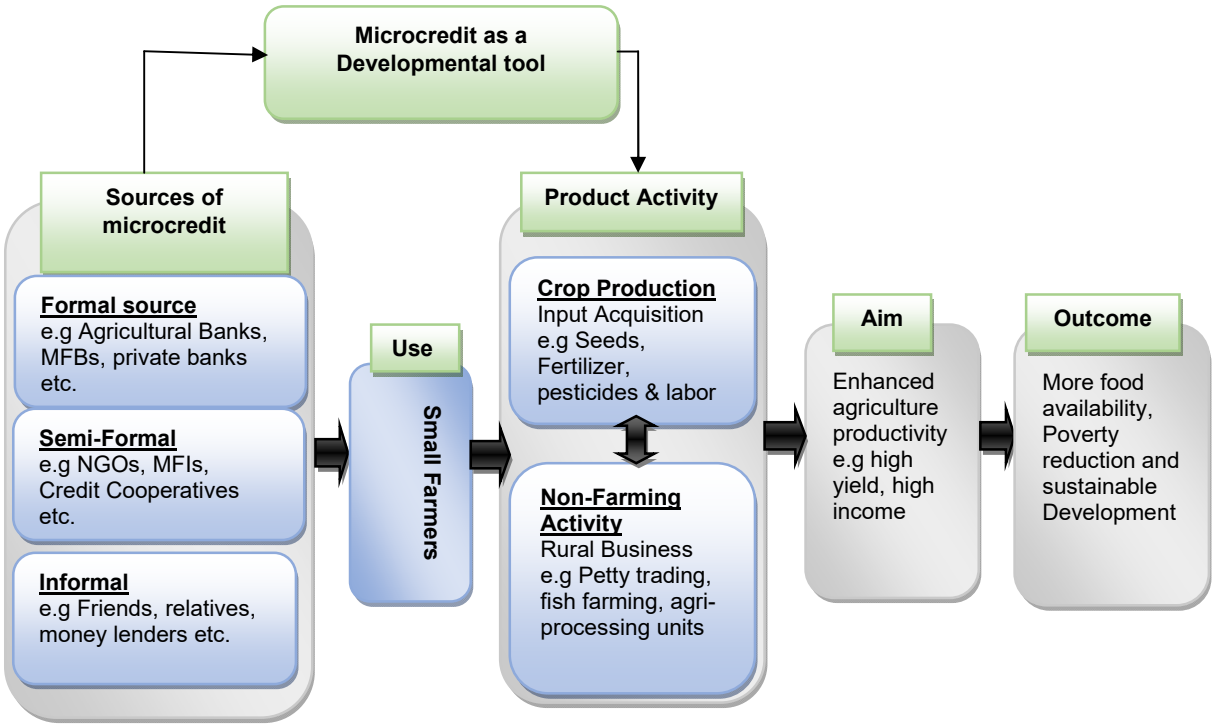

Figure 1 – Conceptual Framework

Golait (2007) conducted a study in India to discuss the performance of agriculture credit and the results revealed that credit flow to agriculture significantly increased the application of necessary farm inputs. He also suggested that credit services should be provided to a broader range of farmers through microfinance bank (MFBs), microfinance institutions (MFIs), NGOs, processors and input dealers on fair terms and low interest rate for sustainable agriculture performance. Akinsanmi and Doppler (2005) carried out a study in Nigeria to examine the aspects of agriculture resources and food security. They found that small farmers were crop oriented, retained little financial base, and had poor living standard. Large volume of their farm production was sold out but they spend less to meet food requirements. The incidence of food insecurity decreased if income and education of household is increased (Omonona and Agoi, 2007).

Javed, et al. (2006) concluded from a study conducted in Pakistan to examine the impact of microcredit on sugarcane and wheat productivity; that farm yield was increased and the living standard of farmers was also improved. They suggested that microcredit

facilities should be further expanded to agriculture community. Studies in literature (Vaessen, et al., 2014; Anang, et al. 2016; Osman, 2016) suggested that a double-edged impact on food security could be ascertained from microcredit. One impact of credit could be that it would facilitate the farmers to use the optimal level of inputs at the right time. This practice could help to produce maximum crop yield which increase supply of food (availability of food). The second impact of microcredit could be that extra crop-yield would increase farmers' income level which would improve their purchasing power (accessibility) for other food items.

To our knowledge, in Pakistan there is not a particular research that had studied the agriculture farm performance and factors of inefficiency linked to credit. In this study, we attempt to explore the existing farm inefficiencies on wheat production and its associated factors. Study evaluates that by incorporating microcredit, to what extent the farm inefficiency can be reduced. The specific objectives of this study were to: assess the impact of microcredit on wheat crop production; compare the levels of farm-specific efficiency between microcredit borrowers and non-borrowers; determine the nature of link between microcredit, farm efficiency and food security.

MATERIALS AND METHODS OF RESEARCH

Data source. Keeping in view the objective of this study, we collected primary data from wheat farmers living in the southern Punjab province, which was our study area. We selected 16 villages based on purposive sampling from four districts i.e. Vehari, Lodhran, Bahawalpur and Rahimyar Khan. These districts are highly concentrated with agriculture and livestock farming. Farmers of these 16 villages were our sampling frame, from which 231 farmers were included in the sample size of this study. From these 231 farmers, 118 were microcredit borrowers (treatment group) who had taken credit different sources for agricultural purpose and 113 were non-borrowers (control group). During sample collection, it was ensured that farmers having similar socioeconomic conditions should be included in the both control and treatment groups. A comprehensive questionnaire was developed to gather the relevant data in perspective of study objectives. Warwick and Lininger, (1975) approach was observed to collect reliable and valid data. Field survey questions were simple to understand that contained information about personal and agriculture farming. The personal information include such as their age, education, farming experience and family size. While the farming questions were concerned with farm input and output information such as land, seed, fertilizer, irrigation, labor, yield obtained, selling price and microcredit taken. Table 1 showed the sample distribution of farmers who were microcredit borrowers and non-borrowers across the four selected districts of Punjab province.

Table 1 – Name of Districts Surveyed and Number of Farmers interviewed from southern Punjab

Districts Name		Number of Farmers interviewed from		Aggregate
		Microcredit-borrowers	Non-Borrowers	
1	Vehari	29	26	55
2	Lodhran	30	28	58
3	Bahawalpur	32	31	63
4	Rahimyar Khan	28	26	54
Total		118	113	231

Source: Authors' field survey information, 2016.

Conceptual framework of Agriculture Efficiency Performance. Farrell (1957) first presented the concept of efficiency measurement. The distinctive feature of 'Farrel' efficiency measures were the assumption of constant return to scale (CRS) and less restrictive technologies. An economic efficiency consist of two parts: technical and allocative efficiency. In perspective of agriculture sector, technical efficiency deals with to achieve maximum level of farm production from a given level of farm inputs, keeping the production technology fixed. In agricultural production, farm-inefficiencies always exist due to certain factors such as; lack of improved technology, less information, limited access to capital lack of agricultural

extension services and inappropriate allocation of farm input resources. The concept of technical efficiency can be explained diagrammatically as in Figure 2. Assume that production activity of a farm by applying a linearly homogenous production technology produces a single output *Y* through a given set two inputs X_1 and X_2. The frontier isoquant *II'* intersect the line 'OB' at point *'T'* which represent a technically efficient combination of inputs '$X_{1'}$ and 'X_2'for this technology, as it lies on the frontier isoquant *II'*. The distance between point 'B' and 'T' represent the amount of technically inefficiency by producing the same level of output from both inputs. Usually, it is written in the percentage terms 'TB/OB'.

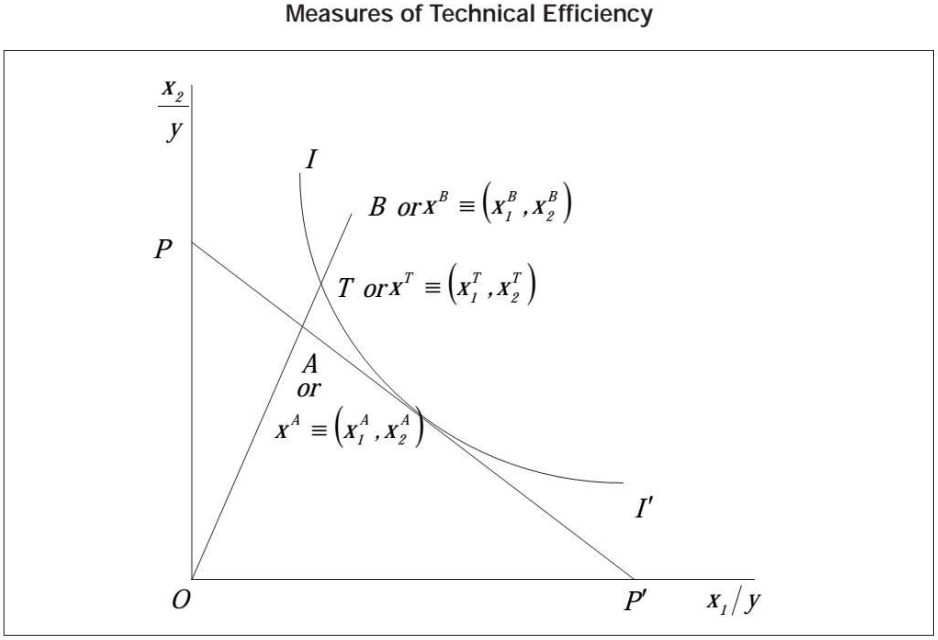

Figure 2 – Graphical representation of Technical Efficiency

A farm producing at point 'T' is fully efficient because its production scale is found efficient and frontier isoquant *II'*. Farm technical efficiency at point B can be expressed as:

Technical efficiency= OB/OT

Technical inefficiency = 1- TB/OB

Generally, the technical efficiency lies between 0 and 1 representing minimum to maximum level of output from given inputs with existing technology. Hence, 1- TE represents technical inefficiency that is actually a gap between actual production and optimal attainable production.

Stochastic frontier production model (SFA). The model of stochastic frontier analysis has two components: the first part is concerned with measurement of physical inputs in a production structure whole the second part deals with those factors that are not directly involved in production function but they are capable enough to affect the production activity. One such factor in our case is microcredit borrowing, as it is not a direct part of physical inputs (seed, fertilizers, pesticide) but may influence or facilitate agriculture production secondarily. Comprehensive reviews of SFA model had been provided by Green (1993), Fired et al. (1993) and Battese (1992). SFA model can be defined as:

$$Yi = f(X_i;\beta)e^{\mu i_i} \quad (1),$$
$$\mu_i = \xi_i - \zeta_i, i = 1,2,3 \dots \dots \dots q,$$

Where: Yi denotes the output level of i^{th} farms; Xi represents a vector of q inputs; β shows the parameters; μ represent error term of production function.

The error term is decomposed into two parts; stochastic symmetric random error (ξi) and asymmetric random errors (ζi). The stochastic error ξi take account the measurement of errors caused due to factors that are not under the control of the farmers; whereas, the ζi account for technical inefficiency for production technology. The ξi gives rise to the stochastic frontier while taking any real value when added to the deterministic frontier. However the value of ζi lies between 0 and 1, so when it is 0 then the production function will produce maximum level of farm production from available quantities of farm inputs; but, when ζi>0, then the farm production will be less due to the presence of technical inefficiency.

$$\varphi_i = \frac{Y_i}{Y_i^*} = \frac{f(X_i,\beta)e^{(\xi i-\zeta i)}}{f(Xi,\beta)e^{\xi i}} = e^{-\zeta i} \qquad (2)$$

The ratio of observed output of *i*th farms produced from the given levels of the inputs to the corresponding frontier output will give the measurement of farm-specific technical efficiency (*ϕi*), which can be written as above in equation 2. Technical inefficiency (1-TE) of each farm can be measured as:

$$\varphi_i = \left[\frac{1-\Phi\{\sigma_i^* - (\mu_i^*/\sigma_i^*\}}{1-\Phi(-\frac{\mu_i^*}{\sigma_i^*})}\right] e^{\left(-\mu_i^* + \frac{1}{2}\sigma_i^{*2}\right)} \qquad (3),$$

Where, it is assumed that systematic error is distributed independently and identically along the mean zero and variance $e^2_{\xi i}$.

Technical inefficiency effects model. This model is very effective econometric tool to measure the efficiency performance. Technical inefficiency is estimated by modelling as a function of microcredit and certain other socio-economic factors such as farmers' education, farming experience, and level of land fragmentation. Potential differences existed in farm-inefficiencies among various farmers may be due to the variations presented in the household socio-economic characteristics. Exploring the influence of these characteristics for technical inefficiency provides some explanations regarding the nature of impact on efficiency performance. Hypothetically, technical-inefficiency is to be estimated by incorporating the variables such as: microcredit taken, farmers' education, farming experience and level of land fragmentation.

$$IE_i = \delta_0 + \delta_{1zi} + \delta_{2zi} + \delta_{3zi} + \delta_{4zi} + w_i \qquad (4),$$

Where: IE represent farm inefficiency; zi denotes factors of microcredit, education, experience, and land fragmentation; wi shows stochastic random error that is assumed to be normally distributed.

This model quantify the factors (zi) coefficients with a positive or negative sign to explain nature of influence on farm inefficiency. Analysis results recommends some policy implications to increase farm productivity which subsequently enhance food security through reduction of farm inefficiency.

Propensity Score Matching (PSM) technique. Impact assessment of microcredit intervention in agriculture production can be carried out by making a comparison between treated group (microcredit borrowers) and control group (non-borrows). Microcredit impact assessment on the average incomes of farmers from both groups was evaluated by using Propensity Score Matching (PSM) technique. Matching the outcomes for the treatment and control groups to estimate causal treatment effects has become a popular approach (Heckman et al., 1997; Dehejia and Wahba, 1999). However in non-experimental studies, treatment effects between treated and controls differ due the presence of many other factors. Hence, the estimation of mean effect of participating in a treatment (e.g. microcredit borrowing) requires making a match of mean output if they had not been treated (control group). Matching procedure for PSM technique can be described as:

Let Y_1 is the outcomes of a microcredit-borrowers and Y_0 is the outcomes of the same microcredit borrower individual if he does not receive microcredit. So the D= {1, 0} is a binary indicator (D=1 if borrowed microcredit, 0 otherwise). In our case to estimate the impact on average income of individual i, the match for observed household income would be:

$$Y_i = Y_{0i} + D(Y_{1i} - Y_{0i}) \qquad (5)$$

Following this procedure we attempt to identify; average treatment effects (ATE)=E(Y1–Y0) which denotes the difference between the average incomes of two groups:

- E (Y1 –Y0 |D=1) represents the average treatment effect on the treated that estimate the average income difference for the income which microcredit borrowers has earned and the income he would earned if not had borrowed credit.
- E (Y1 – Y0 |D=0) denotes the average treatment effect (ATE) on the non-treated which measures the income difference between the potential income that a non-borrower did not earn (D=0) and the real income that he had earned Y_0.

To estimate how microcredit borrowers would perform, if had not they received credit; propensity score matching (PSM) support this analysis by making a match for non-borrowing farmers.

RESULTS AND DISCUSSION

Table 1 showed the summary statistics of important farm indicators regarding the production of wheat. Five important inputs, seed, fertilizer, irrigation, machinery and labor were included in the empirical analysis. Average farm revenue was observed to be Rs. 35,720 (Pakistani Rupee). Coefficient of variations mentioned in Table 1, indicates variability of input/indicator use among sampled farmers. Irrigation cost represent 38.3 percent of average total variable cost (ATVC) which was major cost due to lack of irrigation water in the south region of Punjab province and farmers had to bear additional expenses for using ground water through tube wells or turbine water. Coefficient of variation for irrigation was 68.41. Second major cost was fertilizer that represents 33.6 percent of ATVC and C.V is 78.73. Machinery cost constitutes 16.50 percent of ATVC with C.A. of 81.23. Labor and seed costs showed 6.27, 5.84 percent of ATVC with C.V. of 81.87, and 62.94 respectively. Table 1 also presented the average amount of microcredit borrowing that was Rs. 7850/- with C.V. 95.64. The mean value of farmers' experience and schooling years was about 22 and 5 years respectively. The average land holding among farmers was 2.25 acre.

Table 1 – Summary Statistics of Farm Performance Indicators for Wheat Production

n/n	Mean	Coefficient of variation	Minimum	Maximum
Revenue earned (PKR)	35720	54.36	26000	51000
Irrigation	10284	68.41	7000	15000
Fertilizer	9022	78.73	3800	9510
Machinery	4430	81.23	3000	6200
Labor	1683	81.87	1300	2400
Seed	1568	62.9	850	1800
Amount of Microcredit borrowing	7850	95.8	0	30000
Farmers' experience	22	36.45	5	28
farmers, education	5	66.85	0	16
Land holding	2.25	66.75	0.5	5.5

Source: Authors' field survey results, 2016.

Findings of stochastic frontier model for microcredit borrowers and non-borrowers have been presented in Table 2. Results showed that the coefficients 'β' of five indicators were positive and significant except that labor. It was found that fertilizer had dominant contribution followed by irrigation and then machinery. Labor had also positive sign but it was not statistically significant representing a low influence.

Table 2 – Results of Stochastic Frontier Analysis (SFA) Model

n/n	Microcredit Borrowers (n-118)			Microcredit Non-Borrowers (n-113)	
	Parameter	Coefficient	t-ratio	Coefficient	t-ratio
Constant	β0	3.032	21.722	2.162	14.283
Land	β1	0.116	4.364	0.160	2.018
Labor	β2	0.089	1.685	0.109	2.106
Seed	β3	0.907	3.258	-0.023	-0.953
Fertilizer	β4	0.246	5.587	0.181	3.740
Irrigation	β5	0.193	3.647	0.224	5.321
Machinery	β6	0.1562	2.357	0.205	3.021

Source: Author's field data results, 2016.

Results of Table 2 also provided information for the findings relating to the microcredit non-borrowers. For microcredit non-borrowers all the coefficients 'β' were positive and significant except that of seed that was negative but insignificant. Irrigation was found a dominating factors. Machinery and fertilizers were the second and third dominating factors (Table 2).

The results derived from inefficiency effect model are presented in Table 3. It was found that coefficients for microcredit borrowing, framer's education and farming experience were negative which was expected.

Table 3 – Results of Inefficiency Effects model

n/n	Parameters	Coefficient	t-ratio
Constant	δ_0	0.192	12.2124
Microcredit taken	δ_1	-0.124	-1.1887
Framer's Education	δ_2	-0.497	-1.145
Farmer's experience	δ_3	-0.435	-1.3875
Land fragmentation	δ_4	0.1263	5.314
R-Squared		0.0862	-
DW-statistic		2.8091	-

Source: Author's field data results, 2016.

Results validated that educated farmers with more experience had performed more efficiently as compare to those with less experience and low education. This demonstrated that by applying the present production technology, the farmers that had taken microcredit and also possess more education & experience were in better position to efficiently utilize the farm inputs to obtain higher production. Increased wheat production will ensure the improvement in food security. The outcomes showed that the variable of land fragmentation had positive sign and significant (Table 3). This concluded that an increased level of land division/fragmentation leads to enhance farm-inefficiency during crop production. The possible justification for this finding may be that, marginal and small farmers were not capable enough to utilize farm inputs efficiently along with new technology on their small land area.

Outcomes of Farm-Specific Efficiency Performance. Table 4 presented the results regarding the frequency distribution of farm specific efficiency performance. Findings revealed that for microcredit borrowers, the estimated farm specific technical inefficiencies displayed a substantial level of variability. The efficiency level varies between 33-94 percent while its mean value was 80.21 percent having a standard deviation of 8.62 percent. Majority of farms (32%) were between 81-90 percent technically efficient.

Results for microcredit non-borrowers presented in lower section of Table 4 indicates that variability of farm specific efficiency ranges 36-94 percent with a mean value 78.61 percent and standard deviation was 9.78 percent. Outcomes revealed that majority of farms (30 percent) were 81-90 percent technically efficient followed by 25% farms were between 71-80 percent technically efficient. Only 8 farms were performing between 91-100 percent efficiency but among them none was to be fully (100%) efficient. This analysis proved that in order to attain maximum technically efficiency and farm productivity, there is still a

considerable room for making improvements. Furthermore, the comparison of mean efficiency between microcredit borrowers and non-borrowers proved that, microcredit borrowers were 1.56 percent more technically efficient than non-borrowers. Although making an improvement of 1.56 percent in farm specific efficiency was not remarkable but it recommend that microcredit can be applied as potential tool to reduce farm-inefficiency. Reduction in farm inefficiency could lead to enhance wheat production and food supply.

Table 4 – Frequency Distribution of Farm Specific Efficiency Index

n/n	Microcredit Borrowers		
Efficiency Index	Number of Farms	Percentage of Farms	Cumulative of Farms
0-50	6	5	6
51-60	11	9	17
61-70	22	19	39
71-80	29	25	68
81-90	38	32	106
91-100	12	10	118
Mean efficiency	Standard Deviation	Maximum Efficiency	Minimum Efficiency
80.21	8.62	95	39
Microcredit Non-Borrowers			
	Number of Farms	Percentage of Farms	Cumulative of Farms
Efficiency Index			
0-50	7	6	7
51-60	12	11	19
61-70	24	21	43
71-80	28	25	71
81-90	34	30	105
91-100	8	7	113
Mean efficiency	Standard Deviation	Maximum Efficiency	Minimum Efficiency
78.64	9.78	94	36

Source: Author's field data results, 2016.

Propensity score matching (PSM) technique had been applied for making an assessment of microcredit impact. Pair of microcredit borrower (treatment group) were matched with a non-borrower from control group. The matched pair was similar to other pairs except of microcredit factor. PSM technique enable to create a balance between treatment and control groups for drawing a casual inference. PSM results have been presented in Table 5.

Table 5 – Outcomes of Propensity score matching and Effects Microcredit borrowing

Indicators	Coefficient	t-ratio
Education	0.165	3.547
Experience	0.148	2.457
Land Fragmentation	0.104	1.9245
Goodness of fit	0.614	
Log likelihood	-327.248	
Effects of Microcredit Borrowing		
Mean of income earned by matched treatment group		26670
Mean of income earned by matched controlled group		24620
Impact of microcredit borrowing		2050

Source: Author's field data results, 2016.

Findings of PSM technique revealed that farmers with education and experience were more likely to borrow microcredit. Likewise, farmers with small land holdings would likely to receive microcredit rather than a farmer who owned large farm size. The overall impact of microcredit program was positive on farm productivity and income level (Table 5). For example, microcredit borrowers earned on an average 8.32 percent more than those of non-borrowers. This increased income level could improve the purchasing power of household to attain food security.

CONCLUSION

The primary objective of this study was to explore the relationship among microcredit borrowing and performance of farm-efficiency for wheat crop along with its link with food security. Results of stochastic frontier analysis (SFA) model demonstrate that the estimations of five farm inputs were positive and significant for output elasticities. For microcredit borrowers, fertilizer was dominating factor followed by irrigation and machinery. For non-borrowers, irrigation was dominating factor having 'β' value of 0.224, second was machinery (0.205) and fertilizer (0.181). The outcomes of inefficiency effects models provided a sign of negative relationship among farm inefficiency and microcredit; farmer's education, and, farming experience. This implied that farmers taken microcredit and having good education and greater farming experience are more likely to operate farm activities in a better way to attain higher level of wheat production. Land fragmentation was positively correlated with farm inefficiency which disclosed that as the level of land fragmentation increased, farmer became less efficient to manage its farm resource to produce higher yield. Farm specific efficiency performance for microcredit borrowers ranged from 39 to 95, with mean efficiency level of 80.21 percent. For non-borrowers, range of efficiency lies between 36-94; with a mean efficiency level of 78.61 percent. Efficiency index revealed that microcredit borrower's farm efficiency was 1.56 percent higher than non-borrowers. Hence, microcredit program proved as to be effective tool for increasing farmers' efficiency that could lead to improve wheat production and subsequently ensure food supply/security.

The findings of propensity score matching (PSM) analysis confirmed that there exist positive influence of microcredit towards wheat production and income generation. Results exposed that farmers having smaller land holding but more education and experience were more likely to receive microcredit from different financial institutions to perform their farm activities at the optimal level. Microcredit borrowers on an average earned more Rs.2050/- (Pakistani rupees) as compared to non-borrowers. This increased in farm production and income level of marginal and small farmers would, no doubt, assist them to reduce their poverty conditions. The reduction in poverty would ensure food security and food affordability. Finally based on the findings of this study, it could be suggested that policies for the timely and low-cost delivery of microcredit should be introduced in south region of Punjab province. Such policies would help the marginal and small farmers to operate their farm activities efficiently. Reduction in agricultural farm inefficiency could lead to improve farm production which subsequently improve food availability and food security.

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GROWING POPULARITY OF MAIZE CULTIVATION IN RANGPUR DISTRICT OF BANGLADESH : AN EVIDENCE FROM GANGACHARA UPAZILLA

Moumita Roy, Lecturer
BBA Professional Program, Habibullah Bahar College, Dhaka, Bangladesh
E-mail: moumita058@yahoo.com

Md. Touhidul Alam, Lecturer
Dhaka School of Economics, University of Dhaka, Dhaka, Bangladesh
E-mail: touhidul.alam@dsce.edu.bd

Md. Sajib Hossain, Senior Assistant Secretary
Bangladesh Knitwear Manufacturers and Exporters Association, Dhaka, Bangladesh
E-mail: sajibeconbd@gmail.com

ABSTRACT
Maize cultivation has been gaining popularly in the rangpur district of Bangladesh in recent years. The study is mainly an attempt to explore the reasons for the growing popularity of maize cultivation in the Gangachara upazila (Sub-district) of Rangpur district. It also examines the future viability of maize cultivation in this area. For data collection, three-stage cluster sampling method has been used to determine the setting of the study selecting 110 farmers who have been involving themselves in maize cultivation for at least ten years, by replacing traditional crops like tobacco and boro rice. Benefit-cost (ratio) analysis is carried out in the study for its purpose and it is found that the cultivation of maize is more profitable than that of boro rice and tobacco. Furthermore, water table data analysis in the study also reveals that the ground water level is depleting in the study area in rabi season and causing groundwater scarcity. Therefore, it would be viable to cultivate maize in the near future at the backdrop of the scarcity of the ground water as maize is less water-intensive crop than other traditional crops grown in this region.

KEY WORDS
Maize, crop diversification, cost- benefit ratio, water table, groundwater.

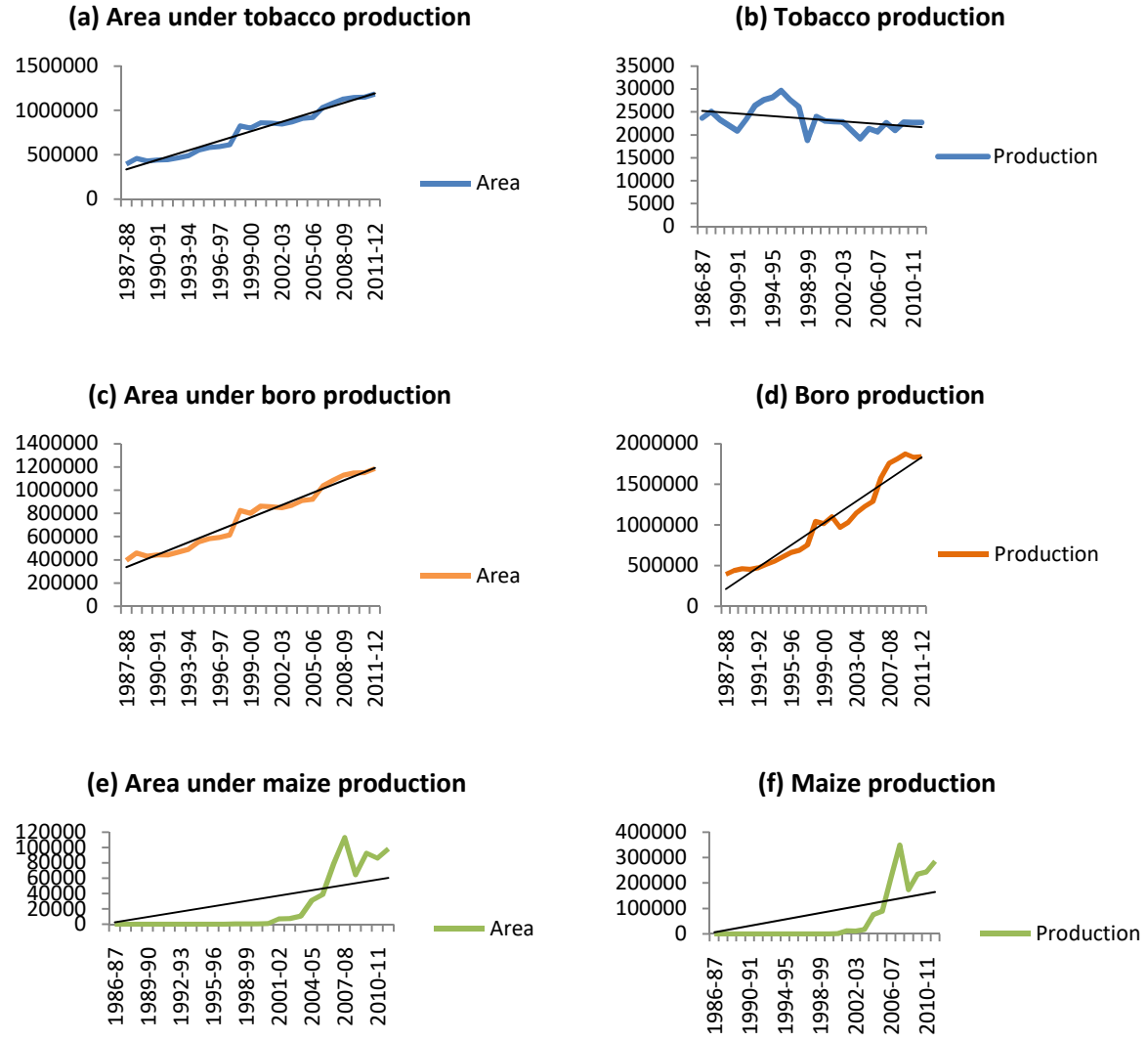
The replacement of traditional crops with the new profitable one is no longer a new phenomenon in the agricultural sector of Bangladesh. In this process, farmers tend to switch to a new profitable crop from their traditional crops and maize is such one of these switched crops, which is pivotal of this study. The cultivation of maize is gaining popularity among the farmers in the Rangpur district of Bangladesh. Both the area of cultivation and production of maize are increasing gradually because of its huge market demand for poultry, fish feed industry, bakery as well as other human consumer products. Maize provides food, feed, and fuel in rural areas of Bangladesh (OXFAM, 2013) and hence is creating its own demand.

According to Karim (1992), “Calorie yield per hectare of maize is one of the highest and cost per 1000 Calories from maize is one of the lowest among the crops”. Besides, Moniruzzaman *et al.* (2009) calculated Benefit-cost ratios of maize cultivation in the major maize growing areas, namely Chuadanga, Dinajpur, Bogra, and Lalmonirat districts of Bangladesh during 2006-2007 to know the profitability level of maize production and finally, the study is found maize cultivation more profitable. The study also identified the lack of capital and high price of Triple Superphosphate (TSP) fertilizer as the main constraint to the higher production of the maize.

Moreover, few recent studies conducted by Ali *et al. (*2009); Hasan (2008); and Mohiuddin *et al.* (2007) show that the cultivation of maize is increasing being more profitable than other crops such as boro rice, wheat and so on. But, so far, there is probably, no quantitative reasoning behind the growing maize cultivation in Rangpur District, particularly at

Gangachara upazila. For this reason, the study tries to fill the said gap. The main objective of the study is to explore the reasons for the growing popularity of maize cultivation in this area.

Overview of boro, tobacco, and maize production in Rangpur district. Boro rice is the most important and single largest crop in Bangladesh with respect to the volume of production and is transplanted in the winter season (December to February). Boro rice contributes to more than 55% to the total rice production during 2008-09 and its yield depends on a considerable part of irrigation and fertilizer management practices (Basak, 2011).



Source: Various issues of Yearbook of Agricultural Statistics of Bangladesh, 1990-2012.

Figure 1 – Area (in Acre) and Production (in MT) of tobacco, boro rice, and maize respectively in Rangpur district

Tobacco is a non-food crop and its cultivation requires a huge amount of fertilizers, pesticides, seeds, irrigation water and labor. Tobacco cultivation has been being introduced into the cropland of Testa-silt in Rangpur district since the mid-sixties of the past century and has been pushed by a multinational company named British American Tobacco and some local companies after the liberation of Bangladesh (Sarkar and Haque, 2001).

In contrast to boro rice and tobacco, maize is a food grain, which is a year-round crop. In Bangladesh, maize is cultivated mostly in rabi[1] and kharif-1[2] season. The production of maize doesn't require an extensive amount of water as is required for boro rice and tobacco production. But, quality of maize production, rather, requires the best quality of seeds and an appropriate amount of fertilizers at the right time.

To get an insight into the production scenario of boro rice, tobacco, and maize in the Rangpur district, secondary data for FY 1987-88 to 2011-12 are collected from the Bangladesh Bureau of Statistics (BBS) and analyzed. It is found that both the cultivated area and production for boro rice are in overall increasing trend over the time period [Figure-1 (c & d)]. As boro rice is a staple food of our country and so production and area are quite large in comparison to other crops. High-yield varieties seeds, availability of fertilizers, underground irrigation system, pesticides as well as new machinery have brought revolutionary change in boro production.

Despite Rangpur district is a drought- prone area, irrigation water supply from Barind Multipurpose Development Authority (BMDA) and application of deep tube well to bore water have made it possible to produce a huge amount of boro rice. At the same time, a production boom in maize has also been observed since the start of the new century [Figure 1e,f]. From 2000 to till now, both production and cultivation areas of maize have shown an overall increasing trend. On the other hand, areas under tobacco production have found to be increased over the period but its production has remained almost the same over the same period [Figure 1a,b] due to, perhaps, loss of soil fertility.

Similarly, for Gangachara upazila, it is found that the cultivation area of maize production stood at 3,200 acres, with an increase of 6% in FY2010-11, which was 3000 acres in 2009-10 while the production increased to 6,400 MT from 6,000 MT, 6% more than in the previous fiscal year. In the case of tobacco, the area of cultivation arrived at 13300 acres from 13250 acres with an increase in only around 0.4% increase while production reached to 7692MT with an increase in only around 1% from FY 2009-10 to FY 2010-11. And for boro rice, the production increased to 47800 MT with an increase of around 10% and the cultivation land is increased by only about 2% in FY 2010-09, compared to the previous fiscal year. It indicates that the cultivation of maize is gaining ground in this area (Based on Rangpur district Statistics, 2011).

MATERIALS AND METHODS OF RESEARCH

Selection of study area, sampling design, and data collection. Gangachara upazila of Rangpur district is selected as the study area, which is reputed for its tobacco cultivation for long. The upazila consists of 10 union parishads[3], 92 mouzas[4], and 128 villages. The total cultivable land in the study area is 38598 acres. Apart from maize, rice, tobacco, potato, and other vegetables are the main crops of the area. However, it is known that many farmers in that area have replaced their important traditional crops (i.e. tobacco, boro rice) with maize.

Keeping this view in mind, to examine the reasons for the increasing popularity of maize cultivation, the study is mainly carried out based on primary data with a sample size of 110 maize farmers. For selecting the farmers, three-stage random sampling is used in it. In its first stage, from among 10 (ten) union parisads (UPs), 2(two) UPs are selected randomly. From the selected UPs, in the second stage, 3 villages are randomly selected. And from those selected villages, a sampling list of 200 farmers, who have been cultivating maize by replacing boro rice and tobacco for at least ten years, is formed. Finally, from the sampling list, a total of 110 farmers are selected randomly for face to face interview from 15 to 25 November 2015 through a pre-designed semi-structured interview schedule.

In the study, the total production cost of maize per 25 decimal of land (locally known as

[1] *Winter/dry season, typically spanned along mid-October through mid-March.*
[2] *Summer or wet or rainy season, conventionally spread over the period of mid-April to mid-October.*
[3] *Union Parishad is the smallest administrative rural geographic unit comprising of mauzas and villages and having union parishad institution.*
[4] *Mauza is the lowest administrative unit having a separate jurisdiction list number (J.L. number.) in revenue records.*

don, which is a unit of measurement of land) and selling price of produced maize from that 25 decimal are collected from the 110 sampled farmers for the year 2005, 2010 and 2015. And finally, the arithmetic mean value of total production cost of maize and their selling price is taken. On the other hand, two FGDs are conducted separately to find out the average total cost of boro rice and tobacco production for 25 decimal of land and their selling prices from that 25 decimal are collected for the year 2005, 2010 and 2015. Each FGD has contained 15 farmers who involved in boro rice and tobacco cultivation for long. Furthermore, secondary data are collected from different research reports; journal articles and the published books to achieve the study objectives.

Analytical Framework. For the study, the general form of the benefit-cost ratio is used. In determining the cost, the total production cost is considered while profit is as the benefit. The cost of labor (own and hired), fertilizer, land preparation, irrigation, pesticide, land rent, and threshing per acre[5] of land are considered in calculating total production costs. To do the benefit-cost ratio analysis, the following formulas are considered:

$$\textit{Total cost} = \textit{Cost of Labor} + \textit{Cost of Fertilizer} + \textit{Cost of Land Preparation} + \textit{Cost of Irrigation} + \textit{Cost of Pesticide} + \textit{Cost of Land Rent} + \textit{Cost of Threshing}$$

$$\textit{Total Revenue} = \textit{Selling Price} * \textit{Production}$$

$$\textit{Total Benefit} = \textit{Total Revenue} - \textit{Total Cost}$$

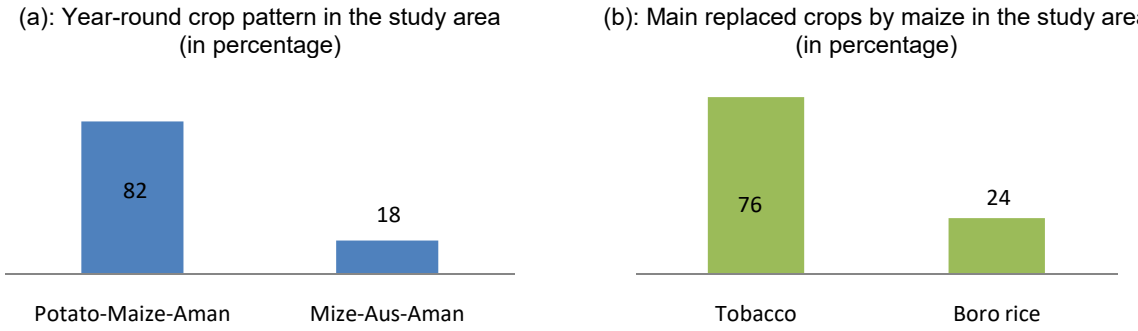
$$\textit{Benefit-Cost Ratio} = \frac{Total\ Benefit}{Total\ Cost}$$

RESULTS AND DISCUSSION

Descriptive Analysis:

Cropping pattern in the study Area. From the interview, it is observed that farmers are very careful in the selection of their round crops so that they can be able to get the maximum benefit. In the study area, two types of crop pattern are found and they are Potato-Maize-Aman and Maize-Aus[6]-Aman[7]. Potato-Maize-Aman crop pattern is found to be the most popular among the farmers as it is reported by about 82% of the respondents, because Potato-Maize-Aman crop pattern is economically beneficial which, requires less land, less organic fertilizer and plow as well. Maize-Aus-Aman crop pattern is followed by the rest of the 18% [Figure 2a].

Tobacco is found to be the major replaced crop by maize which is reported by 76% respondents. On the other hand, 26 respondents (24%) report that they have replaced Boro rice with Maize [see Figure 2b].

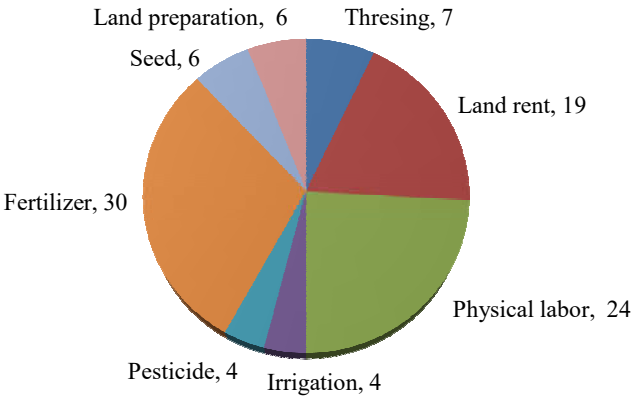


Source: Field Survey, 2015.

Figure 2 – Year-round crop pattern and main replaced crops in the study area

[5] *To get per acre of production cost, collected production cost for 25 decimal is multiply by 4.*
[6] *Aus, a type of rice grown in summer months.*
[7] *Aman, a type of winter rice.*

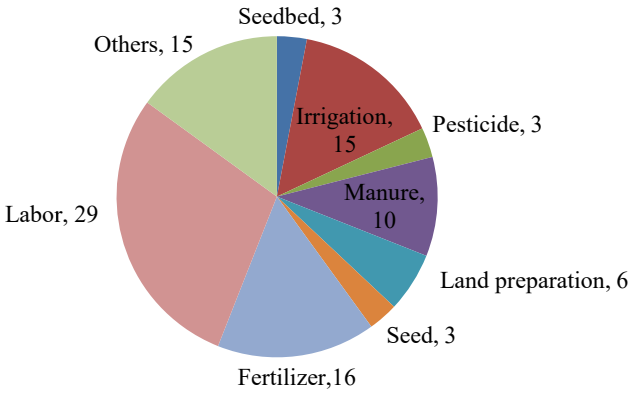
Production cost of maize, boro rice, and tobacco. The production cost of maize is quite lower (if we consider own labor cost) than that of boro rice and tobacco. Maize requires less water as well as fertilizers. The data reveals that for 25 decimal of land, the total cost of maize cultivation is about Tk.5, 000-6,000 And the majority of the cost goes to fertilizer, which is about 30% of the total cost. On the other hand, physical labor; land rent, threshing, land preparation, seed, irrigation, and pesticide account for 24%, 19%, 7%, 6%, 6%, 4%, and 4% of the total cost respectively (Figure 3).



Source: Field Survey, 2015.

Figure 3 – Production cost of maize (in percentage) in 2015

The production cost of boro rice is quite higher than maize. Most of the costs are alike maize, except for labor and irrigation. According to the interview data, it is found that per acre production cost of boro rice is around Tk.40, 000 and the lion's share of the cost go to labor, which accounts for 29% of the total cost. The cost of fertilizer, irrigation, and manure is about 16%, 15%, and 10% respectively. While Seedbed, seed, and pesticide account for 3% each of total cost. Finally, other costs which include: threshing, packaging, etc. responsible for 15% of the total cost.

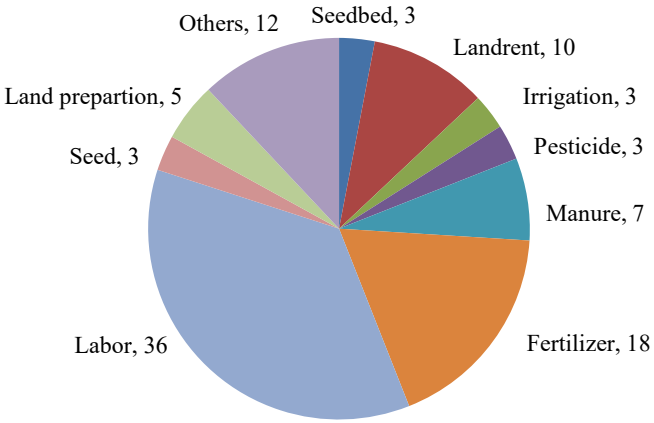


Source: Field Survey,2015.

Figure 4 – Production cost of boro rice (in percentage) in 2015

Tobacco is a luxury product and production cost of it is quite high. It is extensively produced in Rangpur district and is responsible for supplying one-third of the total production in Bangladesh. It needs more care as well as labor. In a nutshell, tobacco is a labor-intensive crop. So, a major portion of the cost goes into labor, which accounts for 36% of total production cost. Fertilizer is the second highest and that accounts for 18%. Other costs include threshing, drying, packaging, storing etc. which account for 12 percent. Land rent is

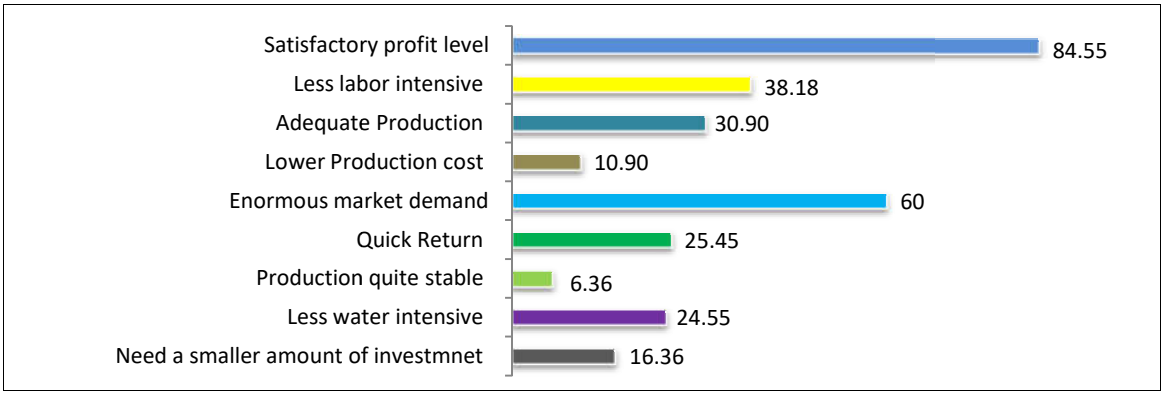
the fourth highest cost 10%. The cost of manure and land preparation is only 7% and 5% respectively. The cost for seedbed, seed, pesticide and irrigation all account for around 3% each of the total cost of production (Figure 5).



Source: Field Survey, 2015.

Figure 5 – Production cost of tobacco (in percentage) in 2015

Farmers' perception towards maize cultivation. From the field survey, it is found that about 16.36% of the respondents chose maize cultivation because they think maize requires a smaller amount of investment. Whereas about 25% of the respondents who once used to grow boro rice or tobacco on their farms, but now cultivate maize, has replied that maize is less water intensive. The statement that production of maize is quite stable is supported by 6.36% of respondents. Again, 25.45% of the respondents have agreed with this view that maize is a cash crop and quick return is possible in case of maize production. 60% of the respondents think that maize has gained popularity for its enormous market demand. In fact, this increasing market demand motivates the farmers to switch from their traditional crops to maize cultivation. On the other hand, about 11% of the farmers have agreed that the production cost of maize is low. About 31% of the respondents agree that there is an adequate level of maize production. Maize is less labor intensive, and about 38% of respondents have agreed with this statement. But, around 85% of the respondents have considered the satisfactory profit level as the reason for maize cultivation (Figure 6).



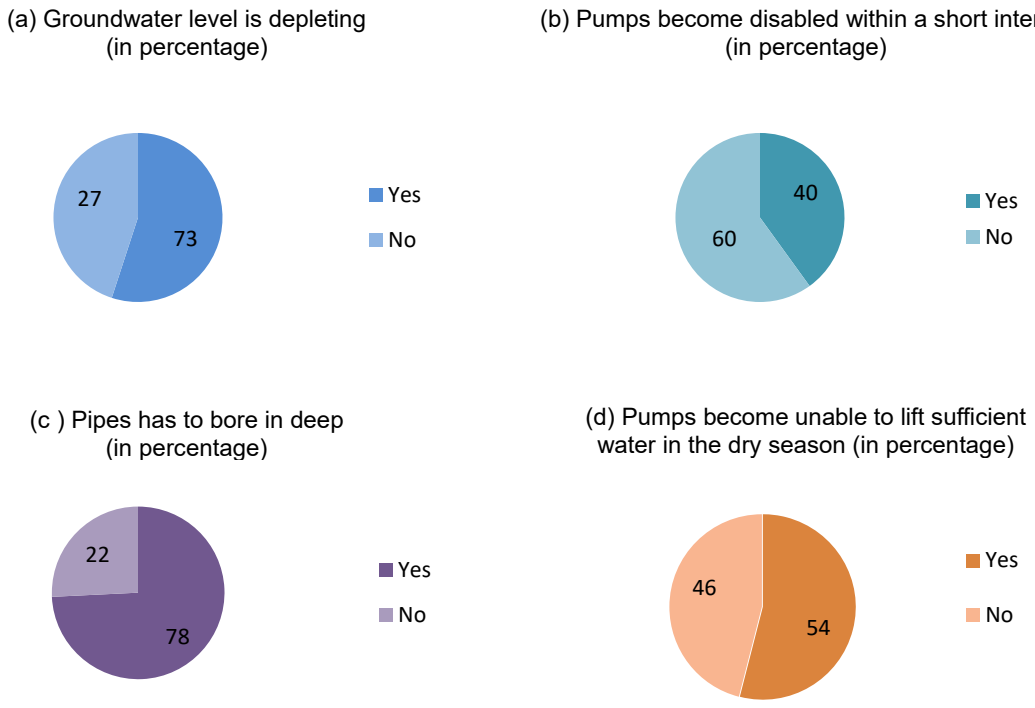
Source: Field Survey, 2015.

Figure 6 **–** Perception towards maize cultivation (in percentage) (multiple answers allowed)

Scenario of groundwater depletion in the study area. Farmers in Bangladesh are now experiencing groundwater depletion problem due to the extensive extraction of it. The northwestern part of Bangladesh also faces groundwater depletion problem because of its

drought-prone nature or being free from seasonal flooding due to water withdrawal from major rivers by upstream countries (Rahman *et.al,* 2012). Like other areas of the northern region, due to the unavailability of surface water, agricultural production at Gangachara upazila is totally dependent on the groundwater based irrigation system and groundwater is depleting gradually in robi season due to more extraction than its regenerating capacity. Boro rice, tobacco, maize, potato, mustard, spice, wheat, other vegetables are some major crops in the rabi season. And it is noted that cropping in rabi season is totally dependent on groundwater irrigation because it is a very dry season and rainwater is rarely found in this season. Furthermore, most of the farmers do not have an own irrigation system and have to depend on the rented irrigation supply by paying Tk.100 for 25 decimals of land for an hour as the irrigation cost. It is also known that there is no electricity connection in those villages of the study area and irrigation is totally fuel-based. So, the increase in the price of fuel is making the irrigation to be costly and ultimately hampers the boro rice cultivation. However, the study has, therefore, tried to show the scenario of ground water level on the basis of respondents' perception about it and water table data collected from the Bangladesh water development board.

Understanding the groundwater depletion from the farmer's perception. In the answer to the question whether the ground water level is depleting or not, most of the respondents (about 73%) say that the ground water level is depleting. And the remaining 27% respondents do not agree to or do not know whether the ground water level is depleting [Figure 7a].



Source: Field Survey, 2015.

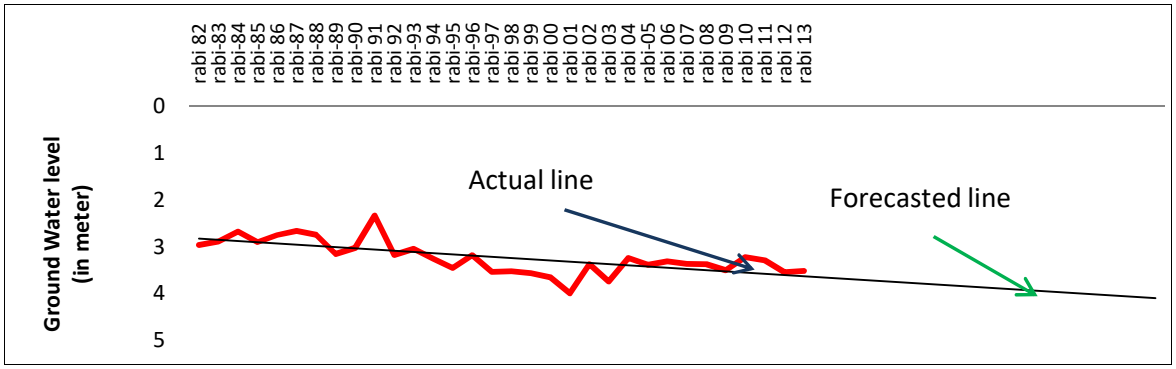
Figure 7 – Understanding the groundwater level depletion from respondent's perception

In the case of pumps become disabled within a short interval as an indicator for depletion of ground water level, 40% of the respondents say yes and make excessive water extraction as responsible for this type of disability. But, 60% of the respondents don't show their concern [Figure 7b].

Furthermore, 78% of the respondents say that in every year pipe of the pump is to set deeper because the pump is not able to lift sufficient water. To bore pipe in deep is one of

the signs that is ground water is continuously depleting. But, 22% of the respondents do not make any comment about it. On the other hand, 54% of the respondents say that in the dry season, the pump becomes unable to lift sufficient water and water contains sand and other materials. On the other hand, 46% of respondent do not agree with this matter [Figure 7c,d].

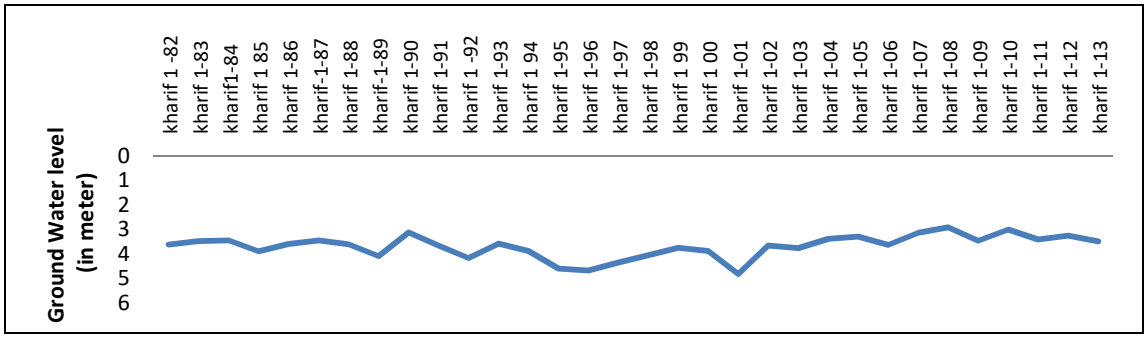
Water table analysis. Trend line forecasting of water table data reveals that in 2030, the ground water level will be about 4-meter depth from the surface in rabi season and that indicates severe water crisis for this season in the near future. In figure-8, the red line is the water table trend line (actual) and the black line is the possible scenario of the water level in 2030.



Source: Authors' compilation based on data from Bangladesh water development board (BWDB), 2015.

Figure 8 – Water table scenario for rabi season at the study area

But, like rabi season, the ground water level is not depleting in kharif-1 season (Figure 9). This stability of water table can be attributed to the rain of the rainy season and regeneration thereby (mid April-mid October). In this season, farmers tend to cultivate water intensive aus rice. Kharif-2 season's data are also available but has been discarded from the analysis because it is found that aman rice is the main adopted crop for this season and almost every farmer commonly cultivate aman rice in this season.



Source: Authors' compilation based on data from Bangladesh water development board (BWDB), 2015.

Figure 9 – Water table scenario for kharif-1 season at study area

Results of Benefit -Cost Analysis (Acre-based). In the study, the calculation of the B-C ratio is done for maize, boro rice, and tobacco cultivation respectively. From the analysis of the data, it is found that if the production cost of maize is Tk[9] 1(one) then it brings Tk. 1.40 from the market i.e. it creates a profit of Tk. 0.40 (forty paisa[8]) for the investment of Tk. 1(one) for the year 2015. Accordingly, maize brought a profit of Tk. 0.37 (thirty-seven paisa) and Tk. 0.29 (twenty-nine paisa) for the year 2005 and 2010 respectively (Table 1). So, it can be concluded that the profit of maize production is increasing gradually over the years.

[8] *Paisa is a monetary unit of Bangladesh; 1 paisa equal to one hundredth of 1 (one) Tk.*

In the case of boro rice production, for the investment of Tk. 1 (one), the incurred loss is Tk. 0.32 (thirty-two paisa) for the year 2015. On the other hand, for the investment of Tk. 1 (one), the incurred loss was Tk. 0.30 (thirty paisa) and Tk. 0.22 (twenty-two paisa) for the year 2010 and 2005 respectively (Table 2).

Table 1 – Results of benefit-cost ratio of maize cultivation

Particulars	2015	2010	2005
Production	61 maund[9]	53 maund	46 maund
Selling Price[a]	615	525	475
Total Return[a]	37,515	27,825	21,850
Total production cost [a]	26,777	20,265	17,000
Net return[a]	10,738	7,560	4,850
B-C ratio	1.40	1.37	1.29

Source: Field Survey, 2015.
[a]Selling Price, [a]Total and Net Return and [a]Total production cost reported in Tk.

Table 2 – Results of benefit-cost ratio of boro rice cultivation

Particulars	2015	2010	2005
Production	50 maund	44 maund	42 maund
Selling Price[a]	550	470	450
Total Return[a]	27,500	20,680	18,900
Total production cost[a]	40,438	29,500	21,500
Net return[a]	12,938 (-)	8820 (-)	2600 (-)
B-C ratio	0.68	0.70	0.88

Source: Field Survey, 2015.
[a]Selling Price, [a]Total and Net Return and [a]Total production cost reported in Tk.

Table 3 – Result of benefit-cost ratio of tobacco cultivation

Particulars	2015	2010	2005
Production	18 maund	17 maund	14 maund
Selling Price[a]	2,330	1790	1,445
Total Return[a]	41,940	30,430	20,230
Total production cost[a]	55,935	42,833	39,500
Net return[a]	13995 (-)	12403 (-)	19270(-)
B-C ratio	0.75	0.71	0.51

Source: Field Survey, 2015.
[a]Selling Price, [a]Total and Net Return and [a]Total production cost reported in Tk.

For tobacco production, the incurred loss is Tk. 0.25 (twenty-five paise) for the investment of Tk. 1 (one) in 2015. Similarly, the incurred loss was Tk. 0.29 (twenty-nine paisa) and Tk. 0.49 (forty-nine paisa) for the year 2010 and 2005 respectively for the same amount of investment (Table 3).

CONCLUSION

Maize has a huge potential market demand for its diversified uses and it can make a contribution to the overall socioeconomic development of its cultivation area. The study finds that the cultivation of maize is profitable whereas, other important traditional crops like boro and tobacco are incurring a loss in the study area. So, rational farmers in the study area prefer maize cultivation to other traditional crops due to its profitability.

The northern region of Bangladesh is totally dependent on the groundwater based irrigation system, but the soil of this region is gradually losing its soil moisture and the ground water level is alarmingly depleting. At the same time, surface water availability in this region is also found inadequate. Therefore, in this backdrop, less water intensive crop like maize is,

[9] *Maund is widely used in rural Bangladesh and India. 1 Maund equals to approx.37.32 kg.*

possibly the best solution to reduce the pressure on the ground water in this region in general and the study area in particular.

The study, lastly, calls for encouraging maize production on a large-scale by ensuring maize growers' access to quality inputs at reasonable rates and remunerative prices for their products in the market.

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AUTHOR CONTRIBUTIONS

All the authors have written the paper but Moumita Roy and Md. Touhidul Alam were actively involved in designing the study design, data collection and in analyzing the results. Both, Md. Touhidul Alam and Md. Sajib Hossain have interpreted analyzed results.

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МОФОБИОЛОГИЧЕСКИЕ ПАРАМЕТРЫ ПЕРСПЕКТИВНОГО СОРТА ОВОЩНЫХ БОБОВ В ПОЧВЕННО-КЛИМАТИЧЕСКИХ УСЛОВИЯХ ЦЕНТРАЛЬНО-ЧЕРНОЗЕМНОГО РЕГИОНА РОССИЙСКОЙ ФЕДЕРАЦИИ

MORPHOBIOLOGICAL PARAMETERS OF PROMISING VARIETIES OF BROAD BEANS IN SOIL-CLIMATIC CONDITIONS OF CENTRAL BLACK EARTH REGION OF THE RUSSIAN FEDERATION

Нго Тхи Зием Киеу, соискатель
Ngo Thi Diem Kieu, Post-graduate student
ФГБОУ ВО Орловский ГАУ, Орел, Россия
Orel State Agrarian University, Orel City, Russia
E-mail: nguyenkieunk@mail.ru

АННОТАЦИЯ

Исследования проведены в 2014-2016 гг. на базе Белгородского государственного национального исследовательского университета. Опытными объектами служили 24 сортообразца овощных бобов коллекции кафедры биотехнологии и микробиологии университета. Период вегетации овощных бобов длился в среднем 80 дней. У самых раннеспелых сортов его продолжительность в среднем составила 77, у наиболее поздних – 96 дней. Выявлено, что межфазные периоды вегетации до появления всходов и после цветения, тесно коррелируют с продолжительностью всего вегетационного периода (r=+0,61 и r=+0,87 соответственно). Выделены раннеспелые, высокопродуктивные образцы, с крупными семенами и высоким содержанием белка, которые предложены селекции, как перспективный исходный материал. Масса семян с растения положительно коррелировала с числом бобов (r=+0,8) и числом бобов на боковых побегах (r=+0,68), а число семян в бобе и размер бобов были отрицательно связаны с количеством плодов на растения (r=–0,46 и r=–0,54, соответственно). Высокий процент семенификации (81-82%) отмечен у сортов Белорусские, Белый жемчуг, Велена и Виндзорские. Содержание белка у опытных сортообразцов составляло 18-33%. Косвенным показателем его высокого значения в семенах генотипа может служить признак «число узлов на главном побеге» с обратной зависимостью (r=–0,4) и «масса 1000 семян» с положительной (r=+0,7). Наиболее распространенными и вредоносными заболеваниями овощных бобов были фузариоз, альтернариоз, аскохитоз, черноватая и шоколадная пятнистости, приводившие в годы исследований к потерям до 27% семенной продуктивности. При этом сортообразцы характеризовались формированием в ризосфере специфических комплексов микромицетов с преобладанием видов родов Penicillium, Aspergillus и Fusarium и усилением доли токсигенных, оппортунистических и аллергеных видов: *A.alternata, A.niger, A.ustus, C.krusei, F.oxysporum, S.solani, U.botrytis* – соответственно до 29%, 31% и 24%. В результате определены морфобиологические параметры перспективных сортов овощных бобов для ЦЧР как цели селекции по продолжительности периода вегетации; уровню семенной продуктивности и ее элементов; биохимическому составу семян; структуре микосообществ ризосферы и отношению к фитопатогенам.

ABSTRACT

Study was conducted in 2014-2016, based on the Belgorod state national research university. Experimental objects were 24 varieties broad beans of a collection of the department of biotechnology and microbiology. On average, the vegetation period of broad beans lasted 80 days. At the very early maturing varieties the vegetation period averaged 77, at the latest – 96 days. It was revealed that the interfacial vegetation periods before emergence and after flowering, which was closely correlated with the duration of the vegetation period (r=+0,61 and r=+0,87 respectively). Early-maturing, high-yielding with large seeds and high content of protein samples, which were offered breeding as the promising

initial material were obtained. The seed weight per plant was positively correlated with the number of beans per plant (r=+0,8) and the number of pods on the lateral stems (r=+0,68), number of seeds in a bean and the size of beans were negatively related to the number of pods per plants (r=–0,46 and r=–0,54 respectively). The high percentage of a semenification (81-82%) was observed in varieties of Belorusskie, Belyj zhemchug, Velena and Vindzorskie. The protein content in the experimental varieties was 18-33%. An indirect indicator of its high value in the seeds of the genotype may serve as a sign of “the number of nodes on the main stem” with the inverse relation (r=–0,4) and “weight of 1000 seeds” with a positive (r=+0,7). The most common and harmful diseases of broad beans were Fusarium root rot, Alternaria, Ascochyta, Stemphylium and chocolate leaf spot, which led to losses up to 27% of seed production in years of research. At the same time, varietise were characterized by forming of specific complexes of micromycetes in the rhizosphere with a predominance of species of the genera Penicillium, Aspergillus and Fusarium and increasing of the part toxigenic, allergenic and opportunistic species: *A alternata, A.niger, A.ustus, C.krusei, F.oxysporum, S.solani, U.botrytis* – 29%, 31% and 24% respectively. As a result, were determined the morphobiological parameters of promising varieties of broad beans for the CBR as the breeding purposes by the duration of the vegetation period; level of seed productivity and its components; biochemical composition of seeds; structure of rhizospheric micocomplexes and relation to phytopathogens.

КЛЮЧЕВЫЕ СЛОВА
овощные бобы, селекция, продуктивность семян, содержание белка, семена, косвенные признаки продуктивности, пятнистость листьев.

KEY WORDS
Broad beans, breeding, seed productivity, protein content, seeds, indirect signs of productivity, leaf spot.

Бобы овощные (*Vicia faba* L. var. *major* Hazr) очень древняя культура, чьи плоды давно начали употреблять в пищу, в том числе, как источник белка для бедных. Семена богаты растительным белком, содержат углеводы, растительную клетчатку, витамины, микро- и макроэлементы, другие полезные вещества. Обладая большим биоресурсным потенциалом, они претендуют занять ведущее место в развитии пищевых технологий третьего поколения, обеспечивающих более полную и глубинную переработку сырья с учетом химического состава и биологической ценности[1-6].

Культура имеет огромное значение в экологическом земледелии. Она способна повышать плодородие почвы и состав микроорганизмов, свободноживущих в почве. Овощные бобы являются лучшими предшественником для многих сельскохозяйственных культур, накапливая в почве до 50-80 кг/га азота [7].

Растения бобов богаты веществом L-допа (L-dopa), которое используется в медицине при лечении болезни Паркинсона [8].

В настоящее время под овощными бобами в мире занято примерно 2,5 млн. га [9]. В России площадь их возделывания небольшая, в основном сосредоточена в областях Нечерноземной зоны: Московская, Орловская, Тульская и др. Бобы в Западной Сибири выращиваются как огородная культура [5].

Сдерживающим фактором расширения посевов бобов в России является отсутствие сортов, максимально приспособленных к возделыванию в местных условиях. В Белгородской области, расположенной на ЦЧР посевы овощных бобов не имеют производственного значения, носят опытнический характер, а культура возделывается как садово-огородная. Поэтому, целью наших исследований было выявление морфобиологических особенностей перспективного сорта, как цели селекции овощных бобов в условиях Центрально-Черноземного региона.

УСЛОВИЯ, МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЙ

Исследования проведены в 2014-2016 гг. на кафедрах Института инженерных технологий и естественных наук и Ботаническом саду Белгородского государственного национального исследовательского университета (ФГАОУ ВО НИУ «БелГУ»). Объектами исследований были 24 сортообразца овощных бобов коллекции кафедры биотехнологии и микробиологии НИУ БелГУ: Аквадул, Батром, Белорусские, Белые крупноплодные, Белый жемчуг, Бобчинские, Виндзорские, Велена, Дачник, Детский восторг, Зеленый Джек, Изысканное блюдо, Кармазин, Лидер, Оптика, Розовый фламинго, Русские черные, Трижды белые, Царский урожай, Янкельбялы и 4 образца Бел-1, Бел-2, ВН-34, Гибрид-16.

Опытный материал выращивался на делянках площадью 5 $м^2$ широкорядным способом. Посев и уход проводили вручную с применением общепринятой методики Б.А. Доспехова [10] и в соответствии с требованиями зональной агротехники без применения удобрений и пестицидов.

Потенциальная семенная продуктивность (ПСП) определялась расчетным способом, исходя из количества заложившихся семязачатков и фактической крупности семян. Коэффициент продуктивности семяобразования ($К_{пр}$) рассчитывался отношением образовавшихся у растений семян к количеству заложившихся у них семязачатков, выраженное в процентах.

Материалами для микологических лабораторных исследований служили пробы почвы, собранные из прикорневой зоны 10-ти растений каждого изученного образца, также образцы листьев, стеблей, плодов и семян здоровых и больных растений.

Период вегетации овощных бобов в 2014 г. отличался сразу двумя засушливыми месяцами – март-апрель, когда создается основной запас влаги в почве для успешного протекания начальных этапов органогенеза бобов, и в июле, в период активного цветения и плодообразования. Тогда как в 2015 г. недостаток осадков отмечен на всем протяжении вегетации растений. В 2016 г., после очень влажного мая (период активного вегетативного роста растений) наступил сухой июнь (активное развитие генеративных органов).

Фенологические наблюдения осуществляли по общепринятой методике [11], а учет семенной продуктивности и составляющих ее элементов по И.В. Вайнагий (1974) [12].

Микологические эксперименты проводили в лабораторных условиях, оценивая основные болезни растений по их распространенности, интенсивности и развитию [13-14]. Для изучения микроморфологии и идентификации выделенных грибов использовали световой оптический микроскоп «Микромед-2» и видеоокуляр DCM 310 SCOPE. Определение болезней растений проводили с использованием специальных определителей.

Статистическую обработку полученных данных осуществляли в компьютерной программе Microsoft Excel.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Полученные экспериментальные данные подтвердили, что урожайность сельскохозяйственных культур есть интегральный показатель, отражающий эффективность взаимодействия генотипа со средой. Поэтому при отборе перспективного исходного материала для селекции следует опираться ни на один, а на комплекс признаков, наиболее тесно связанных с продукционным процессом растений, учитывая при этом их генотипическое и фенотипическое проявление.

1. Продолжительность вегетационного периода. При селекции овощных бобов в почвенно-климатических условиях Белгородской области особое внимание следует обратить на раннеспелость, учитывая, что продолжительность периодов до появления всходов и после цветения положительно коррелируют с продолжительностью вегетационного периода (r=+0,61 и r=+0,87). Среди изученных опытных образцов

раннеспелостью (75-82 дней) характеризуются: Белые крупноплодные, Дачник, Оптика, ВН-34, причем последний отличается и наиболее скорым образованием плодов.

2.Высота растений является важным сортовым признаком, от значения которого во многом зависит продолжительность вегетации, устойчивость агроценоза к полеганию и эффективность использования ассимилянтов на налив семян [15].

В годы исследований высота растений у опытных сорообразцов овощных бобов варьировала в диапазоне от 49,5.до 115 см.

Значение этого признака изменялось также и в зависимости от погодных условий лет выращивания. В 2014 году, когда отмечалось большое количество осадков в фазу «бутонизация – начало цветения», высота растений имела в среднем 88,2 см, тогда как в 2015 году ее значение было ниже и составляло в среднем по коллекции 77,0 см., так как период вегетации был теплее и суше: температура в мае и июне составила 15,8^{o}C и 20,6^{o}C, что несколько выше среднемноголетнего; количество осадков было 27,2 мм в мае и 55,0 мм в июне, что ниже среднего многолетнего на 12-28 мм. В мае и июне 2016 года температура была на уровне 14,8^{o}C и 19,6^{o}C, количество осадков – 96,0 мм и 32,8 мм, что на 54,3 мм выше среднемноголетнего значения, высота растений составляла в среднем 81,6 см.

Раннеспелые (75-82 дней) сортообразцы (Белые крупноплодные, Дачник, Оптика, ВН-34) имели высоту растений от 62,8 до 77,3 см.

3. Тип роста и развития. Известно, что интенсивное нарастание главного побега в период формирования генеративных органов у зернобобовых растений оказывает значительное влияние на продукционный процесс [16]. Развитие вегетативных органов, в том числе главного побега в длину, во время образования и созревания семян, приводит не только к удлинению вегетативного периода, но и уменьшению семенной продуктивности; к осложнению уборки. Поэтому, важно при отборе исходного материала предпочтение отдавать генотипам с детерминантным или физиологически ограниченным вегетативным ростом в период формирования семян. Из коллекционных образцов в этом отношении наибольший интерес для селекции представляют Белые крупноплодные, Оптика и ВН-34, которые имеют ранние сроки прекращения роста главного побега.

4. Количество боковых побегов у растений. Значение признака у изученных сортообразцов изменялось от 1 до 9 шт./растение. Больше всего (9 шт.) их насчитывалось у образца ВН-34 в 2016 г. Наименьшим количеством (0-2 шт.) боковых побегов отличались Велена, Детский восторг и образец Гибрид-16 в 2015 г, а оптимальным – Аквадул, Белорусские, Бобчинские, Дачник, Изысканное блюдо, Кармазин, Оптика, Русские черные, Бел-2.

5. Высота прикрепления первого боба на главном побеге. Этот признак является решающим для выбора сортов с учетом механизированной уборки. Его значение существенно изменялось в зависимости от генотипа и условий возделываниям: колебалось от 13,4 см (Гибрид-16, 2015 г.) до 31,2 см (Белые крупноплодные, 2016 г.) и в среднем составило 22,5 см. Признак характеризовался средней степенью изменчивости (V=17%).

6. Параметры листовой системы в среднем на растение. У изученных образцов овощных бобов площадь листовой поверхности растений наиболее тесно была связана с числом цветков и бобов на растении (r=+0,75 и r=+0,95 соответственно), средне – с массой 1000 семян (r=+0,36) и слабо – с массой семян на растение (r=+0,24), с массой и длиной боба (r=+0,33 и r=+0,29 соответственно). Самые крупные листья были обнаружены у крупносеменных сортообразцов Белые крупноплодные, Оптика, Дачник, Виндзорские и Бел-2. Растения с наименьшими листьями характерны для сорта Кармазин.

С площадью листа положительно коррелировали длина, ширина и количество листочков в одном листе (r=+0,57, r=+0,33 и r=+0,55 соответственно). Между площадью листа и характеристиками устьиц тесной связи не обнаружено.

Среднее количество листочков в листе варьировало от 5,25 до 6,83 шт. В зависимости от положения (яруса) и этот признак характеризовался средней степенью

изменчивости по образцам (V=22%).

Длина листочков колебалась от 5,69 до 8,80 см, а их ширина – от 2,13 до 4,03 см. Эти признаки обладали средней степенью изменчивости (V=12%, V=15%, соответственно).

Анализ корреляций показал, что длина листочков была тесно связана с их шириной (r=+0,69).

7. Потенциальная и реальная семенная продуктивность и составляющие их элементы. Количество семязачатков в расчете на главный стебель в зависимости от генотипа варьировала от 155,0 (ВН-34) до 535,9 шт./растение (Янкель бялы), что потенциально может обеспечить формирование семенной продуктивности в среднем 400 г/растение и более при массе 1000 семян 1185 г. Реальная же семенная продуктивность была намного меньше (в среднем 9 раз**)** и находилась в диапазоне от 18 (Аквадул) до 70 (Бел-2) г/растение. Коэффициент продуктивности семяобразования ($К_{пр}$) изменялся от 5% до 19%. Наибольшими $К_{пр}$ обладали образцы ВН-34 (19%), Бел-2 (15%) и Гибрид-16 (16%).

Количество семязачатков в расчете на боковой побег образцов варьировала от 91 (ВН-34) до 388,3 шт./растение (Янкель бялы) и была в среднем в 1,7 раза меньше, чем на главном стебле. Коэффициент продуктивности изменялся от 2% до 11%. У большинства (71%) образцов имели $К_{пр}$ меньше 10%. Максимальным $К_{пр}$ свойственны образцам Аквадул (11%), Изысканное блюдо (11%), Царский урожай (12%) и ВН-34 (11%).

Масса семян с растения наиболее значимо коррелировала с числом бобов на растения (r=+0,80) и числом бобов на боковых побегах (r=+0,68). Ее связь с другими элементами была менее существенной и составляла: с числом продуктивных боковых побегов – r=+0,42; числом продуктивных узлов на главном побеге – r=+0,54; числом соцветий с растения – r=+0,36; числом соцветий на боковых побегах – r=+0,39.

Число семян в бобе отрицательно коррелировало с количеством плодов на растении – r=–0,46.

Высокий процент семенификации наблюдался у сортов Белорусские, Белый жемчуг, Велена и Виндзорские. По коэффициенту продуктивности, в расчете на главный стебель, выделялись образцы «народной селекции» Бел-2, Гибрид-16 из Белгородской области и ВН-34 из Вьетнама; в расчете на боковой побег – Аквадул, Царский урожай и ВН-34.

8. Содержание в семенах белка. У изученных сортообразцов содержание белка колебалось от 17,5 до 33,1% и в среднем составило 25,8%, коэффициент вариации признака находился на уровне V=18%. Высоким его значением (более 30%) характеризуются сортообразцы: Белорусские, Бел-1, Бел-2, Белые крупноплодные, Дачник и Оптика.

Содержание белка в семенах овощных бобов положительно коррелирует с массой семян на растение (r=+0,26) и массой 1000 семян (r=+0,70); отрицательно – с количеством узлов на главном побеге – r=–0,41. Высоким значением данного показателя (более 30%) характеризуются сортообразцы: Белорусские, Бел-1, Бел-2, Белые крупноплодные, Дачник и Оптика.

В качестве косвенного показателя высокого содержания белка в семенах может служить признак «число узлов на главном побеге» с обратной зависимостью и «масса 1000 семян» – с положительной.

9. Наличие в ризосфере сортообразцов овощных бобов микромицетов. Установлено, что видовой состав и структура ризосферных микокомплексов изученных сортов *V. faba* различны. Количество микромицетов в ризосфере значительно (на 12,5±2,3 тыс. КОЕ/г почвы) выше, чем в парующей почве. В комплексе микромицетов под бобами доля типичных видов увеличивалась на 8-47% и их обилие возрастало на 4-28% по сравнению с парующей почвой. Степень сходства комплексов микромицетов ризосфереы бобов с парующей почвой составила 20-60%.

Таблица 1 – Морфобиологические параметры перспективного сорта овощных бобов как цели селекции в условиях ЦЧЗ

Хозяйственно-биологические признаки	Среднее по изученным сортообразцам	Характеристика признаков у перспективного сорта	Перспективный исходный материал
1. Продолжительность вегетационного периода (дни)			
Вегетационный период	85-105	75-80	Белые крупноплодные, ВН-34, Дачник, Оптика
2. Высота растений			
Высота растений, см	82	80-85	Бел-2, Белорусские, Велена, Розовый фламинго
3. Тип роста и развития стебля			
Тип роста стебля	индетерминантный	детерминантный (или физиологически ограниченный)	Белые крупноплодные, ВН-34, Оптика
4. Боковые побеги у растений			
Число боковых побегов	1-9	4-6	Аквадул, Белорусские, Бобчинские, Дачник, Изысканное блюдо, Кармазин, Оптика, Русские черные, Бел-2
5. Высота прикрепления первого боба на главном побеге			
Высота прикрепления первого боба, см	23	24-28	Бел-1, Белорусские, Белые крупноплодные, Виндзорские, Лидер, Оптика, Розовый фламинго
6. Параметры листовой системы, в среднем на растение			
Длина листочков, см	7,3	8-8,8	Белые крупноплодные, Виндзорские, Дачник, Оптика, Бел-1
Ширина листочков, см	3,1	3,5-4	Батром, Дачник, Оптика
Количество листьев, шт.	66	80-90	Лидер, Русские черные, Царский урожай
Площадь листьев, $см^2$	7637	13 тыс.-14 тыс.	Бел-1,Виндзорские, Русские черные
7. Семенная продуктивность и ее элементы, в среднем на растение			
Масса семян с растения, г	40	50-70	Батром, Бел-1, Бел-2, Бобчинские, Лидер, Царский урожай
Коэффициент семенификации, %	71	74-81	Белорусские, Белые крупноплодные, Белый жемчуг, Велена, Виндзорские, Гибрид-16, Лидер, Трижды белые,
$К_{пр}$ главного стебля, %	9	11-19	Батром, Бел-1, Бел-2, Белые крупноплодные, Белый жемчуг, Гибрид-16, Царский урожай
$К_{пр}$ боковых побегов, %	7	8-12	Батром, Бел-1, Бел-2, Белый жемчуг, ВН-34, Гибрид-16, зысканное блюдо, Русские черные, Царский урожай
Число семян в бобе	4	5	Белые крупноплодные, Белый жемчуг
Масса 1000 семян, г	1185	1400-1700	Белорусские, Белые крупноплодные, Белый жемчуг, Виндзорские, Дачник, Оптика, Розовый фламинго
8. Биохимическая характеристика семян			
Содержание белка в семенах, %	26	30-33	Бел-1, Бел-2, Белорусские, Белые крупноплодные, Оптика, Дачник
9. Устойчивость к микромицетам			
Распр. фузариоза (%)	38	5	Кармазин, Бел-2
Распр. альтернариоза (%)	19	3-4	Кармазин, Бел-1
Распр. аскозитоза (%)	13	0-5	ВН-34
Распр. ботритиоза (%)	19	0-5	Белорусские
Распр. черноватой пятн. (%)	15	0-5	ВН-34
Недобор продуктивности при альтернариозе (%)	8	5-7	Аквадул, Батром, Бел-1, Бел-2, Белорусские, Бобчинские, Виндзорские, Зеленый Джек, кармазин, Оптика
Недобор продуктивности при фузариозе (%)	31	6-15	Белые крупноплодные, Велена, Дачник, Лидер, Оптика
Обилие аллергенных видов (%)	16-46	24	Аквадул, Белые крупноплодные, Бобчинские, Розовый фламинго, Лидер, Русские черные
Доля оппортунистов (%)	до 35	20	Аквадул, Белые крупноплодные, Оптика, Янкель бялы

При этом отмечается и сортовая специфичность. Ряд численности микромицетов под изученными сортами в порядке возрастания выглядит следующим образом: парующая почва – Русские черные – Царский урожай – Розовой фламинго – Оптика – Бобчинские – Янкельбялы – Лидер – Дачник – Детский восторг – Изысканное блюдо – Белые крупноплодные – Велена – Зеленый Джек – Батром – Аквадул – Белорусские.

В целом сортообразцы культуры характеризуются формированием в ризосфере специфических комплексов микромицетов с преобладанием видов родов Penicillium, Aspergillus и Fusarium и усилением доли токсигенных, оппортунистических и аллергеных видов: *A. alternata, A. niger, A. ustus, C. krusei, F. oxysporum, S. solani, U. botrytis* – соответственно до 29%, 31% и 24%.

Наиболее распространенными и вредоносными заболеваниями сортообразцов овощных бобов в почвенно-климатических условиях Белгородской области являются фузариоз, альтернариоз, аскохитоз, черноватая и шоколадная пятнистости, приводившие в годы исследований к потерям до 27% семенной продуктивности [18].

В годы исследований распространенность альтернариоза, в среднем по всем образцам, составляла 9%, индекс развития болезни – 3%, степень развития болезни – 1-2,5 баллов. В 2014 году минимальной степенью поражения обладал сорт Белорусские, а в 2015 г. – сорт Лидер (встречаемость 3%, индекс развития болезни до 1%. Наименьший недобор продуктивности при альтернариозе отмечен у сорта Белорусские (5%). В 2016 году наибольшей распространенностью (17%) альтернариозахарактерены растения образца Бел-1 с степенью развития 5,8% и вызывал потерь продуктивности более 3%.

Распространенность аскохитоза в 2014 году составила в среднем по всем образцам 24%, индекс развития – 15% и развитие болезни 1,5-4 балла. В 2015 году распространенность уменьшалась до 7,5%. Болезнь развивалась на уровне 1-2 балла с индексом развития 2% и вызывала недобор продуктивности до 6%. В 2016 году болезнь зафиксирована на растениях 4 сортов *V. faba* (Бобчинские, Трижды бялы, Детский восторг и Дачник), в среднем распространенность составила 6% с развитием болезни 1 балла, степенью развития – 1,5% в фазе цветения начала плодообразования.

После культивирования бобов в почве остаются фитопатогенные виды *A. fabae, C. herbarumF. graminearum, F. oxysporum*Schl. var.*orthoceras*, *F. oxysporum, F. solani, U. botrytis,* которые могут наносить вред другим сельскохозяйственным растениям, поэтому необходимо выбирать наименее чувствительные к данной микофлоре следующие в севообороте культуры.

Таким образом, полученные экспериментальные данные позволяют заключить, что в условиях Центрально-Черноземного региона России для перспективного сорта овощных бобов наиболее важными признаками и свойствами растений являются: продолжительность вегетационного периода, высота растений, тип роста, количество боковых побегов, высота прикрепления первого боба, особенности листовой системы, семенная продуктивность и составляющие ее элементы, показатели потребительских качеств семян, устойчивость к болезням. Данные признаки у имеющихся сортообразцов культуры еще не достигли оптимальных значений для региона и требуют дальнейшей селекционной проработки, ориентируясь на следующие морфобиологические параметры (табл. 1).

БЛАГОДАРНОСТЬ

Выражаю искреннюю и глубокую благодарность научному руководителю, кандидату сельскохозяйственных наук, доценту кафедры биотехнологии и микробиологии Белгородского государственного национального исследовательского университета Ю.Н. Куркиной.

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ИССЛЕДОВАНИЕ АДАПТАЦИОННЫХ ВОЗМОЖНОСТЕЙ ДУБА ЧЕРЕШЧАТОГО (QUÉRCUS RÓBUR) К АВТОТРАНСПОРТНОМУ ЗАГРЯЗНЕНИЮ

THE STUDY OF ADAPTIVE CAPACITY OF OAK (QUÉRCUS RÓBUR) TO MOTOR TRANSPORT POLLUTIONS

Кулакова Н.Ю., **Колесников А.В.**, старшие научные сотрудники
Kulakova N.Y., Kolesnikov A.V., Senior Researchers
ФГБУН Институт лесоведения РАН, Московская область, Россия
Institute of Forest Science of Russian Academy of Sciences, Moscow region, Russia
E-mail: nkulakova@mail.ru, wheelwrights@mail.ru

Баранова Ю.А., **Голубева М.В.**, магистранты
Baranov Y.A., Golubeva M.V., Post-graduate students
E-mail: kirsche24@yandex.ru, bleckcat2007@yandex.ru
ФГАОУ ВО «Российский университет дружбы народов» Москва, Россия
RUDN University, Moscow, Russia

АННОТАЦИЯ

Выбор пород деревьев, пригодных для создания лесозащитных полос вдоль автомагистралей, должен базироваться на исследовании адаптационного потенциала растений к автотранспортному загрязнению. Использование комплексного подхода к оценке состояния деревьев дуба черешчатого в экосистемах разной степени загрязнения позволило определить эту породу как высоко толерантную к воздействию автотранспорта и легкорастворимых солей, поступающих в экосистемы при применении антигололёдных средств. Степень загрязнения экосистем определяли по содержанию в снежном покрове и в почве тяжёлых металлов и легкорастворимых солей, содержанию тяжелых металлов в пыли, оседающей на листья. Показано, что содержание суммы неструктурных углеводов в ветвях деревьев в конце вегетационного периода и прирост ветвей в контрастных по загрязнению экосистемах были одинаковыми. Дуб способен переносить весеннее хлоридно-натриево-кальциевое засоление почв средней степени. При этом накопление ионов Na^+ до 0,41±0,13 мг/г в листьях деревьев на засолённых почвах не приводит к изменению содержания в них калия. Одним из механизмов адаптации дуба черешчатого к засолению является увеличение содержания фракции дисахаров более чем в два раза относительно деревьев на слабозасолённых почвах.

ABSTRACT

The choice of tree species suitable for the creation of forest belts along highways, should be based on the study of adaptive capacity of plants to vehicle pollution. An integrated approach to the assessment of the condition of the trees of oak (*Quercus robur L.*) in ecosystems with various levels of contamination allowed to define this species as highly tolerant to the effects of vehicles and soluble salts, that incoming to the ecosystem when applying anti-icing reagents. The degree of contamination of the ecosystem were determined by the content heavy metals and soluble salts in the snow cover and soil, the content of heavy metals in dust deposited on leaves. It was shown that the content of total non-structural carbohydrates in the branches of the trees at the end of the vegetation period and the growth of the branches in contrast to the pollution of ecosystems was the same. Oak spring can carry medium degrees of sodium and calcium chloride soil salinity in spring. The accumulation of Na^+ ions to 0.41±0.13 mg/g in leaves of trees on saline soils does not change the content of potassium. One of the mechanisms of adaptation of oak to salinization is the increase in the content of disaccharides fraction more than two times in compare to the trees on slightly saline soils.

КЛЮЧЕВЫЕ СЛОВА
Автотранспортное загрязнение; лесозащитные полосы; дуб черешчатый; неструктурные углеводы; легкорастворимые соли.

KEY WORDS
Transport pollution, windbreaks, oak, non-structural carbohydrates, soluble salt.

Автотранспортное загрязнение становится препятствием для создания жизнестойких древесных насаждений [7]. Поиск пород, способных существовать в условиях повышенного поступления поллютантов должен опираться на изучение потенциала, которым обладают растения для адаптации. Исследование процессов адаптации связано с изучением поведения неструктурных углеводов (NSC) в растениях. Участие NSC в процессах адаптации разнообразно. Пластические углеводы выполняют в растительных организмах запасающую, осмолитическую, транспортную и протекторную функции.

Известно, что воздействие автотранспортного загрязнения часто вызывает некрозы листьев, преждевременное их старение и дефолиацию [2, 24]. Одним из способов адаптации к уменьшению продолжительности жизни листьев является увеличение скорости их ротации и усиление побегообразования [26]. Для восстановления площади ассимилирующей поверхности требуется дополнительный, часто очень существенный, расход углеводов [33]. Крахмал интенсивно используется для репарации клеточных оболочек растений, испытывающих воздействие поллютантов [4]. Можно утверждать, что содержание пластических углеводов в тканях и органах растений характеризует потенциальную возможность растений к адаптации в неблагоприятных условиях урбанизированной среды.

Адаптационные процессы связаны с изменением состава NSC. Значительная часть насаждений вдоль автомагистралей приурочена к почвам, испытывающим весеннее засоление разной степени. Восстановление нормального градиента водного потенциала в растениях на засолённых почвах происходит в частности за счет гидролиза полимерных форм углеводов (неспецифическая ответная реакция растительных организмов на воздействия различной природы) и синтеза низкомолекулярных полисахаридов [20, 35]. Накапливаясь в цитоплазме, и работая как осмотики, они, кроме того, способствуют локализации токсичных одновалентных ионов в вакуолях [10], тормозят процессы свободнорадикального окисления [6]. Сахароза является важной транспортной формой углеводов во флоэме [16], особенно в отсутствии транспирации [19].

При исследовании поведения неструктурных углеводов необходимо учитывать различные параметры состояния деревьев, так как сложность адаптационных процессов не позволяет всегда однозначно трактовать поведение NSC в органах растений. Так, у деревьев худшего санитарного состояния отмечалось увеличение содержания неструктурных углеводов за счёт ингибирования их оттока [4, 17, 33]. В нашей работе, которая является первым этапом в исследовании толерантности дуба черешчатого к автотранспортному загрязнению, весной были выбраны деревья, которые находились в условиях очень сильного и среднего загрязнения, но жизненное состояние которых соответствовало первому баллу (наилучшее состояние) по шкале В.А. Алексеева [1].

В качестве маркёров загрязнения мы использовали тяжёлые металлы (ТМ), т.к., во-первых, это одна из наиболее вредных составляющих автотранспортных выбросов, и, во-вторых, поступление тяжёлых металлов в целом пропорционально поступлению агрессивных оксидов серы и азота. Ведущий механизм воздействия ТМ на растения – инактивация белков и других макромолекул, выполняющих каталитические и регуляторные функции. Тяжелые металлы оказывает токсическое действие на такие процессы как рост, развитие, фотосинтез, митоз, дыхание, поглощение воды, перенос электронов через мембраны и т.д. [18]. Степень ингибирования тяжелыми металлами физиологических процессов в большой степени определяется концентрацией металла

в окружающей среде и чувствительностью вида. Установленные значения ПДК для Zn, вычисляемые по уровню снижения урожайности для различных с/х культур [17] соответствуют 150–300 мг/кг; проявление хлороза листьев связывают с концентрацией цинка 300–500 мг/кг сухого вещества. Нормальной для с/х растений считается концентрация свинца 0,1–5 мг/кг в растении, критической – 10 мг/кг, фитотаксичной – более 60 мг/кг [17]. Влияние комплекса факторов на развитие и рост взрослых древесных растений делает затруднительной разработку ПДК для них.

Было множество попыток использовать растения как биоиндикаторы загрязнения почвы и воздуха в городах [25,28,31,34]. Аккумуляция тяжёлых металлов на поверхности листьев и коры в основном определяется степенью загрязнения атмосферы аэрозолями и пылью, но зависит от дождей, ветров и т.д. Концентрация тяжёлых металлов в тканях растений отражает как степень загрязнение почв подвижными формами тяжёлых металлов, так и способность данного вида к их накоплению. Поэтому для определения степени загрязнения экосистем лучше использовать комплексный подход.

Даже в условиях гумидного климата и промывного типа водного режима почв, для оценки загрязнения современных придорожных экосистем необходимо учитывать поступление и концентрацию в их компонентах легкорастворимых солей, попадающих в экосистемы из-за применения антигололёдных средств и отрицательно сказывающихся на состоянии насаждений [20].

Целью работы было сопряжённое исследование содержания неструктурных углеводов (NSC), тяжёлых металлов, ионов натрия и калия в органах дуба черешчатого и состояния деревьев в экосистемах разной степени автотранспортной нагрузки для выяснения адаптационных возможностей дуба черешчатого к автотранспортному загрязнению. Для индикации загрязнения в нашей работе использовались образцы растений, снега и почв, в которых поллютанты аккумулируются.

Предварительные исследования древостоев дуба черешчатого в Московской области показали, что состояние деревьев контролируется разнообразными факторами [14]. Одним из важных моментов является конкуренция между деревьями в насаждении. Для того чтобы среди прочих факторов вычленить воздействие поллютантов на состояние деревьев, необходимо было найти деревья, близкие по развитию кроны, т.е. находящиеся в равных условиях при конкуренции за свет. Важность этого условия показало проведенное нами ранее исследование [8, 30]: оказалось, что от типа развития кроны (узкокронный тип развития, зонтикообразный или раскидистый [9]) зависит содержание неструктурных углеводов в тканях и органах дуба. Необходимо было учитывать и возраст деревьев. Существует мнение, что с возрастом дерева запас NSC увеличивается и возрастает способность к восстановлению фотосинтезирующего аппарата [33]. Другие исследователи отмечают, что чем старше деревья, тем менее устойчивы они к стрессам [17].

Содержание и состав неструктурных углеводов в растениях одного вида зависят, прежде всего, от сезонной динамики процессов метаболизма. Особенно динамичен пул моно- и дисахаров [30]. Потенциальную способность дерева противостоять неблагоприятным факторам характеризует баланс между процессами ассимиляции и расходования углеводов после окончания вегетационного периода, когда процесс фотосинтеза отсутствует и расход углеводов минимальный.

В задачи работы входило изучение сезонной динамики содержания моно- и дисахаров, содержания сахаров и крахмала по окончанию вегетационного периода в ветвях деревьев; содержание Pb, Zn в ветвях и листьях; Na и K в листьях дуба и оценка степени загрязнения автотранспортом экосистем с насаждениями дуба черешчатого. Исследованием были охвачены деревья старого генеративного онтогенетического состояния с раскидистым типом кроны. Велось наблюдение за их санитарным состоянием. Оценивался прирост ветвей в конце сезона вегетации, т.к. интенсивность ростовых процессов – один из важнейших показателей устойчивости растений к различным стрессам [5, 12].

МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЙ

Были выбраны 2 участка (по 6 деревьев): в первом случае (пробная площадь №1) деревья росли в 2–3 метрах от магистрали (Свободный проспект, 55˚75'в.д.; 37˚82'с.ш.), во втором (пробная площадь №2) – примерно в 300 м от шоссе (Терлецкий парк, 55˚77'в.д.; 37˚82'с.ш.).

Для определения динамики моно и дисахаров в 2016 году было отобрано 72 растительных образца: по 12 (ветви) в марте (начало набухания почек), в мае (формирование зрелых листовых пластин), сентябре (начало осеннего окрашивания) и ноябре (конец листопада); 24 образца (ветви и листья) в июле (массовое появление некрозов листьев деревьев на Свободном проспекте). Каждый образец формировался из 5–6 ветвей тонкой фракции или из 20–25 листьев одного дерева. Содержание крахмала определялось в ветвях деревьев, отобранных в ноябре. Для оценки поступления поллютантов из атмосферы в экосистему в конце предыдущего зимнего периода отбирались пробы снега снегоотборником из всей толщи снежного покрова. Количество поллютантов в месяц учитывали исходя из времени сохранения снежного покрова. Всего было проанализировано 8 проб талой воды, по четыре на каждом участке. Почвенные образцы отбирали с глубины 0–5, 10–20 и 20–30 см, всего проанализировано 24 почвенных образца, из 8 прикопок, по 4 на каждой пробной площади. В 12 образцах листьев, отобранных в мае, определялось содержание Na и K, в 24 образцах листьев (12 образцов, протёртых ватой, смоченной в бидистиллированой воде и 12 не обработанных ничем) и в 12 образцах ветвей, отобранных в сентябре – содержание свинца и цинка.

Анализ поступления в почву загрязняющих веществ (по содержанию их в талой воде, полученной из проб снега) осуществлен согласно следующим методам: общая минерализация (сухой остаток) – ГОСТ 18164-72; кальций (Ca и Mg) – трилонометричесим способом ПНД Ф 14.1:2.95-97; натрий (Na) – пламенно-фотометрическим методом ПНД Ф 14.1:2:4.138-98; хлориды (Cl) – титриметрическим методом, ПНД Ф 14.1:2.96-97; сульфаты (SO_4) – ПНД Ф 14.1:2:4.157-99; свинец и цинк методом атомно-абсорбционной спектрофотометрии (Pb), – ПНД Ф 14.1:2:4.214-06; (Zn) – ПНД Ф 14.1:2:4.214-06.

Определение концентрации легкорастворимых солей в почве : Ca, Mg, Na, хлоридов, сульфатов произведено методами, аналогичными определению их в талой воде.

Определение значений pH почв – в водной суспензии при соотношении почва:вода 1:5.

Определение подвижных форм свинца и цинка в почве – методом пламенной атомно-абсорбционной спектрофотометрии – ГОСТ 27593-88.

Определение свинца, цинка в тонких ветвях и листьях дуба черешчатого – методом пламенной атомно-абсорбционной спектрофотометрии ГОСТ 29929.

Определение содержания моно и дисахаров в тонких ветвях и листьях дуба черешчатого по методу Соловьева [13].

Крахмал из органов и тканей извлекали хлорной кислотой по методу Пьючера, его содержание определяли по количеству образованной в результате кислотного гидролиза глюкозы глюкозооксидазным методом.

Определение Na и K в листьях проводилось в водной вытяжке из листьев при соотношении образец:вода 1:5 после 1-часового настаивания при температуре 45˚C и 10-минутного центрифугирования при 3000 об/мин.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Параметры загрязнения экосистем. Сравнение двух пробных площадей по количеству поступающих поллютантов показало значительные различия между ними: в среднем за один зимний месяц поступление натрия на первой пробной площади было в 7 раз, хлоридов и кальция – в 4 раза, сульфатов и свинца – в 2 раза, цинка – в

полтора раза выше, чем на второй (рис.1, А и Б), составляя соответственно 192±26; 219±34; 504±87; 213±52; 0,19±0,14; 1,3±0,61 мг/м^2. Вместе с тем, поступление поллютантов в обоих случаях было существенно больше, чем в лесу за городом, в Подмосковной Мещёре [15]. В снежном покрове, собранном с наиболее удалённой от магистрали второй площади, содержание кальция и нитратов примерно в 4 раза, а хлоридов и сульфатов – в 8 раз больше, чем в снежном покрове Мещёры (рис.1, А).

В соответствии с интенсивностью поступления поллютантов, оказались загрязнены почвы исследуемых экосистем. Высокое содержание свинца и цинка было зафиксировано в почвах обоих участков. На первой пробной площади содержание свинца и цинка было в 1,8–1,6 раз больше, чем на второй площади. В почве Свободного проспекта содержание цинка сверху вниз по почвенному профилю изменялось от 84,28 до 53,83 мг/кг почвы, в почве Терлецкого парка – от 45,92 до 31,75 мг/кг. В обоих случаях значения были выше ПДК для почв легкого механического состава (23 мг/кг). Содержание свинца в почве Свободного проспекта изменялось от 26,2 до 22,3 мг/кг, в почве Терлецкого парка – от 16,3 до 12,8 мг/кг, при значениях ПДК 6 мг/кг.

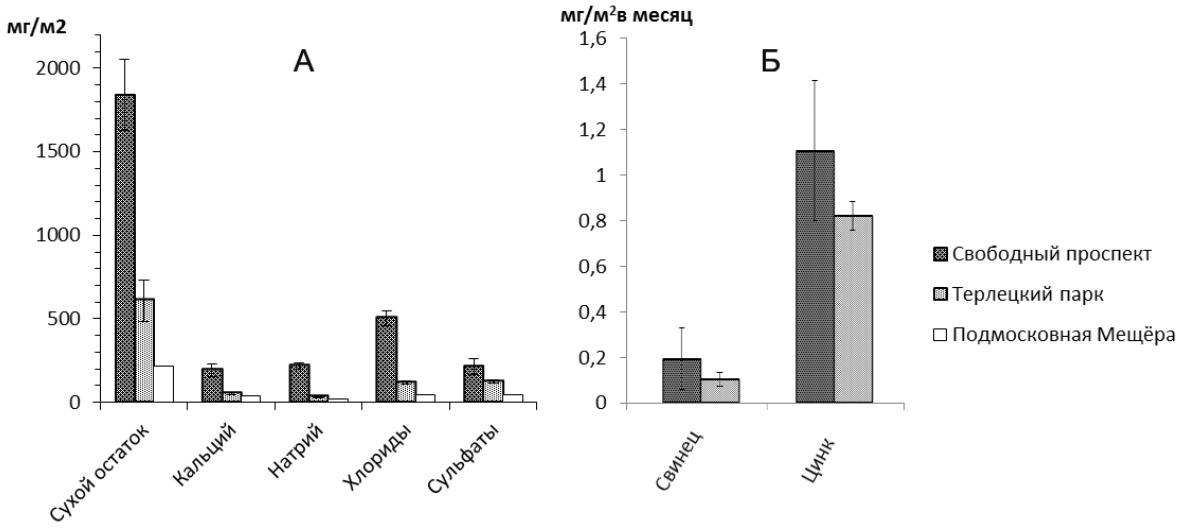

Рисунок 1 – Содержание поллютантов в снежном покрове (показаны доверительные интервалы при n=6, P≤0,05. Данные по Мещёре по [15].

По данным Никифоровой с соавторами [15], величина плотного остатка водной вытяжки в верхнем 15-см слое почв в районе Свободного проспекта колебалась весной 2010 года в пределах от 0,2 до 0,4%, что соответствует средней степени засолённости почв, сумма солей в среднем составляла 15 смоль/кг. В почвах Терлецкого парка плотный остаток составлял от 0,1 до 0,2% (слабое засоление), сумма солей около 5 смоль/кг. Состав солей, по данным этих авторов, хлоридно-натриево-кальциевый, что определяется составом применяемых антигололёдных средств. При анализе образцов, отобранных нами в июле, оказалось, что почвы пробных площадей были промыты от легкорастворимых солей. Отмечалось только повышенное содержание гидрокарбонат-иона в почве Свободного проспекта: (0,15–0,14 мг-экв./100 г в почве Терлецкого парка и 0,81–0,64 мг-экв./100 г в почве Свободного проспекта) и связанные с этим повышенные значения pH (6,81 и 6,12 на участке у дороги и в парке соответственно), что являлось косвенным признаком повышенного весеннего засоления почв на Свободном проспекте. Для фоновых почв Мещёры значения pH были 4,9, концентрация иона HCO_3^- – 0,18 мг-экв./100 г [15].

Загрязнённость атмосферы в летний период характеризовалась количеством тяжёлых металлов, поступающих с пылью и аэрозолями на поверхность листьев. Количество поступающих свинца и цинка было рассчитано как разность между данными, полученными при анализе чистых и необработанных листьев. Из табл. 1

видно, что с пылью и аэрозолями, аккумулирующимися на листьях деревьев у дороги, поступало в 1,6 раза больше свинца и цинка, чем в парке.

Таблица 1 – Содержание цинка и свинца в ветвях и листьях дуба черешчатого, мг/кг абсолютно-сухого веса (показаны доверительные интервалы при n=6, P≤0,05)

Элемент		Ветви		Листья		Листья чистые		Пыль	
		С.п.	Т.п.	С.п.	Т.п.	С.п.	Т.п.		
Zn		989±171	1241±151	1167±230	992±126	617±150	641±55	550	351
Pb		10,50±5,05	7,16±3,22	23,38±6,74	17,62±5,08	10,75±3,32	9,64±2,78	12,63	7,98
Растение/ почва	Zn	12	27	14	22	7	14		
	Pb	0,40	0,45	0,90	1,10	0,41	0,60		

Содержание тяжёлых металлов в листьях и ветвях дуба черешчатого. Содержание свинца в листьях, с которых удалили пыль, на двух площадках было примерно одинаковым и составляло около 10 мг/кг сухого образца (табл.1). Содержание свинца в не обработанных водой листьях у дороги и в парке было соответственно в 2,3 и 1,8 раз выше, чем в чистых. В необработанных образцах листьев концентрация свинца была существенно выше, чем в образцах ветвей, возможно из-за большей площади поверхности, аккумулирующей пыль. В необработанных образцах листьев и ветвей деревьев у дороги содержание свинца было немного выше, чем на пробной площади в парке (табл.1), но разница не подтверждалась статистически.

Содержание цинка в чистых листьях на двух площадках было примерно одинаковым, несколько выше критических значений [17], составляя 617±150 и 641±55 мг/кг образца соответственно. Статистически не достоверны были и отличия между содержанием цинка в необработанных ветвях и листьях деревьев на разных пробных площадях и между концентрацией цинка в листьях и ветвях.

Содержание свинца в обработанных листьях дуба было существенно ниже, чем в почве. Коэффициент накопления свинца в растениях (отношение содержания свинца в растении к содержанию его в почве) составлял 0,4 и 0,6 на участках у дороги и в парке. Это соответствует данным о том, что свинец мало подвижен в растениях и аккумулируется в основном в корнях [23, 29]. Содержание Zn напротив, было выше в листьях дуба, чем в почве (в 7 и в 14 раз на первой и второй пробных площадях соответственно). В Терлецком парке коэффициент накопления цинка в листьях дуба в 2 раза, а свинца в 1,5 раза выше, чем на участке у автотрассы. Это связано, вероятно, с более низкими значениями pH в почве Терлецкого парка, способствующими большей подвижности тяжёлых металлов в почве [17].

Таким образом, несмотря на существенные различия в поступлении и аккумуляции тяжелых металлов в почве, их концентрация в ветвях и листьях дуба мало различалась на разных площадках. В листьях и ветвях дуба не накапливается свинец, относительно его содержания в почве. Дуб черешчатый оказался способен к аккумуляции цинка в ветвях и листьях, и этот процесс контролировался, очевидно, значениями pH почвы.

Содержание Na и K в листьях дуба черешчатого. Дуб черешчатый является солеустойчивой породой. Наши исследования [8, 30] показали, что слабое смешанное засоление до 10 ммоль/100 г почвы с преобладанием в составе солей сульфатов кальция и магния, увеличивающее физиологическую сухость почв, не препятствует развитию дуба, но может сказываться на санитарном состоянии насаждений, особенно в засушливые годы. Засоление почв более 10 ммоль/100 г почвы с доминированием ионов натрия, карбонат- и бикарбонат-ионов, является пограничным для

распространения дуба на водоразделах в аридных условиях юга лесостепной зоны (Теллермановский стационар ИЛАН РАН).

Хлориды также токсичны для многих древесных растений. По данным С.Д. Эрперт, для корней вяза токсичным является содержание иона Cl^- 2 мг экв/100 г почвы [21].

Для уменьшения водного потенциала растения могут поглощать из почвы натрий, токсичность которого проявляется в хлорозах и некрозах листьев, их усыхании, сокращении периода роста и площади листа [11].

Способность деревьев дуба исследуемых нами экосистем выдерживать среднее засоление с преобладанием хлоридов натрия, объясняется, видимо, промывным режимом почв и связанной с этим непродолжительностью периода засоления. Вместе с тем, выявлена способность дуба к накоплению натрия в листьях в условиях засоления почвы. В образцах листьев дуба, собранных в мае на пробной площади у дороги, отмечается повышение содержания натрия относительно образцов, отобранных в Терлецком парке – 0,41±0,13 и 0,03±0,03 мг/г соответственно. Накопление натрия не сказывалось на поглощении растениями калия. Концентрация калия была одинаковой в листьях деревьев обеих площадок и составляла 1,26±0,03 и 1,25±0,02 мг/г на первой и второй площадках соответственно.

Содержание неструктурных углеводов в ветвях и листьях дуба черешчатого. Содержание суммы ди- и моносахаров в ветвях дуба черешчатого изменялось от 28,2 до 140,5 мг/г у деревьев в Терлецком парке и от 40,2 до 128,5 мг/г у деревьев на Свободном проспекте (рис.2). Колебания содержания суммы сахаров в ветвях объясняются сезонным характером процессов метаболизма: минимальные значения в мае связаны с развитием листьев и побегов, а максимальные в ноябре – с резким похолоданием. Увеличение концентрации сахаров в холодный период в тканях и органах деревьев отмечается многими авторами [3, 6, 32]. В этот период сахара играют протекторную роль, связывая воду в клетках и предохраняя их от разрушения.

Литературные данные по содержанию сахаров в деревьях дуба очень ограниченны. В ветвях дуба скального в Швейцарии содержится близкое количество сахаров – 40–50 мг/г в течение практически всего периода вегетации, кроме апреля. К этому месяцу приурочены минимальные значения – менее 20 мг/г сахара [27]. Во Франции в ветвях дуба отмечались значения от 20 до 40 мг/г [22].

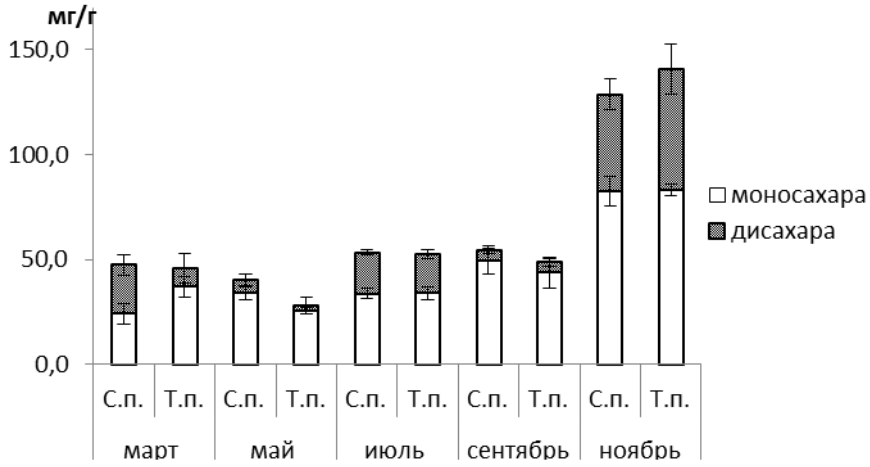

Рисунок 2 – Сезонная динамика содержания моно- и дисахаров в ветвях дуба черешчатого, мг/г сухого веса образца (показаны доверительные интервалы при n=6, P≤0,05)

В Теллермановском лесничестве наблюдались существенно более высокие значения содержания сахаров в мае после распускания и роста листьев (около 80 мг/г [8], что связано, видимо, с благоприятными условиями метаболизма в этот период – достаточным запасом влаги в почве и высокой солнечной инсоляцией).

Сравнение двух участков между собой показало весьма близкие значения суммы моно- и дисахаров в ветвях дуба (рис.2). Основные различия приходятся на май: несколько меньшее содержание сахаров в ветвях деревьев Терлецкого парка по сравнению дубами на Свободном проспекте, связано, вероятно, с менее интенсивным приростом деревьев у магистрали, на почвах, которые в мае, ещё не промыты от солей и с необходимостью привлечения сахаров для поддержания высокого осмотического давления. В период других измерений достоверных различий между участками не наблюдалось.

Определение сахаров в листьях, собранных в мае не проводилось, т.к. на обоих участках на листьях было много тли. В листьях, собранных в июле, содержание суммы сахаров было примерно одинаковым на участках у дороги и в парке: соответственно 71,6 и 74,2 и выше, чем в ветвях. Измерения сахаров в листьях деревьев дуба Теллермановского лесничества показали гораздо более высокие значения (100–170 мг/г образца) [8]. Вероятные причины этого – необходимость поддерживать высокое осмотическое давление в более аридных условиях и усиление процессов ассимиляции при более высокой солнечной инсоляции.

Соотношение фракций моно- и дисахаров в ветвях деревьев в весенний период на двух участках различалось (рис.3). И относительное, и абсолютное содержание дисахаров в марте (начало сокодвижения) и в мае в образцах деревьев на Свободном проспекте было выше, чем в Терлецком парке, правда достоверность различий из-за сильного варьирования показателей отмечается только в марте. В июле, сентябре и ноябре подобной тенденции не наблюдается. Увеличение фракции дисахаров отмечалось у деревьев дуба, испытывающих водный дефицит на слабозасоленных почвах [8]. Очевидно, увеличение доли дисахаров связано с адаптацией дуба черешчатого к воздействию засоления, с поддержанием низкого водного потенциала.

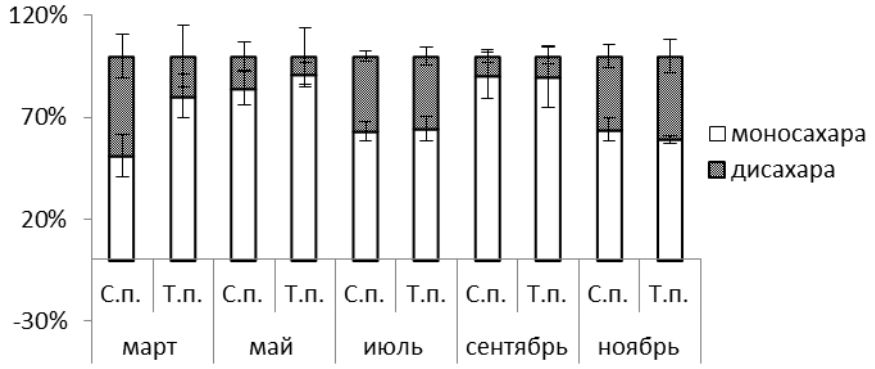

Рисунок 3 – Сезонная динамика содержания моно- и дисахаров в ветвях дуба черешчатого, % от суммы (показаны доверительные интервалы при n=6, P≤0,05)

Сумма моно-, дисахаров и крахмала, измеренная в ноябре, была примерно одинаковой на разных участках. Она равнялась 136,26±9,22 мг/г образца в ветвях деревьев на Свободном проспекте и 146,38±12,62 – в Терлецком парке. Доля крахмала составляла около 6% от суммы NSC в ветвях деревьев на Свободном проспекте и около 4% в ветвях деревьев Терлецкого парка (рис. 4).

При сравнении наших данных с данными [22], полученными в октябре, выявляются принципиальные различия в составе углеводов: при близких значениях NSC (около 135 мг/г) содержание крахмала составляло более 70%. Такие различия объясняются, безусловно, существенно более теплой погодой во время взятия образцов во Франции. Имеющиеся данные по содержанию NSC и крахмала в холодный период в Швейцарии [27] тоже относятся к октябрю. В этот период здесь наблюдались минимальные значения суммы NSC за вегетационный период (около 100 мг/г), содержание крахмала составляло около 25%. Это различие с данными, полученными нами, мы также связываем с погодными условиями.

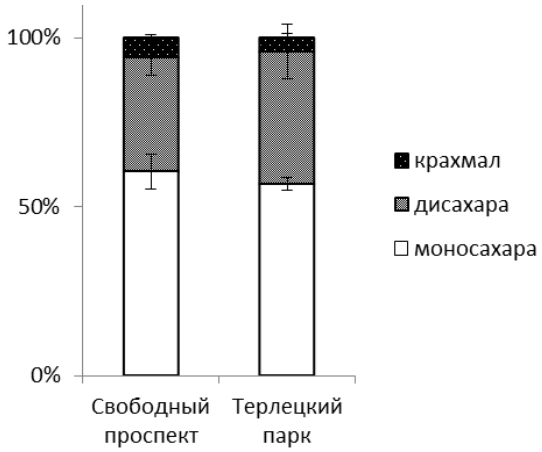

Рисунок 4 – Содержание NSC в ветвях деревьев дуба черешчатого в ноябре (показаны доверительные интервалы при n=6, P≤0,05)

Примерно одинаковое содержание суммы NSC, дисахаров и моносахаров в ветвях деревьев дуба старого генеративного онтогенетического состояния с раскидистым типом кроны, произрастающих в контрастных по загрязнению условиях, свидетельствует о высоком потенциале адаптации этих деревьев к загрязнению.

Состояние деревьев дуба черешчатого на исследуемых участках. Визуально состояние деревьев оценивалось в мае, июле, августе. Различия были отмечены только в состоянии листьев. В мае состояние листьев было одинаковым. Листовые пластины имели яркую зелёную окраску, не было отмечено некроза или хлороза листьев ни на одном из участков. В июле поражение некрозом листьев у деревьев на участке у дороги составило не более 10% от площади листовой поверхности, в августе – 25–35%, у деревьев Терлецкого парка некроз листьев в июле практически отсутствовал, в ноябре некротизированные ткани не превышали 5–15% от площади листовой поверхности. Прирост ветвей, измеренный в ноябре, у деревьев Терлецкого парка составил 38±12 см, у деревьев Свободного проспекта – 32±14 см. Разница между участками при P0,95 и n=6 несущественна. Размер листовых пластин также не различался на двух участках.

Негативное влияние автотранспортного загрязнения на санитарное состояние исследуемых деревьев выражалось только в увеличении площади некрозированных тканей листьев на участке сильного автотранспортного загрязнения относительно участка с меньшей автотранспортной нагрузкой.

ВЫВОДЫ

Выявлена высокая толерантность деревьев дуба черешчатого старого онтогенитического состояния с раскидистым типом кроны к условиям интенсивного автотранспортного загрязнения. Об этом свидетельствуют примерно одинаковое содержание NSC в ветвях деревьев дуба на разных по степени загрязнения участках при близких показателях роста ветвей деревьев.

Дуб черешчатый хорошо адаптирован к кратковременному весеннему хлоридно-натриево-кальциевому засолению почв. Одним из механизмов адаптации дуба черешчатого к засолению является увеличение содержания фракции дисахаров, играющих роль осмолитиков и протекторов от воздействия ионов легкорастворимых солей.

Близкое содержание Pb и Zn в листьях дуба у деревьев с различным проявлением некроза листьев, свидетельствует о слабом влиянии содержания этих элементов на формирование некрозивных тканей. Предположительно такое воздействие оказывают оксиды серы и азота, поступающие в атмосферу примерно пропорционально выбросам тяжёлых металлов.

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BUSINESS ANALYSIS OF SMOKED FISH TO INCREASE SMALL SCALE FISHERMEN'S HOUSEHOLD INCOME

Intyas Candra Adi*, **Koestiono Djoko**
Social Economic Program, Faculty of Agriculture, University of Brawijaya, Indonesia

Agus Tjahjono
Social Economic Program, Faculty of Marine and Fisheries, University of Brawijaya, Indonesia

*E-mail: candra.intyas@gmail.com

ABSTRACT
As much as 62.63% of Poor citizen in Indonesia comes from Rural and coastal communities. Development policy in fisheries sector only take sides for large scale fishermen only thus leading to over exploitation of fishery resources. In order increase the income, small – scale fishermen's household do some livelihood alternative amongst them is smoked fish business. The purpose of this research is to analyze the value added from fresh fish to smoked fish which done by small - scale fishermen's household who also members of processing group and the marketer (poklashar). Added value analysis is used to determine how much added value for a commodity because of its functional input which is done to the comodity. The research location determined in purposive with consideration that Tasikmadu village has Nusantara fishery port with the big amount of used summed from the small scale fishermen expecially hand lines fishermen. The sampling method is multistage cluster sampling. The data analysis is used hayami method of added value. The research result shows that small – scale fishermen household who become members of poklashar have bigger value added than (Rp. 14.672 / kg with added value ratio of 36.28%) small scale fishermen households who are not members (Rp. 9.971 / kg with added value ratio 28.86%).

KEY WORDS
Fisheries institution (Poklashar), added value, smoked fish.

The coastal communities which are consist of fishermen, fish farmers, processors and traders of marine products, as well as other community socio-economic life depends on marine resources which is a segment of the nation in general, is still relatively poor. According to the data KKP (2014), 62.63% of the poor in Indonesia come from rural and coastal communities.

Fisheries development efforts have created sizeable foreign exchange, but only some fishermen get improvements revenue, while most fishermen are still in a state of poverty. Various programs for the development of fisheries is generally not profitable for small scale fishermen and only in favor of large scale fishermen also leading to over exploitation of fishery resources. The Modernization of fishing equipment can only be enjoyed by large scale fisherman who has strong experienced capital and access to power holders whereas government policies that focus on increasing productivity often ignore the interests of small fishermen. This makes the domestic life of small-scale fishermen become more marginalized and in poverty (Tain, 2011).

According to Allison and Horemans (2006), the vulnerability of the livelihoods associated with the risk contained in the livelihood systems and capabilities to adapt to the occurring impacts. Low levels of education, lack of skills and assets, expecially land causing small scale fishermen difficulties in adapting.

With the conditions concerned by small-scale fishermen, one of the efforts to increase the income of smallscale fishermen household is to look for a livelihood alternative by cultivating traditionally caught fishes in accordance with the capital they have.

Traditionally processed fish, or "traditional cured" is a product that is processed in a simple and commonly performed on an household industrial scale because the tools and the processing methods are traditionally so it does not require a large capital. Type of processing methode that include in the traditional processed products are boiled fish, dried fish or dried salted fish, smoked fish, and fermented products, namely soy sauce, peda, shrimp paste, and else. Smoked fish in Indonesia is one of the traditional processing methods which are good enough to utilyze fisheries where usually household small-scale fishermen chose this method.

Simple processing method of the to the fish can create added value which is expected to increase the income of fishermen's household. According to Purba (1986), by analyzing the added value the amount of labour and processor share can be known. Analysis of the added value is also useful to know how many additional value contained in one unit of output produced. According Jamaliah (2015), the private investment has a significant positive effect on the production of value added, employment and labor productivity.

Empowerment of coastal communities by strengthening economic institutions are built from the local community of fishermen is also very necessary as a solution to the structural poverty. According Kosamu (2014), the power of social capital that comes from the local community greatly affect the sustainability of small-scale fisheries in the resources scale. Government involvement will not work if the social capital of the local community is weak which is led to discontinuation in all of its aspects. Therefore the Government's key role in small-scale fisheries, especially in developing countries is by supporting the local institutions.

Development of the National Community Empowerment (PNPM Mandiri) is one of the Government's program associated with the institutional development of the local economy with programs such as the activities of Business Development Mina Rural (PUMP) with one of its role to fund the productive economy in instituion (Group Processors and Marketers - Poklashar) to the initial establishment of fishing 'Koperasi' managed by members (KKP, 2011).

From the background stated, it can be formulated that the object of the the research is to analyze the added value of the small-scale fishermen's household by processing frsh fish into smoked fish to the members and non-members of Poklashar.

METHODS OF RESEARCH

The method used in this research is a case study method. According to Nazir (2003), a case study is a study on the status of research subjects related to a specific phase of the whole personality, the study subjects may be individuals, groups, institutions and communities. The purpose of case studies is to provide a detailed overview of the background, characteristics and distinctive character of the case or the status of the individual will then be a matter of a general nature.

The sampling research method used is multi-stage clusters due to the inavalaibality of the sampling frame or too much of it so it took a long time and a large cost in the formulation. The methods clusters classify the unit - the unit of analysis in the population into clusters - groups called clusters, which is a unit - a unit where samples will be taken. The number of the group taken must as a random sample then to all of the elements of the research in this cluster are studied. Sampling is taken on the certain stage. So one population can be divided - for the first level cluster, then on the first level cluster is divided into clusters - second level clusters and so on (Singarimbun, 1987).

In the fisrt stage of the research, the district that has many small fishermen vessles with engine power of at least 6 PK has to be selected and Trenggalek District is chosen because the number of fisherman is large enough which is 9.656 people. The second stage is to choose subdistricts with fisherman conditions that can represent the diversity of fisherman conditions in the district level, the Watulimo Subdistrict is chosen with the highest number of fishermen which is 6.897 people that composed of 12 villages. The third stage is choosing an area that has the highest number of fisheries institution (poklashar) which is Tasikmadu village that has 10 Poklashar. Furthermore the households which has a small

fishing vessels (the outboard motor with engine power 12 PK and use hand lines) are to be selected.

It is obtained from the surveys small scale fishermen household who also process the catch into smoked fish are eight (8) respondents so that households who only fishing found eight (8) rosponended. The total sample is sixteen (16) respondents

The methods of data analysis used is a quantitative approach that analyzes the value-added Hayami method. Value added is the increase in the value that occurs because the commodity get processed, transported and storaged in the production process with using / provision of functional input (Hayami et al, 1987).

Analysis of the value-added using Hayami method aims to determine productivity, the value of output, value added, profits, remuneration for labor and processing advantages which can be seen in Table 1 below.

Table 1 – Added Value Analysis Formula

DESCRIPTION	VALUES
OUTPUT, INPUT, PRICE	
1. Output (kg/year)	a
2. Raw material input (kg/year)	b
3. Workers/labours (HOK/year)	c
4. Convertion Factor (1/2)	d = a/b
5. Workers Cooefficients (3/2)	e = c/b
6. Product Price (Rp/kg)	f
7. Wage rate (Rp/HOK)	g
INCOME AND PROFIT (Rp/kg of raw material)	
8. Raw material input	h
9. Other current input	i
10. Product (4 x 6)	j = d x f
11. a. Value Added (10 – 9 – 8)	k = j – h – i
b. Value Added ratio ((11a/10) x 100%)	l % = (k/j) x 100%
12. a Labour income (5 x 7)	m = e x g
b Labour's share ((12a/11a) x 100%)	n % = (m/k) x 100%
13. a Processor Profit (11a – 12a)	o = k – m
b Profit rate ((13a/11a) x 100%)	p % = (o/k) x 100%
RETRIBUTION OF PRODUCTION FACTOR	
14 Margin (10 – 8) (Rp/Kg)	q = j – h
a. Labour income ((12a/14) x 100%)	r % = (m/q) x 100%
b. other current input ((9/14) x 100%)	s % = (i/q) x 100%
c. Processors Profit ((13a/14 x 100%)	t % = (o/q) x 100%

Source: Hayami, et al, 1987.

RESULTS AND DISCUSSION

Small – scale fishermen' household conduct some livelihood alternative to meet their needs as fluctuative fish caught and seasonal conditions that can not be predicted.

Traditional processing method is chosen by small-scale fishermen household for its number of fish caught per fisherman is relatively small, the type and size of the fish are diverse and do not require substantial capital investment. Simple processing method for fresh fish can create added value which is then expected to increase the income of fishermen by which is that smoked fish processing.

From the results, value-added business of smoked fish either as a member Poklashar or not members, can be seen in Table 2.

From the calculation of the average of the added value in Table 3, it can be concluded that:

Production result / output for one year in the business of processed smoked fish on average fisherman group 1 with average of 4,320 kg / year with the use of raw materials amounted to 4,740 kg / year while the average fisherman group 2 - average of 4968 kg / year with the use of raw materials amounted to 5,490 kg / year. The result of fishermen's group 1

is fewer than group 2 because the frequency of smoked fish activities fishermen's group 1 was low (only weekends and holidays), while group 2 was almost every day.

Output price for fishermen group 1 is valued at Rp. 45 471, -/ kg compared to the price of the output of fishermen's group 2 is valued at Rp. 36 532, -/ kg. This is because as a member of Poklashar, fisherman group 1 get location facilities at tourist spots which is Prigi beach while fisherman group 2 usually sells in traditional market or selling around to neighbors.

Table 2 – Added Value Analysis of Smoked Fish by Small - scale fishermen's household Rumah Tangga (Poklashar Members) in Tasikmadu Village, Watulimo Subdistict for One Year

DESCRIPTION	1	2
OUTPUT, INPUT, PRICE		
1. Output (kg/year)	4.320	4.968
2. Raw material input (kg/year)	4.740	5.490
3. Workers/labours (HOK/year)	1.632	2.070
4. Convertion Factor (1/2)	0,89	0,89
5. Workers Cooefficients (3/2)	0,43	0,49
6. Product Price (Rp/kg)	45.471	36.523
7. Wage rate (Rp/HOK)	7.208	6.256
INCOME AND PROFIT (Rp/kg raw material)		
8. Raw material input price	21.625	18.500
9. Other current input	4.103	3.529
10. Product (4 x 6)	40.400	32.000
11. a. Value Added (10 – 9 – 8)	14.672	9.971
b. Value Added ratio ((11a/10) x 100%)	36,28	28,86
12. a Labour income (5 x 7)	2.968	3.185
b Labour's share ((12a/11a) x 100%)	19,58	33,81
13. a Processor Profit (11a – 12a)	11.704	6.786
b Profit rate ((13a/11a) x 100%)	29,00	19,42
RETRIBUTION OF PRODUCTION FACTOR		
14 Margin (10 – 8) (Rp/Kg)	18.775	13.500
a. Labour income ((12a/14) x 100%)	15,32	23,86
b. other current input ((9/14) x 100%)	21,93	28,78
c. Processors Profit ((13a/14 x 100%)	62,74	47,86

**Note: Small - scale fishermen's household (1) Poklashar member's and (2) Non-member's.*

The labor in the processing of smoked fish for one year in fishermen group 1 average of 1,632 person-days / year while the average fisherman group 2 - average of 2,070 person-days / year. Number of HOK / year in fishermen's group 1 less than in group 2 because fishermen group 1 do smoked fish activity only during holiday and weekend while fsherman group 2 almost every day.

The amount of the conversion factor in fishermen's group 1 and group 2 is 0.89 which means that 1 kg of raw material is needed to produce 0.89 kg of smoked fish.

The coefficient of labor to process fresh fish in to smoked fish on the fisherman group 1 is 0.43 person-days or 3.4 hours which means that 1 kg of raw material input requires as much labor as 0.43 HOK or 3.4 hours while in group 2 is 0.67 HOK or 6.7 hours which means 1 kg of raw material input requires as much labor as 0.49 HOK or 6.7 hours. These long working hours included waiting for a buyer. The coefficient of labor in the fisherman group 1 is fewer than fisherman group 2 due to the division of labor for fishermen group 1 (the number of workers 2-3 person), while the fishermen's group 2 usually work by themselves (the number of workers 1-2 person).

The average of wage rate / day / person-days for one production processing on fishermen group 1 Rp 7208, - day / HOK while the fishermen group 2 Rp 6256, - day / HOK. Average of wage rate wage rate / day / HOK of fishermen group 1 is higher than the fishermen group 2 because the fisherman group 1 profit is higher.

The input price of raw material used is fresh fish in which the fishermen group 1 the average price of Rp. 21 625, -/ kg whereas in the fishermen group 2 of Rp. 18.500, -/ kg. The averages of raw material input fisherman groups 1 is greater than the fishermen group 2. This is because generally the buyer of fishermen group 1 is tourists who visit Prigi beach so

the species of fish sold are more diverse and has a high economic value and preferred by consumers such as snapper red, kweh rombeh, squid / cuttlefish, mackerel and pomfret while fishing groups 2 usually sell swordfish, yellowfin tuna and salmon..

Other current input in the fishermen group 1 is Rp 4.103, -/ kg of raw materials compared to the fishermen group 2 is Rp 3,529, -/ kg of raw material. This is because some of the equipment used by fishermen group 1 is more modern, transportation costs bigger and the packaging is more actractive.

The added value of processing fresh fish into smoked fish on fishermen group 1 is Rp 14 672, -/ kg with added value ratio of 36.28%, while in the fishermen group 2 the added value of Rp. 9971,-/ kg with added value ratio 28.86%.

The labor income provided from each kilogram of fresh fish raw material processed into smoked fish on the fisherman group 1 is Rp. 2.968, - the labour's share percentage is 19.58%, while in the fishermen group 2, the labor income is Rp. 3.185 with a labour's share percentage is 33.81%.

The profit amount obtained from the processing of fresh fish on a fishermen group 1 is Rp.11 704, - / kg with profit rate of 29.00% of the value of the product / output, while in fishermen group 2 the amount of profit is Rp. 6786, - / kg with profit rate of 19.42%.

In the fishermen group 1, each 1 kg of fish processed into smoked fish obtained margin of Rp 19,000, - is distributed to each factor which is labor income about 24.56%, other current input is 23.27% and processor profit is 52,16% whereas in the fisherman group 2, each kg of fish processed into smoked fish obtained margin of Rp 13.500, - is distributed to each factor which are labor income is 23,86%, other current input is 28,78% and processor profit is 47,36%.

CONCLUSION

The average value added which obtained by small – scale fishermen's household who are the members poklashar (Rp. 21 625, - / kg with added value ratio of 36.28%) is bigger than small – scale fishermen's household who are non member (Rp. 18.500, - / kg with added value ratio of 28.86%).

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ANALYSIS ON PRODUCTIVITY OF MEAT PROCESSING INDUSTRY IN INDONESIA

Jafrizal
Faculty of Economics, University of Sriwijaya, Indonesia
E-mail: drh_jafrizal@yahoo.co.id

ABSTRACT
The purpose of the paper is to analyze level of productivity of and affecting factors in meat processing industry in Indonesia. Data used are the data from the 1990 to 2013 annual survey of big-scale and mid-scale Indonesian meat processing industry from Indonesian Central Bureau of Statistics and the Indonesian Standardized Industrial Classification (ISIC) used is code 10130. Level of productivity is estimated using Total Factor Productivity approach and Data Envelopment Analysis-Malmquist (DEA-Malmquist) method. The findings show that the average productivity is 127.9%, which consists of 114.29% of growth of technology. In addition, the growth of efficiency is 95.5% and growth of economic scale is 98.33% (diseconomy and inefficiency). The market structure of the industry is strict oligopoly where average concentration of four largest companies (CR4) is 62.5%. Based on regression analysis using Weighted Least Square (WLS), it is found out that concentration, capital intensity and number of business unit have positive, significant influence towards productivity. Collusion and intensity of import have negative, significant influence towards productivity. There is different level of productivity prior to and after the implementation of anti-monopoly regulation; the level of productivity increases after the regulation has been established. On the other hand, level of productivity decreases after imported meat quota regulation is established compared to the time when the regulation has yet been established.

KEY WORDS
Oligopoly, concentration, collusion, regulation, meat product.

Growth of Indonesian meat processing industry has become attention of the researchers in the last few decades (Aswicahyono, 1998; Basri, 2001; Margono & Sharma, 2006; Modjo, 2007; Probowo & Cabanda 2011; Setiawan, 2013; Surjaningsih & Permono, 2014). Based on the data from the Central Bureau of Statistics (2014), growth of Gross Domestic Bruto (GDP) of meat processing industry between 2007 to 2013 keeps declining from 17.6% in 2007 to 1.13% in 2013. Demand of processed products of which ingredient is meet in increasing to 51.4%. Similar condition is also reported by Modjo (2007) who stated that between 1988 and 2000, industrial productivity is high. Surjaningsih and Permono (2014) reported between 2000 and 2004, industrial productivity is high but it is declining between 2005 and 2009. On the other hand, the National Development Planning Board (2010); Probowo and Cabanda (2011) reported similar information that growth of productivity between 2000 and 2007 is high.

Growth of productivity is influenced by various different factors. Different studies have resulted in different findings. Widiati and Kuncoro (2006) reported that productivity of processing industry in Indonesia is related to industrial concentration, size of company, use of imported goods as input, behavior in industry and government policy. Keramidou and Mimis (2011c) revealed that productivity of an industry is not influenced by capital intensity, age of company and skills of employees. At the opposite, Sripoorni and Manonmani (2014) reported that capital intensity has reported positive influence of modal intensity towards productivity. Pradiptyo (1996), also reported that government action also contributes in developing concentration. Bird (1999); Kuncoro (2007); Bank of Indonesia (2008) reported that the industry has relatively high concentration between 67 to 71.5% with tight oligopoly market structure so that it affects low productivity and effieciency of meat processing industry in Indonesia.

Policy intervention, regulation and government that involve limiting raw materials and finished goods can be violated by particular companies to strengthen their positions and control towards the market (Setiawan, 2013). The establishment of regulations about exporting and importing livestock in 2007 aims at decreasing imported beef until 10% of the national consumption. The regulation resulted in shortage of supply for beef used for household consumption and raw materials for certain industry. As the consequence, in 2013 the price of meat increased sharply. The condition influences performance of the national meat processing industry.

LITERATURE REVIEW

The basis of the study is Structure-Collusion-Productivity paradigm with the model developed by Martin (1999) and Carlton & Perlof (2005). Development of framework for industrial organization aims at creating simple causal effects with linear interaction between structure (concentration), behavior (collusion) and performance (productivity), as well as to analyze effect of regulation in market development. Some previous studies are Maudos (1998), Gumbou and Moudos (2000), Ollinger et al, (2005), Byeongyong et al, (2005), and Setiawan et al, 2012a), and Setiawan (2013).

Estimation of growth of productivity refers to theories by Kumbkhar and Lovell (2000) and Coelli et al (2005) who divide growth of productivity into three decompositions namely change of efficiency, technology and economic scale. The Malmquist index is introduced by Caves et al., (1982), and their decomposition for a change in efficiency and technology is proposed by Nishimizu and Page (1982) and Fare et al., (1992).

Empirical studies about meat processing industry in various countries have been conducted by various experts such as Xia and Buccola (2002) who found out that level of productivity of meat processing industry in the USA was low. Ali (2007) in India revealed that between 1980 and 2013, growth of productivity was low. Nossal et al., (2008) stated that productivity of meat processing industry in Australia is growing each year. In Ukraine, Goncharuk (2009) described that growth-increasing efficiency happened due to decrease of inputs such as capital and employees. In Spain, Kapelko et al., (2012) elaborated that decreasing productivity happened due to lower technology.

Related to the elaboration, the study analyzes productivity of meat processing industry and influence of concentration, collusion, intensity of imported meat, capital intensity, number of companies, anti-monopoly regulation, and imported meat quota regulation towards productivity of meat processing industry in Indonesia. The methods used are Data Envelopment Analysis Malmquist (DEA-Malmquist) and Weighted Least Square regression analysis.

RESEARCH METHODOLOGY

Data. The data used in the study were the data from the 1990 to 2013 annual survey of big-scale and mid-scale Indonesian meat processing industry from Indonesian Central Bureau of Statistics (*Badan Pusat Statistik* or BPS) and the Indonesian Standardized Industrial Classification (ISIC) of which code is 10130.

Method. Concentrated Ratio (CR) is a tool used to measure structure of an industry. CR4 is combination of market share of four biggest companies in the industry.

$$CR4 = \sum_{i=1}^{4} S_i \qquad (1),$$

where: CR4 = Concentration of the fourth largest company; Si = market share of i company.

Collusion refers to collusion of estimated score from level of collusion (α) using Clarke et al, (1984) and Demsetz (1973) models presented in the following equation:

$$\Pi / R = \alpha / \eta + ((1-\alpha)) / \eta \; H \; 0 \leq \alpha \leq 1 \text{ dan } (\partial\alpha) / (\partial H > 0) \qquad (2)$$

Π refers to profit, R refers to income, Π / R refers to profit revenue ratio and H refers to Herfindahl Index (HI) or the square amount of market share from all companies in one industry, α refers to collusion, η refers to elasticity of good demand towards change of price. The unit is in the form of percentage. Imported Intensity is total volume of national imported beef per year (in millions of tons).

Capital Intensity Ratio is ratio between total amount of capital divided by the number of production. Smaller ratio means the more efficient the use of asset is (Setiawan et al, (2012b, 2013); Ullah et al, (2013); Keramidou et al, (2010).

$$CIR = (\text{Total Value of Assets}) / (\text{Production}) \quad (3)$$

Regulation refers to government regulation related to anti-monopoly that is the 1999 Regulation number 5 as the Anti-Monopoly regulation and imported and exported meat and implementation of imported meat limitation that is Minister of Agriculture's Decree number 59/Permentan/HK.060/8/2007 as regulation for imported meat quotas. Different effect of the regulations can be seen using regulation Dummy. Year after the regulations is established is given score of 1 and year before the regulation is established is given score of 0. Company Unit refers to number of mid-scale and big-scale companies in meat processing industry in one year (Unit).

Productivity is decided using Malmquist Index. Malmquist Index is introduced by Gua et al., (1982), and their decomposition to change in efficiency and technology is proposed by Nishimizu & Page (1982) and Fare et al. (1992). Kumbhakar and Lovell (2000). Collie, et al., (2005) elaborate Total Factor Productivity (TFP) into three components namely change of technology (technical change), change in technical efficiency (technical change efficiency), and economic effect scale. Malmquist Productivity Index (MPI) measures change in productivity based on time variance and can be described in change of efficiency and change of technology (change of productivity) with DEA as non parametric approach. DEA-Malmquits model can be elaborated in functional pattern (distance function) and the time is t and t + 1.

$$MPI_I^t = \frac{E_I^t(x^{t+1}, y^{t+1})}{E_I^t(x^t, y^t)} \text{ and } MPI_I^{t+1} = \frac{E_I^{t+1}(x^{t+1}, y^{t+1})}{E_I^{t+1}(x^t, y^t)} \quad (4),$$

where: I represents orientation of MPI model and change inTFP index is total factor of productivity (tfpch).

Model Specification. Model of equation for meat processing industry in Indonesia is development of the model that had been used empirically by Keramidou et al., (2010), Keramidou et al., (2011), Ohlan (2013), Xie and Cummins (2013) and Setiawan et al, (2012b and 2013); thus, the equation is as follow:

$$TFP = C(1) + C(2) * CR4 + C(3) * COLLUSION + C(4) * IMPORT + C(5) * CIR + C(6) * UNIT + C(7) * RAM + C(8) * RKID + [AR(2) = C(55)] \quad (2.5)$$

C2, C3, C8 <0 and C4, C5, C6, C7> 0

Estimation model used is WLS-weighted square.

Hyphothesis. Hypothesis in the study is that concentration has negative effect towards production, collusion has negative effect towards productivity, intensity of import has negative effect towards productivity, capital intensity ratio has positive effect towards productivity, company unit has positive influence towards productivity, anti-monopoly regulation is different (positive) towards productivity after it is established, and imported beef quota regulation is different (negative) towards productivity after being established.

FINDINGS AND DISCUSSION

Based on DEA-Malmquist estimation, average level of productivity (Total Productivity Factor/ TFP) of the industry between 1990 and 2013 is 127.9% that means the growth of productivity of the industry is 27.9%. The growth of productivity is contribution of positive growth of technology that is 14.29% while growth of efficiency and economic scale is negative.

Table 1 – Growth of Productivity of Meat Processing Industry in Indonesia

Period	Components Total Factor Productivity (TFP)			
	Δ TFP (percent)	(Δ Efficiency) (percent)	Δ*Tech* (percent)	Δ Scale (percent)
1990-1992	94.5	89	105	94.5
1993-1995	137	129.33	112.67	108
1996-1998	137	100.67	138.67	99.67
1999-2001	128.67	100.33	124	95.33
2002-2004	95.33	104.67	92	115
2005-2007	125.33	102.67	121.33	102.67
2008-2010	130	102	123	104.33
2011-2013	133.67	97	132.67	98.67
Rata-Rata	127.9	99.5	114.29	98.33

Description: EFficincy = Technical Efficiency; TECH = Technology;
Scale = Scale Economics; TFPch = Total Factor Productivity Change; Δ = Change / Growth.
Source: Results DEA-Malmquist Estimation.

The lowest growth of productivity occurs between 1990 and 1992 of -5.5% while the highest growth of productivity occurs between 1993 and 1995 as well as 1996 and 1998 of 37% which becomes the contribution of technical efficiency growth and growth while the growth of economic scale is negative. After the economic crisis, the growth of declined and the lowest one was between 2002 and 2004 of -4.67%. The findings are in line with Aswicahyono (2002) and Timmer (1999). The condition happened due to huge number of new companies using cutting-edge technology and as the effect it requires some time for employees to be able to operate the machine well. Based on report of The World Bank (1991) between 1990 and1992, input of capital in 1992 is IDR 572,500,000,000 or 51 billions more than 1990.

Between 1993 and 1995, it was found out that the average Total Factor of Productivity (TFP) is 137% that means growth of productivity of the industry is 37%. The growth is the positive contribution from change in efficiency growth, positive change of technology and economic scale. The positive growth of productivity is different from Tanuwijaya and Sharma (2004) and Modjo (2007) who found out that the growth of productivity in the meat processing industry is negative.

The average productivity of the industry between 2005 and 2007 is 25.33%. Between 2008 and 2010, there is 30% growth of the industry. In addition, between 2011 and 2013, there is also 33.67% increase. The growth is also the contribution of the growth of technology and economic scale while technical efficiency is negative. There is an issue regarding availability of raw materials and price in the industry between 2011 and 2013. Decreasing number of import results in shortage of raw materials and increasing price helps the industry in the form of cost efficiency. High expenses for raw materials results in low efficiency. Productivity of the industry can still grow due to the use of technology and economic scale. The finding is consistent with the findings of a study conducted by Aswicahyono (2002).

In order to find out influence of concentration, import intensity and regulation towards productivity of meat processing industry, estimation of regression using Weighted Least Square is used. The findings are concentration (CR4) has positive significant influence towards productivity (TFP). It is in line with Fitriani et al., (2014) and different from Gopinath et al (2002). The finding is different from the hypothesis. It happens because the company with huge market share tends to increase productivity using cutting-edge technology which

gives positive contribution towards technology while growth of efficiency and economic scale are negative. High productivity is due to increasing capital for machinery and huge buildings. Change of efficiency and economic scale do not cause growth of productivity so that developing skills of employees so that they can adjust to the growth of technology in meat processing industry is vital.

Collusion has negative significant influence towards productivity (TFP). The finding is in line with the hypothesis. Such condition happens due to collusion that takes place to decide number of production and price; collusion can increase and control price in order to avoid overproduction that reduces price. The production control influences productivity of processing industry accumulatively.

Table 2 – Analysis of Factors Affecting Productivity

Independent Variable	Symbol	Coefficient	t-Statistic	P-Value	Prob
Constant	C(1)	-9.374	-4.880	0.000	***
Concentration (CR4)	C(2)	1.848	2.555	0.025	***
Collusion (Collusion)	C(3)	-3,999	-2.911	0.013	***
Import Of Meat Intensity (Import)	C(4)	-0.014	-5.106	0.000	***
Capital Intensity Ratio (CIR)	C(5)	0.933	3.003	0.011	***
Unit Of Company (Unit)	C(6)	0.365	4.947	0.000	***
Antitrust Regulation (RAM)	C(7)	0.741	2.963	0.012	***
Meat Import Quota Regulation (RKID)	C(8)	-6.081	-4.449	0.001	***
Aotoregression Ordo 2(AR-2)	C(55)	-1.074	-6.153	0.001	***
R-squared	0.679	Mean dependent var		1.308	
Adjusted R-squared	0.465	S.D. dependent var		0.677	
S.E. of regression	0.495	Sum squared resid		2.944	
Durbin-Watson stat	2.769				

Source: Weighted Least Squares Regression Results.

Capital Intensity Ratio (CIR) has significant, positive influence towards productivity (TFP). Capital intensity is effort of company to use all his assets to create sales. The higher CIR is, the more efficient the use of asset is. The average CIR during the study is 0.56 or 56% of the capital used for production. High CIR in the form of cutting-edge machine and equipment to create finished products will increase productivity of industry.

Number of business unit has positive, significant influence towards productivity (TFP). The finding is in line with the hypothesis. Increasing number of productivity will increase national production when a new company develops its market share. Increasing number of companies will encourage competition, decrease concentration and improve performance of the industry. It is in line with Gopinath, et al., (2002)'s study. Increasing number of companies in business competition will also encourage companies to improve efficiency of their production to survive the competition.

There is significant difference prior to and after the implementation of anti-monopoly regulation towards TFP. The finding is different from the findings of the study conducted by Gopinath et al, (2002) and Nurdianto (2004). Such condition support the indication that there are other factors such as the effect of the 1997/1998 economic crisis that affect production after the establishment of anti-monopoly regulation in 1999. One of the purposes is to eliminate monopoly and collusion as well as creating more competitive market. High concentration will encourage collusion that decreases competition and causes inefficient production. The condition decreases productivity of which source is efficiency. The influence does not happen in meat processing industry where an increase of productivity is caused by growth of technology. During the 1997/1998 economic crisis more particularly during the economic recovery, purchasing power and currency rate against US$ was high. It was predicted that these elements influence productivity of the industry so that anti-monopoly regulation is not the variable that influences productivity.

There is significant difference after the imported meat quota regulation was established towards TFP. After the regulation was established, the productivity decreases compared to the time when the regulation has yet been established. The finding is in line with the

hypothesis. Putting limitation for imported meat to nearly 10% has influence towards hotel, restaurant, catering, big retails and processing industry that uses meat as the raw materials. Setting limitation for imported meat for household will increase demand for processed meat products. High demand will cause increasing raw materials and their price. Besides that, efficiency and productivity will also decrease.

CONCLUSION

Based on the analysis, level of productivity (Total Factor of Productivity/ TFP) of meat processing industry in Indonesia between 1990 and 2013 is 127.9% that becomes positive contribution of growth of technology and negative contribution of growth of efficiency and economic scale. The market structure of the industry is strict oligopoly, where average growth of productivity of the four largest company in the industry (CR4) is 62.5%. Concentration, capital intensity and number of business unit have positive significant influence towards productivity, while intensity of import and collusion have negative significant influence towards growth of productivity. Level of productivity is increasing after the implementation of anti-monopoly regulation, while level of productivity decreases after the implementation of regulations related to imported meat quota.

POLICY IMPLICATION

Increasing productivity in Indonesian meat processing industry happens due to technology instead of growth of economy or economic scale. It can be seen based on low growth of economy and economic scale. Policy to increase efficiency and economic scale can happen by the use of efficient raw material, increasing skills of employees and use of efficient fuel such as natural gas, using local products as capital, increasing capacity of production by facilitating market access and raw materials as well as continuous supervision from anti-monopoly regulation executors.

Collusion and intensity of import can reduce growth of productivity. There should be a policy that requires supervision towards companies that have collaboration for setting production and prices. Companies should be encouraged to work together in terms of transfer of technology between companies, getting raw materials to improve efficiency of the companies. There should be supervision related to imported meat intensity of which allocation is given to household consumption, hotel, restaurant and catering. Increasing import will decrease productivity of meat processing industry so that imported meat quota and meat product regulations should consider sustainability of meat processing and livestock industry in Indonesia.

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МОДЕРНИЗАЦИЯ УПРАВЛЕНИЯ В ОТРАСЛИ МОЛОЧНОГО СКОТОВОДСТВА В ЦЕЛЯХ ОБЕСПЕЧЕНИЯ КАЧЕСТВЕННЫМ ПРОДОВОЛЬСТВИЕМ

MODERNIZATION OF MANAGEMENT IN DAIRY FARMING INDUSTRY TO ENSURE FOOD QUALITY

Сухочева Н.А.*, **Грудкина Т.И.**, кандидаты экономических наук
Suhocheva N.A., Grudkina T.I., Candidates of Economic Sciences
ФГБОУ ВО «Орловский государственный аграрный университет имени Н.В. Парахина», Орел, Россия
Orel State Agrarian University, Orel City, Russia
*E-mail: suhoceva@bk.ru

АННОТАЦИЯ
Модернизация процессов управления в отрасли молочного скотоводства является ключевой и приоритетной функцией субъектов агробизнеса. В данной статье предложено наращивание устойчивого производства продукции для своевременного обеспечения продовольствием населения. Новизна, состоит в определении комплекса взаимозависимых последовательных мероприятий, посредством которых достигается эффективное использование ресурсного потенциала и изменения в структуре продовольственного комплекса за счет приоритета в производстве наиболее ценных продуктов питания и сырья для промышленности.

ABSTRACT
Modernization of management processes in the industry of dairy cattle breeding is a key and priority function of the entities of agribusiness. In this article we propose a capacity-sustainable production for timely food security of the population. The novelty consists in defining a set of interdependent sequential activities, which is achieved through effective use of resource potential and changes in the structure of the food complex due to the priority in the production of the most valuable food and raw materials for industry.

КЛЮЧЕВЫЕ СЛОВА
Аграрная экономика, модернизация, молочное скотоводство, показатели эффективности, продовольствие, рацион кормления, управление отраслью, эффективность.

KEY WORDS
Agrarian economy, modernization, dairy farming, performance indicators, provision, feeding, management of the industry, efficiency.

Преимущественно конкурентное ведение сельскохозяйственного производства невозможно без своевременной модернизации управления, в том числе в отрасли молочного скотоводства. Молочное скотоводство является той отраслью аграрного производства, которая, несмотря на существенное внимание со стороны государства, продолжает оставаться низкоэффективной, что говорит о необходимости увеличения объема производства. Молоко относится к базовым продуктам питания, и в соответствии с Доктриной продовольственной безопасности в Российской Федерации уровень самообеспечения страны по молоку и молочным продуктам должен быть не менее 90%, тогда как в 2013 г. он составил всего около 80%. Актуальность обозначенных проблем, при их недостаточной разработанности применительно к конкретным региональным особенностям привели к изучению данного направления, разработке комплекса приоритетных позиций с целью повышения эффективности отрасли молочного скотоводства.

Заметим, что многообразие определений эффективности производства является следствием множества трактовок ее критериев. Критерием экономической эффективности всего народного хозяйства является объем национального дохода в расчете на душу населения. Критерий экономической эффективности выступает в качестве мерила или оценки тех или иных мероприятий, осуществляемых в сельском хозяйстве [11].

По мнению Н.В. Калеева, показатели экономической эффективности сельскохозяйственного производства следует разделять на частные и обобщающие. При этом частные показатели характеризуют эффективно ли используются отдельные виды ресурсов или затрат, а обобщающие показывают полную оценку экономической эффективности использования ресурсного потенциала и текущих производственных затрат [4].

Подробнее система частных и обобщающих показателей эффективности сельскохозяйственного производства представлена в таблице 1.

Таблица 1 – Система частных и обобщающих показателей эффективности производства и реализации молока

Показатели эффективности производства молока	Показатели эффективности реализации молока
частные показатели	
- надой на одну корову, ц -себестоимость 1 ц производимого молока, руб. - производственные затраты на 1 голову, руб. - расход кормов на 1 ц молока, ц к. ед. или в руб. - затраты труда на 1 ц молока, чел.- час. - выход телят на 100 коров, голов	- цена реализации 1 ц молока, руб. - себестоимость 1 ц реализуемого молока, руб. - товарность, % - удельный вес 1 сортового молока, %
обобщающие показатели	
- объем производства молока на 100 га с. − х. угодий - себестоимость 1 ц молока	- рентабельность (окупаемость затрат), %

Выход молока в расчете на 100 га сельскохозяйственных угодий является обобщающим показателем производства молока. В нем суммируются результаты частных показателей, которые характеризуют основные условия производства: молочная продуктивность, производительность труда, кормоотдача [4].

По данным Министерства сельского хозяйства, в России отрасль скотоводства значительно пострадала после развала Советского Союза: сократилось поголовье скота всех пород, производство продукции скотоводства. На 1 января 2013 года поголовье крупного рогатого скота составило 20,0 млн. голов, что на 0,8% ниже показателей 2012 года [14].

Одной из причин упадка в отрасли скотоводства явилось вступление России в ВТО. В результате чего произошло увеличение доли импортной молочной продукции, прежде всего из Белоруссии и стран Европы; некоторое снижение цен на молоко и молочные продукты на розничном рынке и существенное – на рынке сырого молока; рост цен на основные факторы производства.

По данным Росживотноводсоюза, импорт молока и сгущенных сливок в Россию в январе-марте 2014 года вырос на 80% и составил 42,4 тыс. тонн, что на 33% превышает показатель за первый квартал 2013 года. Данная тенденция на отечественном рынке связана с низкой конкурентоспособностью российских производителей молока в условиях нахождения в ВТО и дефицитом собственного сырья на переработку [7].

Рассмотрим подробнее состояние отрасли скотоводства в России в период с 2009 по 2015 год по данным Росстата [10].

Таким образом, в период с 2009 по 2015 поголовье крупного рогатого скота в хозяйствах всех категорий преимущественно снижалось. Причины данного снижения заключаются в низкой инвестиционной привлекательности отрасли, требующей долгосрочных кредитных ресурсов; низкой рентабельности производства; вступлении России в ВТО; недостаточном технологическом уровне. Исключение составляют

сельскохозяйственные организации Брянской области, в которых на протяжении исследуемого периода численность крупного рогатого скота постоянно увеличивалась. Если же рассматривать динамику поголовья крупного рогатого скота в 2015 г. относительно предыдущего, то в ЦФО произошло увеличение поголовья на 1,4%, в том числе и в Орловской и Брянской областях на 36,3% и 4,6% соответственно.

Таблица 2 – Поголовье крупного рогатого скота (на конец года; в хозяйствах всех категорий; тысяч голов)

п/п	Годы						
	2009	2010	2011	2012	2013	2014	2015
Российская Федерация	20671,3	19967,9	20111,0	19930,4	19564,0	19263,7	18992
Центральный федеральный округ	2989,2	2867,7	2845,8	2854,6	2834,9	2833,2	2874,1
Орловская область	151,6	139,6	134,9	133,6	125,9	116,2	158,4
Брянская область	189,0	182,2	213,3	250,1	332,5	405,6	424,1
Курская область	209,9	204,6	134,9	133,6	175,5	162,9	157,1
Липецкая область	158,2	145,9	143,7	138,6	125,6	123,2	123,7

В частности рассмотрим динамику поголовья коров в России в хозяйствах всех категорий, представленную в таблице 3 [15].

Таблица 3- Поголовье коров (на конец года; в хозяйствах всех категорий; тысяч голов)

п/п	Годы						
	2009	2010	2011	2012	2013	2014	2015
Российская Федерация	9025,8	8844,3	8988,0	8858,6	8661,0	8530,8	8408,1
Центральный федеральный округ	1307,0	1266,7	1240,9	1210,0	1192,3	1173,1	1171,6
Орловская область	56,2	52,7	53,7	52,8	46,6	41,1	39,0
Брянская область	96,5	94,9	95,5	96,3	134,1	155,2	176,7
Курская область	92,5	91,0	90,3	84,9	75,6	70,4	65,4
Липецкая область	57,8	55,8	54,7	52,2	50,2	48,8	48,9

Из данной таблицы видно, что на фоне уменьшения общей численности крупного рогатого скота в сельскохозяйственных предприятиях Российской федерации численность коров так же уменьшается, за исключением предприятий Брянской области. Благодаря государственной поддержке и инициативе крупных инвесторов, развитие отрасли животноводства в Брянской области набрало положительную динамику.

На основе данных Росстата рассмотрим изменение в численности крупного рогатого скота в 2015 году по сравнению с 2014 годом [15].

Таблица 4- Поголовье крупного рогатого скота, в том числе коров, тыс. гол.

п/п	Крупный рогатый скот			в том числе коровы		
	2014 г.	2015 г.	2015 г. в% к 2014 г.	2014 г.	2015 г.	2015 г. в% к 2014 г.
Российская Федерация	19263,7	18992	98,6	8530,8	8408,1	98,6
Центральный Федеральный округ	2833,2	2874,1	101,4	1173,1	1171,6	99,9
Орловская область	116,2	158,4	136,3	41,1	39,0	94,9
Брянская область	405,6	424,1	104,6	155,2	176,7	113,9
Курская область	162,9	157,1	96,4	70,4	65,4	92,9
Липецкая область	123,2	123,7	100,4	48,8	48,9	100,2

Не смотря на то, что поголовье имеет тенденцию к снижению, состояние отрасли скотоводства в 2014 году нормализуется в сравнении с предшествующими годами. Одной из причин положительной динамики в отрасли является введение санкций против России.

Так, в августе 2014 года ввоз продовольственных товаров из стран, которые ввели санкции против РФ, уменьшился на 7,5%, что способствует увеличению доли

отечественных производителей во внутреннем сегменте молочной продукции и является дополнительным стимулом к развитию отрасли.

Кроме того, в апреле 2014 года в целях нивелирования негативных тенденций, которые отмечались в отечественном производстве молока в 2013 году, правительство РФ приняло решение дополнительно простимулировать производство товарного молока [7]. Документ предусматривает оказание господдержки сельхозтоваро-производителям с учетом объемов реализованного и отгруженного на собственную переработку молока, стимулируя тем самым развитие данной сферы производства готовой продукции.

Племенная база молочного скотоводства в России насчитывает 1353 племенные организации, что на 124 меньше, чем в 2013 году. По численности поголовья доминирующее положение занимает КРС черно-пестрой породы – 58%, симментальской породы – 9,6%, холмогорской породы- 8,8% и красно-пестрой породы – 5,5% (рисунок 1).

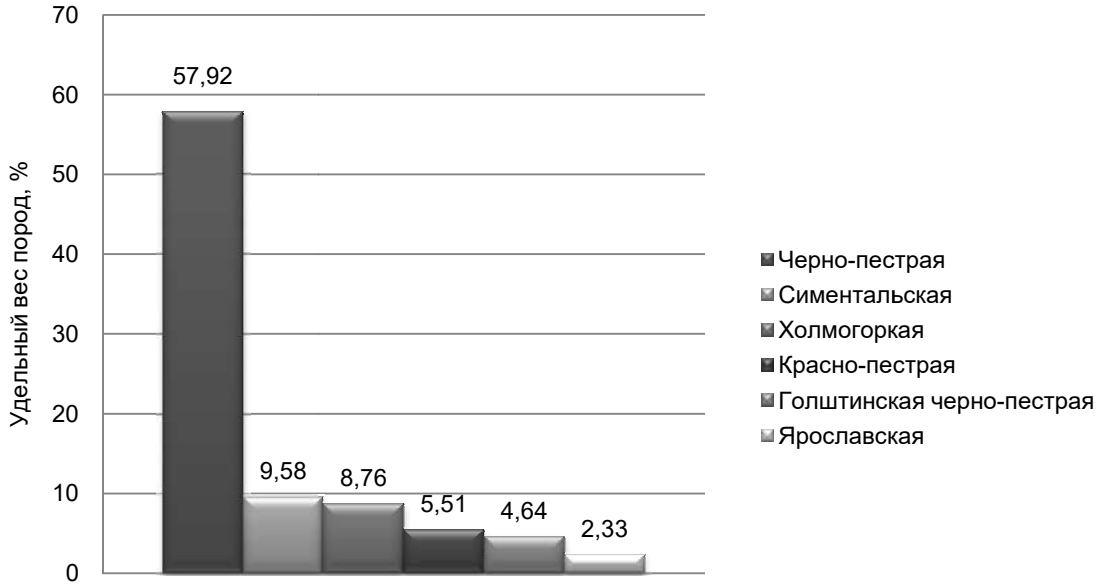

Рисунок 1 – Процентное соотношение породного состава молочного скота в России, %

В обычных условиях животные черно-пестрой породы дают 3000 - 3500 кг молока. Молоко этих коров не особо жирное, жирность составляет 3,6%. Что касается жирности молока в Орловской области, то оно гораздо ниже нормального показателя, который составляет 4, 5%. Средняя жирность молока колеблется на уровне 2,7- 3,9%.

Ввиду того, что жирность молока зависит от физиологического состояния животного и рациона кормления, из представленных выше данных можно сделать вывод о том, что рацион кормления животных недостаточно сбалансирован. Рассмотрим динамику продуктивности коров в среднем по России, представленную на рисунке 2.

одну корову в среднем по России меняется незначительно. Однако, в 2015 г. по отношению к 2010 г. произошло увеличение среднегодового надоя на 1 голову на 14,7%.

Рассматривая особенности и тенденции развития скотоводства в Орловской области, важно отметить, что в рамках реализации Государственной программы развития сельского хозяйства и регулирования рынков сельскохозяйственной продукции, сырья и продовольствия на 2013–2020 годы осуществляется предоставление субсидий на поддержку племенного животноводства [8]. Так, по данным пресс-службы главы региона в 2014 году на поддержку животноводства было 44 млн. рублей.

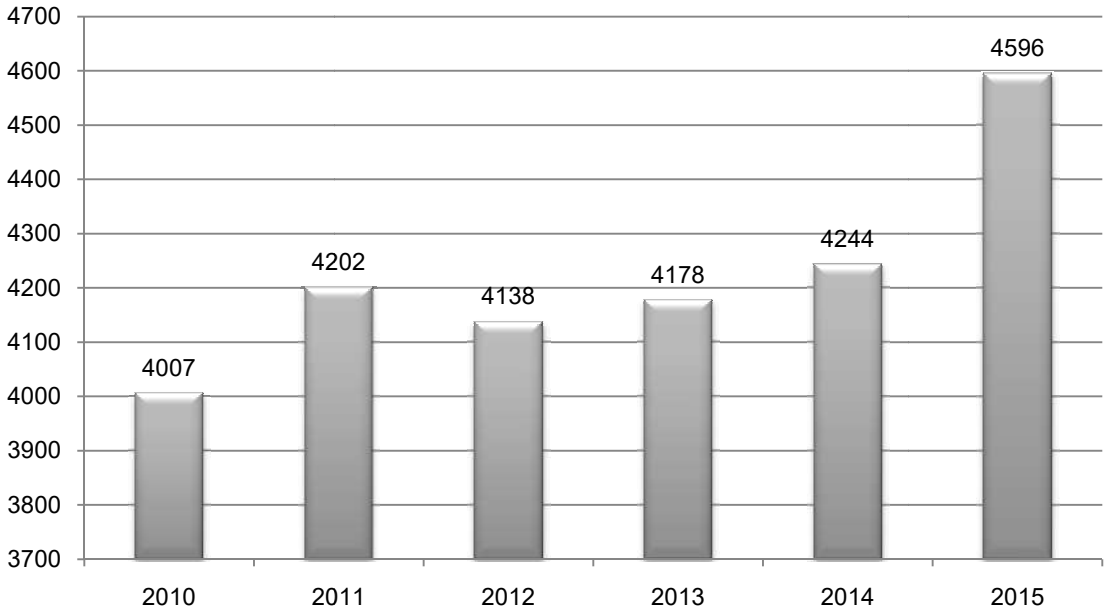

Рисунок 2 – Динамика среднегодового надоя от 1 коровы, кг

По результатам 2014 года стадо крупного рогатого скота в хозяйствах всех категорий орловской Области насчитывало 162,9 тыс. голов (93% к 1 января 2013 г.), в том числе коров – 41,1 тыс. голов (88%) [14].

Как объясняют в областном департаменте, одной из причин снижения поголовья стала выбраковка скота из-за заболевания лейкозом. В прошлом году по этой причине была выбракована 1341 высокопродуктивная корова.

Однако, несмотря на имеющиеся проблемы в молочном скотоводстве, многие организации не только сохраняют отрасль, но и предпринимают реальные шаги по ее дальнейшему развитию и повышению эффективности.

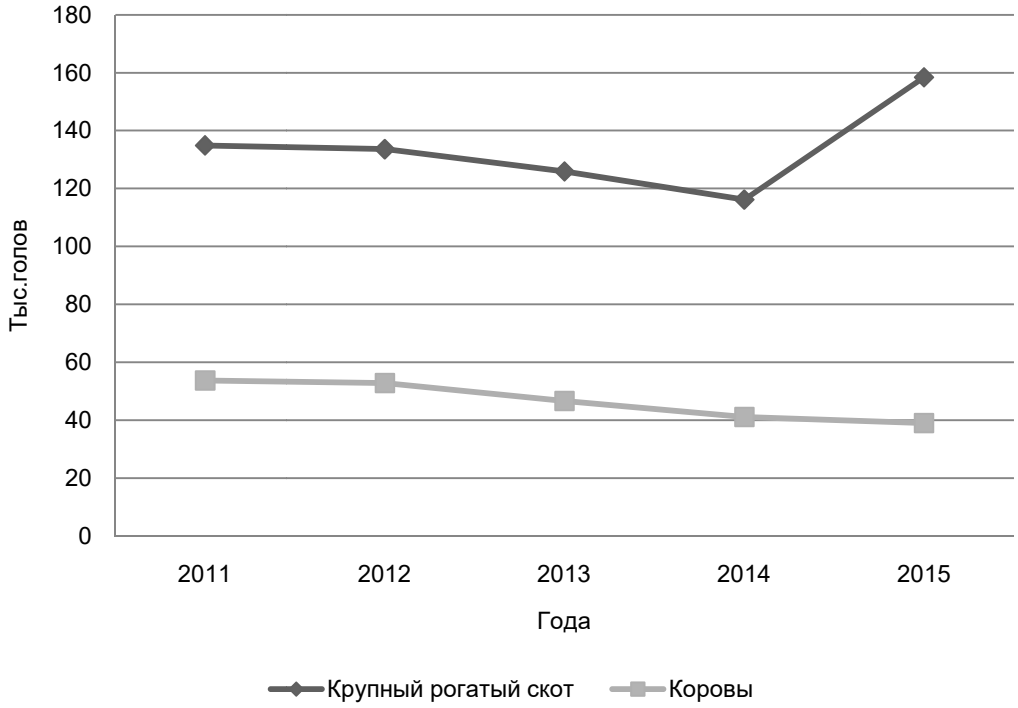

Рисунок 3 – Динамика поголовья КРС в Орловской области

Анализ производства молока в 2014 году по Орловской области, представленный ниже, показывает, что всего получено 214,7 тыс. тонн молока. Наибольший валовой надой представлен предприятиями Ливенского района- 41750 тонн, что на 5,4% выше показателя 2010 года. Кроме того увеличение надоя молока произошло в предприятиях Сосковского, Залегощенского, Глазуновского районов (рисунок 4) [14].

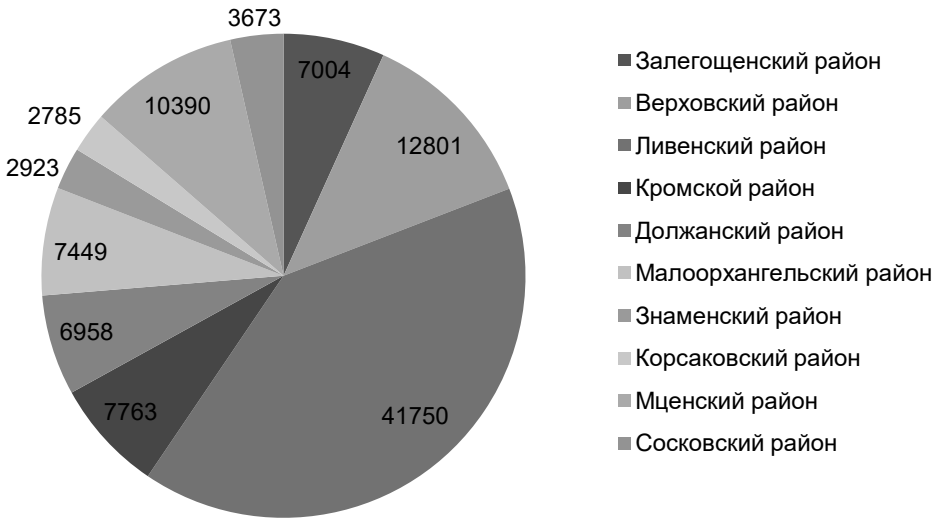

Рисунок 4 – Производство молока в районах Орловской области, тонн

В среднем от одной коровы в крупных, средних и малых сельскохозяйственных организациях надоено по 4110 кг молока, что на 7 кг больше уровня прошлого года. Продуктивность коров возросла в девяти районах, при этом самый высокий надой молока получен животноводами Верховского (6645 кг) и Болховского (6207 кг) районов [14].

В целом в Орловской области вместе с широко известным ОАО АПК «Орловская Нива» организованы такие интегрированные структуры как ЗАО «Орёл-Нобель-Агро», ОАО «Орловские черноземы», «СЕТ-Орёл-инвест» и «Орловский лидер», которые являются высокопривлекательными для инвесторов. Это дает надежду на то, что состояние животноводства в области увеличит свои обороты, приведет к экономическому развитию региона и страны в целом, что возможно благодаря совершенствованию отрасли и повышению эффективности производства.

Обеспечить развитие региональных экономических систем можно только при масштабном притоке инвестиций, как отечественных, так и иностранных. Однако объемы привлекаемых в российские регионы инвестиционных ресурсов явно недостаточны для инновационного прорыва региональной экономики. В этих условиях вопрос об инвестиционном обеспечении в российских регионах в настоящее время выходит на первый план [9].

Прежде всего, это совершенствование грантового механизма, развитие сельскохозяйственной потребительской кооперации, формирование механизма предоставления льготных целевых кредитов под 3-5% годовых, создание информационно-консультационных центров. Совершенствование грантового механизма будет способствовать увеличению объемов производства сельскохозяйственной продукции и повышению вклада региона в обеспечение продовольственной безопасности Российской Федерации [12].

Однако, в условиях современности снижение объемов кредитования малых форм хозяйствования происходит из-за отсутствия гарантий и недостаточности залоговой базы. Банки обоснованно не хотят брать в залог изношенную сельхозтехнику. Но у основной массы КФХ иной техники нет. Ссылаясь на общую высокую задолженность

сельхозпроизводителей, банки отказывают им в выдаче кредитов. Хотя основная часть невозврата кредитов приходится не на малые формы хозяйствования, а на крупные сельхозпредприятия и агрохолдинги [6].

Считаем, что основным направлением повышения экономической эффективности производства продукции животноводства является рост продуктивности животных при экономном расходовании материально-денежных средств на их выращивание. Также повышение экономической эффективности животноводства немыслимо без дальнейшего роста уровня комплексной механизации всех технологических процессов. При этом необходимо отметить, что получение и эффективное использование доступной и надежной информации в управлении рисками играет ключевую роль. Поэтому одним из основных направлений формирования системы риск- менеджмента в сфере аграрного предпринимательства является разработка прогнозных сценариев ее развития [1]. В связи с этим, более детально остановимся на одной из сельскохозяйственных организаций Орловской области. Нами был определен концентратный тип кормления животных, который является биологически неполноценным и часто вызывает заболевание коров, нарушения воспроизводительных функций и раннюю выбраковку животных вследствие нарушения обмена веществ и бесплодия. На таких рационах у коров нарождаются гипотрофичные, нежизнеспособные телята, страдающие диспепсией [2].

Таким образом, на исследуемой организации требуется оптимизация кормового рациона с последующим внесением в корм животных кормовых добавок. Рассчитаем оптимальный рацион для дойной коровы живой массой 450 кг, среднесуточным удоем 8,0 кг, жирностью молока 3,95%.

Функции суточных потребностей в питательных веществах дойных коров:

$$y1=0,587k1+(0,2062+0,07k3)*k2+1,92 \quad (1)$$

$$y2=63,337k1+(22,249+8,2k3)*k2+207,168 \quad (2)$$

$$y3=24,419k1+(8,578+3,162k3)*k2+79,872 \quad (3)$$

где: y1, y2, y3 - соответственно суточная потребность в кормовых единицах (кг), переваримом протеине (г), каротине (мг); k1 - живая масса, ц; k2 - среднесуточная продуктивность, кг; k3-содержание жира в молоке, %.

Таблица 5 – Функции и нормы допустимых вариаций содержания отдельных групп, подгрупп и видов кормов в суточных рационах животных (в% к общей питательности рациона)

Группа (подгруппа) и вид корма	Минимум	Максимум
Концентрированные + травяная мука	К=-0,28k1+1,24k2+7,6	М=-0,28k1+1,24k2+13,4
в т. ч. высокобелковые	-	20%
в т. ч. трав. мука	-	4%
Грубые	К=1,22k1-0,679k2+19,8	М=2,08k1-0,679k2+28,8
в т. ч. сено	К=1,22k1-0,308k2+12,22	М=1,22k1-0,308k2+22,18
Сочные	К=-1,4k1-0,514k2+59,15	М=-1,4k1-0,514k2+67,25
в т. ч. силос	К=-0,96k1-0,609k2+35,33	М=-0,96k1-0,514k2+67,25
в т. ч. сенаж	К=-0,467k1-0,172k2+19,72	М=-0,467k1-0,172k2+22,41

Таблица 6 – Предельные границы содержания кормов в рационе (проценты к общей питательности рациона)

Группа, подгруппа и вид кормов	Минимум, %	Максимум, %
концентраты + травяная мука	16,3	22,1
грубые	23,7	32,7
в том числе сено	15,3	25,2
сочные	48,7	56,8
в том числе силос	26,1	31,5
в том числе сенаж	16,2	18,9

По формулам рассчитываются потребности животных в кормовых единицах, переваримом протеине и каротине.

Перечень переменных включает: x1 кг – горох; x2 кг – овес; x3 кг – ячмень; x4 кг – травяная мука; x5 кг – сено естественных сенокосов; x6 кг – сено многолетних трав; x7 кг – солома; x8 кг – сенаж однолетних трав; x9 кг – силос кукурузный; x10 кг – кормовая свекла; x11 - суммарное количество кормовых единиц.

Числовая математическая модель задачи:

1. Ограничение, требующее наличия в рационе не менее 8.61 корм. ед.:

$$1{,}14x_1+1x_2+1{,}09x_3+0{,}65x_4+0{,}37x_5+0{,}46x_6+ 0{,}2x_7+0{,}3x_8+0{,}16x_9+0{,}11x_{10} –x_{11}= 0$$
$$x_{11}\geq 8{,}61$$

2. По содержанию в рационе переваримого протеина, г.:

$$159x_1+83x_2+89x_3+118x_4+37x_5+83x_6+10x_7+ 42x_8+12x_9+8x_{10} \geq 929{,}3$$

3. По содержанию в рационе каротина, мг:

$$x_1+x_2+128x_4+16x_5+45x_6+3x_7+34x_8+10x_9 \geq 358{,}3$$

4. По минимальному включению в рацион концентрированных кормов и травяной муки, кг корм. ед.:

$$1{,}14x_1+x_2+1{,}09x_3+0{,}65x_4 \geq 0{,}163x_{11}$$

5. По max включению в рацион концентрированных кормов и травяной муки, кг корм. ед.:

$$1{,}14x_1+x_2+1{,}09x_3+0{,}65x_4\ 0{,}163x_{11}\leq 0{,}221x_{11}$$

6. По min включению грубых кормов, корм. ед.:

$$0{,}37x_5+0{,}46x_6+0{,}2x_7 \geq 0{,}237x_{11}$$

7. По max включению грубых кормов, корм. ед.:

$$0{,}37x_5+0{,}46x_6+0{,}2x_7\leq 0{,}327x_{11}$$

8. По min границе введения сена, корм. ед.:

$$0{,}37x_5+0{,}46x_6 \geq 0{,}153x_{11}$$

9. По max границе введения сена, корм. ед.:

$$0{,}37x_5+0{,}46x_6\leq 0{,}252\ x_{11}$$

10. По min включению сочных кормов и сенажа в рацион, корм. ед.:

$$0{,}3x_8+0{,}16x_{9+}0{,}11x_{10} \geq 0{,}487x_{11}$$

11. По max включению сочных кормов и сенажа, корм. ед.:

$$0{,}3x_8+0{,}16x_{9+}0{,}11x_{10} \leq 0{,}568\ x_{11}$$

12. По min введению в рацион силоса, корм. ед.:

$$0{,}16x_9 \geq 0{,}261x_{11}$$

13. По max введению силоса, корм. ед.:

$$0,16x_9 \leq 0,315\ x_{11}$$

14. По min включению сенажа, корм. ед.:

$$0,3x_8 \geq 0,162x_{11}$$

15. По max включению сенажа, корм. ед.:

$$0,3\ x_8 \leq 0,189\ x_{11}$$

16. Ограничение, требующее, чтобы травяная мука составляла не более 4% питательности рациона, корм. ед.:

$$0,65\ x_4 \leq 0,04\ x_{11}$$

17. Ограничение по включению гороха в размере не более 20% питательности концентрированных кормов, корм. ед.:

$$1,14\ x_1 \leq 0,2\ (1,14\ x_1 + x_2 + 1,09\ x_3)$$

После алгебраических преобразований получаем: $0,91\ x_1 - 0,2\ x_2 - 0,218\ x_3 \leq 0$.

Таблица 7 – Питательность и стоимость кормов (в расчете на 1 кг)

Виды кормов	Корм. ед., кг.	Перевариваемый пр., г.	Каротин, мг.	Стоимость, руб.
комбикорм	0,9	120	1	11,00
горох	1,14	159	1	8,90
овес	1	83	-	7,90
ячмень	1,09	89	1	7,80
травяная мука	0,65	118	128	9,20
сено ест. сенокосов	0,37	37	16	2,90
сено многолетних трав	0,46	83	45	2,86
сено однолетних трав	0,46	55	15	2,96
солома	0,20	10	3	0,70
картофель	0,31	13	-	8,30
кормовая свекла	0,11	8	-	2,30
силос кукурузный	0,16	12	10	1,53
сенаж многолетних трав	0,26	25	17	2,08
сенаж однолетних трав	0,30	42	34	2,17
силос кукурузный	0,2	14	20	2,48

Целевая функция, выражающая минимизацию себестоимости рациона, будет иметь следующую математическую запись:

$$8,9x_1 + 7,9x_2 + 7,8x_3 + 9,2x_4 + 2,9x_5 + 2,86x_6 + 0,7x_7 + 2,16x_8 + 1,53x_9 + 2,3x_{10} \rightarrow \min$$

Таблица 8 – Структура оптимального рациона

Группа, подгруппа и вид корма	Оптимальный рацион		Предельные границы содержания кормов, %
	корм. ед.	%	
концентраты + травяная мука	1,7	21,0	16,3-22,1
грубые	2,82	32,7	23,7-32,7
в т.ч. сено	1,68	19,5	15,3-25,2
сочные + сенаж	4,19	48,7	48,7-56,8
в т.ч. силос	2,25	28,1	26,1-31,5

После расчета оптимального кормового рациона, считается целесообразным включить в рацион коровам премикс «Дельта Фидс». Он обеспечивает

сбалансированность рациона коров по витаминам, микро и макроэлементам в соотношении и количестве, необходимых как для развития плода, так и для подготовки к последующей лактации. За счет повышенного содержания витамина Е, магния, цинка и селена, а также кальций - фосфорного баланса, позволяет получить сильных и активных телят, предотвратить нарушение обмена веществ в послеотельный период, предохранить от мастита, укрепить копытный рог, повысить качество молозива, необходимого для выращивания здорового теленка. Как следствие, снижаются финансовые затраты на лекарственные препараты [5].

Норма ввода: 100 г/гол в сутки.

«Дельта Фидс» поставляется в полипропиленовых мешках массой по 25 кг. Цена одного мешка 937,5 руб. Премикс планируется добавлять в пищу в течение трех месяцев после отела по 100 г в сутки. Так, потребность в премиксе на 1 голову составляет 9 кг [3].

В таблице 9 представлена потребность в премиксе и необходимые затраты на его приобретение.

Таблица 9 – Потребность в премиксе и затраты на приобретение

Показатель	Значение
Стадо молочного скота, гол	1059
Потребность в корме на 1 голову, кг	9
Стоимость 1 кг, руб.	37,5
Затраты на 1 голову, руб.	337,5
Потребность в корме на все стадо, т	9,5
Затраты на все стадо, тыс. руб.	357,4

Таким образом, затраты на 1 голову составляют 337,5 рублей. Потребность в премиксе на все молочное стадо составляет 9,5 т. Следовательно, для повышения эффективности отрасли необходимо закупить 382 мешка премикса общей массой 9531 кг. Затраты составят 357,4 тыс. руб. Заказ премикса можно осуществить на сайте торгово – производственной компании БиоПро.

Таблица 10 – Планируемая эффективность производства и реализации молока

Показатели	Факт	Проект
Валовое производство молока, ц	30716	42149
Реализовано молока, ц	25332	34562,2
Уровень товарности, %	82,5	82,5
Удой от 1 коровы, кг	2900,5	3980,1
Выход т1елят на 1 корову, гол	0,9	0,9
Производство на 1 корову, руб.: валовой продукции	23081,9	31673,4
валового дохода	-7657,4	1661,3
Производство на 1 чел.-час. руб.: валовой продукции	124,0	95,0
валового дохода	-41,2	4,9
Затраты труда, чел.-час.: на 1 корову	186,0	186,0
на 1 ц молока	6,4	4,7
Производственные затраты, руб.: на 1 корову	29674,6	30012,1
на 1 ц молока	1059,8	754,1
Цена реализации, руб.	795,8	795,8
Прибыль, руб.	-264,0	41,7
Уровень рентабельности%	-	5,5

По результатам применения премикса «Дельта Фидс» передовыми хозяйствами, отмечается увеличения надоя на 10 – 15%. Исходя из среднего удоя на 1 фуражную голову, при условии увеличения продуктивности коров в среднем на 12%, рассмотрим эффективность отрасли молочного скотоводства исследуемого предприятия при

использовании премикса. Удой на фуражную корову рассчитан исходя из среднего значения удоя за 3 года. [13].

Планируемая продуктивность коровы составила 3980,1 кг в результате увеличения надоя на 12%. Прирост удоя на фуражную корову – 426,4 кг, на всё стадо молочного скота – 4515,6 ц. Выручка от реализации молока, полученного в результате прироста продуктивности, составит 3593,5 тыс. руб., а затраты на премикс за год составят 357,4 тыс. руб., Таким образом будет получена прибыль от реализации молока в размере 3236,1 тыс. руб. Планируемая эффективность реализации молока представлена в таблице 10.

Таким образом, в результате применения премикса в качестве добавки к корму, на фоне увеличения продуктивности коров, наблюдается увеличение валового надоя. Однако, достижение обозначенных результатов, возможно только при условии рационального управления отраслью молочного скотоводства, следовательно данная ситуация при прочих неизменных обстоятельствах, таких как: поголовье животных, затраты труда, уровень товарности молока, приводит к появлению прибыли от реализации молока. В связи с этим, разработанные мероприятия обеспечат повышение эффективности производства продукции животноводства, так как она является важнейшим фактором роста конкурентоспособности сельскохозяйственной организации.

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ОСОБЕННОСТИ МЕТАБОЛИЗМА ЛАКТИРУЮЩИХ КОРОВ
FEATURES OF THE LACTATING COWS' METABOLISM

Милаева И.В.*, доцент
Milaeva I.V., Associate Professor
Воронина О.А., аспирант
Voronina O.A., Post-graduate student
Зайцев С.Ю., профессор
Saitsev S.Y., Professor
ФГБОУ ВО «Московская государственная академия ветеринарной медицины и биотехнологии – МВА имени К.И. Скрябина», Москва, Россия
Federal State Budgetary Educational Institution of Higher Education «Moscow State Academy of Veterinary Medicine and Biotechnology – MVA named after K.I. Skryabin», Moscow, Russia

*E-mail: ira-gurievich@list.ru

АННОТАЦИЯ
Продуктивность коров тесно связана с уровнем метаболизма у животных. На разных стадиях лактации коров интенсивность процессов обмена значительно различается. Изучение механизмов таких изменений может существенно помочь в регуляции метаболических процессов за счёт кормления. Были изучены следующие биохимические показатели крови коров: общий белок, альбумины, глобулины, мочевина, креатинин, амилазы, глюкоза, холестерин, триглицериды и некоторые ферменты, а также белки и жиры молока. Используя биохимические показатели крови и молока, изучили изменения в обменных процессах (белковый, липидный, углеводный и минеральный) у коров чёрно-пёстрой породы в возрасте 3 и 5 лет на разных стадиях лактации.

ABSTRACT
The cow productivity is closely associated with basic metabolic level of animals. The intensity of the metabolic processes varies significantly at the particular stages of cow lactation. The study of the metabolic mechanisms could significantly assist in the regulation of these processes by feeding. The following biochemical parameters of cow blood were studied: total protein, albumin, globulin, urea, creatinine, amilase, glucose, cholesterol, triglycerides and some enzymes, as well as milk proteins and fats. Using these biochemical parameters of blood and milk, the changes in metabolic processes (protein, lipid, carbohydrate and mineral) of black-motley breed cows at the age of 3 and 5 years at different stages of lactation were studied.

КЛЮЧЕВЫЕ СЛОВА
Коровы, пробы крови, молоко, биохимический анализ.

KEY WORDS
Cows, blood samples, milk, biochemical analysis.

На современном этапе развития сельского хозяйства особую актуальность приобретают вопросы научного обеспечения повышения эффективности сельскохозяйственного производства [1], в частности, большое значение имеет развитие молочного животноводства и получение высококачественной молочной продукции. Продуктивность коров тесно связана с уровнем метаболизма, в том числе интенсивностью физиолого-биохимических процессов обмена веществ, связанных с трансформацией значительного количества энергии и питательных веществ корма в

молоко [2]. На разных стадиях лактации коров интенсивность процессов обмена различается [3]. Изучение механизмов таких изменений, а также их взаимосвязи с химическим составом молока может существенно помочь в регуляции метаболических процессов за счёт кормления и даст возможность получать больше высококачественной продукции и повысить возраст продуктивного использования коров.

Целью работы является изучение взаимосвязи обменных процессов в организме коров с химическим составом молока в зависимости от возраста и стадии лактации.

МАТЕРИАЛЫ И МЕТОДЫ ИССЛЕДОВАНИЙ

Для изучения метаболических процессов были сформированы три группы по шесть животных-аналогов каждая из коров чёрно-пёстрой породы, принадлежащих ЗАО «Воскресенское», Воскресенского района Московской области.

Первая группа - коровы 3 лет, 5 месяц лактации, 3 месяц стельности; вторая группа - коровы 3 лет, 9 месяц лактации, 7 месяц стельности; третья группа - коровы 5 лет, 5 месяц лактации, 3 месяц стельности. Кровь для исследования отбирали до утреннего кормления из яремной вены, молоко во время утреннего доения. В сыворотке крови определяли 20 биохимических показателей, характеризующих разные виды обменов (биохимический анализатор Chem-7, реактивы фирмы «Диаком»), химический состав молока определяли на приборе Клевер-2М. Корреляционную зависимость и статистическую обработку результатов проводили с помощью программы Статистика. Для сравнения биохимических показателей с «нормальными» использовали литературные данные для данной породы коров.

РЕЗУЛЬТАТЫ И ИХ ОБСУЖДЕНИЕ

Коровы в период лактации несут двойную нагрузку - это молочная продуктивность и вынашивание плода. Важно не только получение качественной продукции и здорового приплода, но и сохранение здоровья коровы. Особенно большой нагрузке подвергаются обменные процессы на поздних сроках стельности. Сравнивали коров в возрасте 3 лет первой группы - 3 месяц стельности, 5 месяц лактации и второй группы - животные 7 месяц стельности, 9 месяц лактации.

Белки крови являются важным показателем, который характеризует уровень метаболизма в организме животных. Они являются строительным материалом для клеток и тканей самого организма, а также активно участвуют в образовании молочной продукции.

Для характеристики белкового обмена определяли общий белок, альбумины, глобулины и конечные продукты распада белков – мочевину и креатинин.

Уровень общего белка в сыворотке крови животных второй группы несколько ниже за счёт более низкого уровня глобулинов, но эта разница не является достоверной. Уровень основных белков крови альбуминов и глобулинов характеризует обеспеченность животных белками корма. Он находится на среднем уровне, а более низкие показатели глобулинов можно объяснить большим сроком стельности у животных второй группы. Уровень конечного продукта белкового обмена - мочевины очень точно отражает концентрацию аммиака в рубце жвачных животных [5]. У животных второй группы он выше на 15%.

Изменение уровня мочевины в крови связано в первую очередь с функциональным состоянием печени. Большая часть протеина кормов подвергается в рубце гидролизу до аминокислот с последующим их дезаминированием до аммиака, избыток которого всасывается в кровь, попадает в печень и преобразуется в мочевину, что, в конечном счете, приводит к увеличению данного показателя в организме [5]. Во время беременности происходит активация всех обменных процессов для обеспечения возрастающих потребностей плода, плаценты, матки, а также метаболизма в организме коровы. Высокая концентрация мочевины при нормальных

значениях других биохимических показателей крови свидетельствует о высокой степени усвоения протеина кормов [5].

Креатинин наряду с мочевиной являет одним из конечных продуктов белкового обмена в организме, он образуется в процессе метаболизма в мышечной ткани и выводится из организма почками. Креатинин является одним из компонентов остаточного азота и позволяет оценить выделительную функцию почек и интенсивность метаболизма в мышечной ткани коров. У коров обеих групп уровень креатинина соответствует показателям для здоровых животных.

Таблица 1 – Биохимические показатели крови коров

Показатели	1 группа	2 группа	3 группа
Мочевина, ммоль/л	2,88±0,29	3,73±0,26	3,3±0,24
Креатинин, мкмоль/л	84,5±11,96	99±4,93	90±5,12
Глюкоза, ммоль/л	1,82±0,17	1,33±0,22	2±0,14
АЛТ, ед/л	34,33±2,08	32±2,52	36±2,09
АСТ, ед/л	82±3,24	69,67±2,84	62±4,62
Амилаза, ед/л	22±2,78	18±6,24	15±3,21
ЩФ, ед/л	51,17±3,06	66,67±9,7	52±6,12
ЛДГ, ед/л	577,67±16,57	651±32,42	593±21,04
КФК, ед/л	64,67±4,94	168,33±7,14	257±15,11
ГГТ, ед/л	43,83±6,12	28,33±7,22	29±5,16
Общий белок, г/л	69,3±1,54	65,67±2,6	73,8±1,67
Альбумины, г/л	39,68±0,48	38,47±0,52	40,7±0,46
Глобулины, г/л	29,62±0,53	27,20±0,47	33,1±0,54
Триглицериды, ммоль/л	0,14±0,01	0,16±0,01	0,16±0,01
Холестерол, ммоль/л	8,07±0,7	8,07±0,67	7,7±0,66
Ca, ммоль/л	2,98±0,05	3,03±0,09	3±0,06
P, ммоль/л	1,74±0,1	1,68±0,1	1,61±0,1
Na, ммоль/л	124,37±0,32	104,97±0,49	124,8±0,37
Cl, ммоль/л	104,33±0,27	99,67±0,33	109±0,24
K, ммоль/л	4,97±0,02	4,69±0,03	5,13±0,02

Одним из основных биохимических показателей, характеризующих углеводный обмен, является уровень глюкозы в крови. Углеводный обмен отвечает за обеспеченность организма энергией. Уровень глюкозы в крови жвачных невысок, но довольно стабилен и удерживается у здоровых животных в пределах 2,0-2,7 ммоль/л. [6]. Это связано, по-видимому, с тем, что существует целый ряд механизмов (глюконеогенез, гликогенолиз) позволяющих поддерживать уровень глюкозы в крови на постоянном уровне даже при значительных изменениях в организме [7]. У животных первой группы показатели уровня глюкозы в крови ниже на 7%, а у животных второй группы на 15%. Снижение содержания глюкозы в крови у коров, по данным Громыко Е.В., можно рассматривать как результат несоответствия поступления энергии с кормом и расхода ее на метаболические процессы и образование молока. У животных второй группы происходит значительное изменение гормонального статуса, что связано с затуханием лактации и ростом плода. По данным Шамберева Ю.Н. в этот период происходит усиленная секреция инсулина и резервирование питательных веществ, в том числе гликогена, что и является причиной более низкого уровня глюкозы в крови.

Для характеристики жирового обмена определяли уровень холестерола и триглицеридов в крови. Содержание холестерола в крови коров находится в прямой корреляции с молочной продуктивностью животных [6]. У животных обеих групп зафиксирован высокий уровень холестерола (норма содержания 4,5-6,0 ммоль/л). Увеличение этого показателя на пике лактации у животных первой группы возможно, так как в этот период происходит не только усиление обмена веществ, но и увеличение количества железистой ткани в вымени после отела.

По данным ряда авторов [6, 7] к концу лактации содержание холестерола постепенно снижается, так как большое количество его идет на синтез стероидных гормонов, а также на интенсивный рост плода, а у коров второй группы он оставался на высоком уровне. Это можно объяснить погрешностью в кормлении животных, например недостаточным поступлением легкопереваримых углеводов с кормами [7].

Значение правильного, хорошо сбалансированного минерального питания животных велико в условиях повышенных нагрузок на организм. Особенно важно это для жвачных животных, когда растительные корма составляют основу их рациона.

При изучении особенностей использования минеральных элементов у лактирующих коров в зависимости от уровня и источников их в рационе установлено, что в абсолютном количестве использование кальция и фосфора, на образование молока и на отложение в теле, по мере увеличения их уровня в рационе, увеличивается [8].

При несбалансированном минеральном питании лактирующих коров потери минеральных веществ у них не всегда восполняются за счет кормов, что приводит как к снижению продуктивности и изменению состава молока, так и перерасходу кормов на его производство [8].

Для характеристики минерального обмена определяли ионы кальция, фосфора, калия, натрия, хлора. Во второй группе выявлен более низкий уровень натрия (на 16%), хлора (на 5%) и калия (на 6%).

Обмен натрия, калия и хлора тесно взаимосвязаны. Вместе они участвуют в поддержании кислотно-щелочного равновесия, в проведении нервных импульсов, являются частью натрий-калиевого насоса клетки. Соотношение этих компонентов в организме должно оставаться постоянным [9].

Калий является основным катионом в клетках животных, где он составляет 98% от общего количества его в организме, и лишь 2% количества элемента находится во внеклеточной среде. У стельных животных происходит задержка минеральных веществ в тканях, т.к. они необходимы для интенсивной работы ферментных систем, натрий-калиевого насоса и др. Хлор является внеклеточным ионом и отвечает за задержку жидкости в тканях.

В условиях интенсификации обменных процессов в организме животных большую роль играют ферментативные системы. Уровень ферментов является одним из быстро реагирующих звеньев биохимического гомеостаза [10] и отражает малейшие изменения метаболизма животных, помогает выявлять патологические процессы до появления клинических признаков или отклонения других биохимических показателей.Определяли ферменты крови: АСТ, АЛТ, амилаза, ЛДГ, КФК, ГГТ, ЩФ.

Ферменты АСТ и АЛТ играют важную роль в обмене аминокислот. Они обнаруживаются у коров во всех органах и тканях, но повышение их уровня в крови происходит при поражениях печени, скелетной мускулатуры, миокарда [11]. Во второй группе уровень АСТ ниже на 15%. Ферменты переаминирования характеризуют синтетическую активность печени и поступают в кровь при разрушении гепатоцитов, снижение уровня АСТ может быть связано с увеличенной продолжительностью жизни клеток печени.

Изменение уровня амилазы характеризуют процессы, происходящие в поджелудочной железе. У исследованных групп животных этот показатель оставался на среднем уровне для коров чёрно-пёстрой породы.

ЛДГ - это гликолитический фермент, обратимо катализирующий окисление L-лактата в пировиноградную кислоту, то есть реакцию, завершающую внутренний окислительно-восстановительный путь гликолиза. Увеличение его содержания в крови коров второй группы на 13% может быть связано с рядом патологий, но в данном случае оно скорее характеризует интенсификацию процессов гликолиза у беременных животных.

Креатинфосфокиназа (КФК) — фермент, участвующий в реакциях энергообразования и содержащийся в наибольшем количестве в сердечной и

скелетной мускулатуре. Увеличение его содержания в сыворотке крови коров второй группы в 1,5 раза по сравнению с первой связано с интенсификацией энергетических процессов в организме.

Гамма-глутамилтранспептидаза (гамма-глутамилтрансфераза, ГГТ) относится к группе пептидаз, катализирующих передачу аминокислот от одного пептида к другому. ГГТ присутствует во всех клетках организма, кроме мышечных. Однако её наличие в сыворотке крови обусловлено синтезом фермента в печени. Снижение уровня этого ферменты на 35% у животных второй группы может быть связано с большой нагрузкой на печень и использованием аминокислот в первую очередь на построение тела плода, развитием вымени и лактацию.

Уровень фермента щелочная фосфатаза важно рассматривать параллельно с содержанием кальция и фосфора в крови животных. Так как повышенное содержание щелочной фосфатазы является одним из ранних признаков нарушения кальций-фосфорного обмена, костных заболеваний, при этом изменения в уровне содержания кальция и фосфора наступают не сразу [12]. У животных второй группы уровень ЩФ несколько выше, но разница не является достоверной. Такое небольшое снижение уровня фермента может быть вызвано повышенным использованием кальция и фосфора на построение тела плода. Кальциево-фосфорное соотношение у животных обеих групп ниже положенного: для первой группы 1,7:1, для второй группы - 1,8:1. В условиях лактации и большого срока стельности такие изменения настораживают и требуют корректировки с помощью балансирования рационов минеральными добавками.

Середина лактации характеризуется пиком молочной продуктивности, чтобы оценить как с такой нагрузкой справляется организм животных разного возраста исследовали коров первой группы - коровы 3 лет, 5 месяц лактации, 3 месяц стельности и третьей группы - коровы 5 лет, 5 месяц лактации, 3 месяц стельности.

Наиболее значительные изменения у животных разного возраста обнаружены в содержании общего белка и ферментов. У животных в возрасте 5 лет выше уровень общего белка в сыворотке крови на 6% за счёт повышенного уровня глобулинов. Гиперпротеинемия может быть связана с усиленным синтезом белков. Как известно, самый высокий годовой удой, как правило, бывает за 6-7-ю лактацию. После отела двухлетней коровы удой иногда не достигает и трех четвертей этой величины [13], а высокая молочная продуктивность напрямую связана с интенсификацией белкового обмена в организме животного.

У животных 5 лет ниже уровень АСТ (на 15%) и амилазы в крови (на 18%), а КФК выше в 4 раза, чем у коров первой группы.

АСТ (аспартатаминотрансфераза) и амилаза это ферменты, которые содержатся внутри клеток организма и попадают в кровь при повреждении или разрушении клеток. Снижение уровня АСТ и амилазы в крови говорит о повышенной продолжительности функционирования клеток организма. Повышение уровня КФК - о повышенном уровне энергетического обмена.

Наряду с сывороткой крови было исследовано молоко, полученное от животных опытных групп. Неоднократно подтверждалось, что молочная продуктивность коров связана с обменными процессами, протекающими в их организме, где кровь является внутренней средой, отображающей все изменения, которые происходят в нем. Состав крови во многом определяет интенсивность обмена веществ и связанных с ними показателей продуктивности животных [14].

Исследовали коров первой группы - 5 месяц лактации и второй группы - 9 месяц лактации. В молоке определяли процентное содержание белка, жира, лактозы, минеральных солей и др.

У животных второй группы отмечается более высокий уровень жира (на 2%), что согласуется с литературными данными [13].

Для животных разного возраста вторая, самая интенсивная, фаза лактации может приводить к различным изменениям метаболических процессов, что будет

отражаться на составе и качестве молока. Исследовали коров первой группы - 3 года 5 месяц лактации и третьей группы - коровы 5 лет, 5 месяц лактации.

У животных 5 лет отмечается более высокое (на 1%) содержание жира в молоке, а содержание белка ниже на 0,3%. Жир и белок являются ПАВами, повышение одного показателя компенсирует снижение другого и не приводит к значительным изменениям ДПН. Это подтверждается средними корреляционными связями ДПН с обоими показателями.

Таблица 2 – Химический состав молока коров

Показатели	1 группа	2 группа	3 группа
Жир, %	3,29±0,39	5,37±0,96	4,36±0,97
Белок, %	3,39±0,19	3,18±0,08	3,08±0,1
Плотность, кг/м^3	29,94±1,36	27,67±1,22	25,66±1,29
СОМО, %	8,65±0,26	8,55±0,19	8,34±0,17
СМО	11,98±0,07	13,95±0,93	15,05±0,90
Лактоза, %	4,53±0,07	4,63±0,11	4,55±0,08
Мин. соли, %	0,74±0,02	0,74±0,01	0,72±0,01
$T_{зам.}$, ^{0}C	-0,53±0,01	-0,55±0,01	-0,55±0,01

Кровь и молоко неразрывно связаны между собой. С одной стороны для образования составных частей молока основное значение имеет количество и характер их «предшественников». Предшественники - это химические вещества крови, из которых образуются казеин, молочный жир и молочный сахар. С другой стороны большое значение имеет обратное всасывание составных частей молока из вымени в кровь, которое усиливается каждый раз, как только начинается процесс молокоотделения. Если почему-либо обратный процесс нарушается, то нарушается и секреция молока. Оба процесса идут непрерывно, но интенсивность и соотношение их в разные периоды лактации различны и зависят от состояния молочной железы и организма животного в целом [13].

Содержание триглицеридов в крови животных разных групп не имеет достоверных различий, а в молоке выше у животных второй и третьей групп. Это связано с тем, что содержание жира в молоке не зависит напрямую от уровня жира в крови. Несмотря на то, что источником жира молока служит нейтральный жир крови, но часть жира синтезируется в самой молочной железе. Это подтверждают и слабые корреляционные связи между этими показателями в крови и молоке.

У животных третьей группы ранее нами отмечалась гиперпротеинемия, а уровень белка молока снижен. Можно предположить, что это связано с качественным составим белков. Известно, что в молоке находятся альбумины, иммунный глобулин, большая часть которых переходит из плазмы крови в молоко, не претерпевая особых химических изменений. Но основную часть белка молока составляет казеин. Основным источником казеина молока являются свободные аминокислоты плазмы крови. Синтез казеина идет значительно интенсивнее, когда молочная железа поглощает из крови такие аминокислоты, как лизин, триптофан и некоторые другие, а при их низком содержании уровень белка в молоке может снижаться. Важно, что корреляционные зависимости между содержание белка в молоке и крови очень сильные.

Таким образом, у коров с разным физиологическим статусом (беременность, лактация) происходят взаимосвязанные изменения биохимического состава крови и молока. Изучение таких зависимостей может дать возможность как для коррекции продуктивности животных, так и получения продукции лучшего качества.

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РОЛЬ ВОЗБУДИТЕЛЕЙ САЛЬМОНЕЛЛЕЗА ПТИЦ В ИНФИЦИРОВАНИИ И ПАТОЛОГИИ ЧЕЛОВЕКА

THE ROLE OF FARMING POULTRY'S SALMONELLA PATHOGENS IN INFECTION AND PATHOLOGY OF HUMAN DISEASE

Пименов Н.В., доктор биологических наук
Pimenov N.V., Doctor of Biological Sciences
ФГБОУ ВО «Московская государственная академия ветеринарной медицины и биотехнологии – МВА имени К.И. Скрябина», Москва, Россия
Federal State Budgetary Educational Institution of Higher Education «Moscow State Academy of Veterinary Medicine and Biotechnology – MVA named after K.I. Skryabin», Moscow, Russia

Лаишевцев А.И.*, аспирант
Laishevtcev A.I., Post-graduate student
Всероссийский научно-исследовательский институт экспериментальной ветеринарии имени Я.Р. Коваленко, Москва, Россия
All-Russian Research Institute of Experimental Veterinary Medicine named after Y.R. Kovalenko, Moscow, Russia

Пименова В.В., аспирант
Pimenova V.V., Post-graduate student
ФГБОУ ВО «Московская государственная академия ветеринарной медицины и биотехнологии – МВА имени К.И. Скрябина», Москва, Россия
Federal State Budgetary Educational Institution of Higher Education «Moscow State Academy of Veterinary Medicine and Biotechnology – MVA named after K.I. Skryabin», Moscow, Russia

*E-mail: a-laishevtsev@bk.ru

АННОТАЦИЯ
В данной работе отмечены доминирующие сероварианты возбудителя сальмонеллеза, вызывающие пищевые токсикоинфекции у людей, и являющиеся адаптированными возбудителями первичных сальмонеллёзов у кур, фазанов, голубей, водоплавающей птицы, перепелов, индеек и других. Раскрыта роль возбудителей сальмонеллеза птиц в инфицировании и патологии человека. Изучена чувствительность изолятов *Salmonella typhimurium* к антибактериальным препаратам разных групп. На примере этих патогенных культур установлена множественная антибиотикорезистентность сальмонелл, представляющая социальную опасность распространения септико-токсемических болезней, лечение которых существующими методами будет малоэффективным.

ABSTRACT
The dominant serological variants of the causative agent of salmonellosis that cause food toxicoinfection in humans, and is an adapted pathogens of the primary salmonellosis in chickens, pheasants, pigeons, water birds, quail, turkeys and others are noted in this work. The role of the salmonellosis pathogens of birds in infecting and pathology of human is disclosed. The sensitivity of Salmonella typhimurium isolates to antibacterial drugs of different groups is studied. On the example of these pathogenic cultures the multiple antibiotic resistances of Salmonella is set, representing a social danger of the proliferation of septic-toxemic diseases the treatment of which by existing methods will be ineffective.

КЛЮЧЕВЫЕ СЛОВА
Сальмонеллёз, биологическая безопасность, продовольственная независимость, ассоциированные инфекции, анализ рисков.

KEY WORDS
Salmonellosis, biological safety, food independence, associated infection, risk analysis.

Сальмонеллёзная инфекция в отрасли птицеводства рассматривается как одна из основных проблем современной медицины ввиду рисков развития пищевых токсикоинфекций у людей [32].

По заключению Всемирной организации здравоохранения сальмонеллез, как зоонозная инфекция, не имеет себе равных по сложности эпизоотологии, эпидемиологии и трудностям борьбы с ним. Птицеводческие предприятия, сталкиваясь с сальмонеллезной инфекцией, несут большие потери от ограничений, накладываемых надзорными ведомствами. Сталкиваясь с проблемой сальмонеллеза, птицеводческие предприятия несут потери от смертности молодняка, снижения продуктивности, качества продукции и проводимых мероприятий, требуемых для осуществления в неблагополучном пункте. Эффективность проводимых мероприятий при этом остается недостаточной. В частности, при использовании антибиотиков, а антибиотикообработки в реальных практических условиях остаются доминирущим мероприятием по предупреждению заболеваемости и локализации бактерийных инфекций, в т.ч. сальмонеллезной этиологии, - расширяется ареал циркуляции антибиотикорезистентных штаммов. Антибиотикообработки не позволяют избавить птицу от сальмонеллоносительства, не способны профилактировать и ликвидировать инфекцию, а предотвращают лишь массовое клиническое проявление заболевания [7, 19, 21, 22].

Чаще всего сероварианты сальмонелл, циркулирующие на птицефабриках, являются низкопатогенными для людей ввиду не адаптированности их. Это обусловливает возникновение заболевания в качестве следствия употребления недоброкачественной продукции с высокой концентрацией токсинов бактерий рода *Salmonella spp*. Размножение сальмонелл в пищевых продуктах не всегда приводит к ухудшению органолептических показателей и физико-химических свойств, определяемых методами ветеринарно-санитарной экспертизы, а термическая обработка не является абсолютным методом инактивации бактерий и их токсинов. После обработки также не исключены случаи вторичной контаминации [23, 29].

Наше особое внимание к птицеводству в первую очередь объясняется объёмами производимой продукции. Во-вторых, внимание к птицеводству востребовано широким употреблением продукции вследствие её относительно низкой стоимости в сравнении с продуктами иных животноводческих отраслей. В-третьих, - динамичным развитием в промышленных масштабах относительно новых для нашей страны отраслей птицеводства – индейководства, перепеловодства, голубеводства, страусоводства, фазановодства и других [1, 11, 30].

Так, на примере индейководства, очевидны риски заноса новых возбудителей сальмонеллеза, популяционная устойчивость к которым и среди птицы и у человека в нашей стране еще не развита. Так как большая доля инкубационного яйца в индейководстве является импортным, значительно увеличивается риск завоза новых адаптированных к индейке сероваров сальмонелл - *Salmonella arizonae* [8]. Так, на территории России уже зафиксированы случаи обнаружения сальмонелл данного вида, выделенного от экзотического вида животного в Ленинградской области, о чём говорится в информационном сообщении от 01.02.2016 года предоставляемом информационно-аналитическим центром управления ветнадзора [4].

Сальмонелла-инфекция подвида *Arizonae* уже длительное время причиняет огромный экономический ущерб в ряде стран с хорошо развитым индейководством – США, Канаде, ФРГ. В соответствии с директивами совета 2009/158/ЕС по ветеринарно-санитарным условиям, регламентирующим торговлю внутри Сообщества и импорт из

третьих стран домашней птицы и инкубационных яиц, инкубационное яйцо индейки в обязательном порядке проходит контроль на наличие возбудителя сальмонеллеза подвида Arizonae3. По условиям Таможенного союза и ЕАЭС (глава 14 Единые ветеринарные (ветеринарно-санитарные) требования, предъявляемые к товарам, подлежащим ветеринарному контролю (надзору) инкубационные яйца и индюшата допускаются к ввозу с территории свободной от сальмонеллеза в соответствии с рекомендацией кодекса МЭБ. Продукция, обсемененная сальмонеллой, к ввозу не допускается [25, 28].

Вспышки сальмонелла-инфекции, вызванные продуктами птицеводства в последние годы являются достаточно частым явлением. При современных тенденциях развития индейководства на территории Российской Федерации необходимо обратить внимание на продукцию данной отрасли, импортируемую в страну. Так в США зараженными являются 60 % кур и 23 % индеек [3, 20]. Кроме того, в США в 2011 году распространялась инфекция *Salmonella Heidelberg*, охватившая более 150 человек в 34 штатах, вызванная, как показали лабораторные анализы, зараженным фаршем из мяса индейки. В ноябре 2011 года поступили сообщения о 179 случаях заболевания, вызванных этим же сероваром сальмонеллы, но уже из-за продуктов, изготовленных из печени кошерных цыплят. Многие случаи были тяжелыми и требовали госпитализации [14].

Пищевые инфекции наносят, кроме того, огромный экономический ущерб птицеперерабатывающей промышленности, связанный с отзывом продуктов из торговой сети. Только в США в 2007–2009 гг. имели место 44 случая отзыва продуктов. Так, компания Cargill в августе 2011 года отозвала 36 млн. фунтов фарша из мяса индейки и продуктов из него из-за вероятного заражения сальмонеллой, а в сентябре – еще 185 тыс. фунтов по этой же причине [2, 12, 24].

Статистические исследования раскрывают роль сальмонелла-инфекции у птиц в инфицировании и патологии человека. Полученными данными установлено, что сальмонеллёз животных, а в особенности птиц, приводит при инфицировании к развитию токсикоинфекций у человека. Тем не менее, стоит принимать к сведению, что возбудители токсикоинфекций, как уже было отмечено, обладают умеренной патогенностью для людей, ввиду чего развитие заболевания происходит, в основном, в тех случаях, когда потребляется продукт, содержащий изначально большое количество возбудителя. Токсикоинфекция сальмонеллезной этиологии объясняется своим внезапным и кратковременным проявлением схожим с отравлением токсинами (токсикозом). Подобные токсические проявления заболевания возможны при потреблении продуктов, обсемененных не только сальмонеллами, но и золотистым стафилококком, эшерихиями типа 0157, клостридиями, кампилобактериями и листериями и т.д. Но сальмонеллы в этом ряду занимают одно из ведущих мест. Наиболее частые случаи развития пищевых токсикоинфекций наблюдаются в странах с высоким уровнем развития животноводства и высокой плотностью населения.

В нашей стране, по данным Роспотребнадзора, заболеваемость пищевыми токсикоинфекциями сальмонеллезной этиологии у людей в 2006 г. стабилизировалась на уровне 31,96 на 100 тыс. населения, с периодическим ростом заболеваемости сальмонеллезными инфекциями среди людей до 2,4 %, острыми кишечными инфекциями установленной этиологии до 17,3 %. Сальмонеллез занимает второе место после дизентерии в структуре острых кишечных инфекций людей. В этиологической структуре сальмонеллеза преобладают сальмонеллы группы D (более 80 %) – *Salmonella enterica* сероваринт enteritidis и серогруппы B – *Salmonella enterica* вариант *typhimurium*. Ежегодно в стране регистрируется до 30 крупных вспышек сальмонеллеза пищевого характера с числом пострадавших от 500 до 1500 человек.

В качестве возбудителей сальмонеллеза человека могут иметь значение сальмонеллы различных сероваринтов, но большинство из них весьма редко оказываются в роли этиологического агента. Это связано в том числе и с тем, что данные микроорганизмы, не имея адаптивных свойств, вызывают обычно местный процесс воспаления в пищеварительном канале. При этом инфекция не

сопровождается септицемией, ведущей к обсеменению мышечной ткани. Но история знает и возрастание эпидемической роли некоторых сероваров, например, *S. heidelberg, S. arizonae* и некоторых других, вероятно, в следствие временного приобретения вирулентности за счет проникновения дополнительного генетического материала на уровне плазмид.

По классификации ВОЗ все серовары сальмонелл разделены на три основных группы:

В первую группу включены возбудители брюшного тифа и паратифа «А», «В», «С». Эта группа бактерий является наиболее опасной для человека.

Во вторую группу бактерий включены возбудители первичных сальмонеллёзов, имеющих определённую видовую предрасположенность и преимущественно специфическую патогенность в отношении этих видов: для кур *Ss. gallinarum-pullorum*, для лошадей – *abortusequi*, у овец – *abortusovis* и т.д.

В третью группу сальмонелл были включены серовары, вызывающие все остальные сальмонеллезные заболевания сельскохозяйственных животных, в т.ч. птиц, и человека: *Ss. enteritidis, typhimurium, thompson, choleraesuis, brandenburg, dublin* и т.д., возбудителей которых нередко выделяют из мяса кур, яиц, а также из патологического материала от больной и павшей птицы.

Тем не менее, приведённая выше классификация сальмонелл по отношению восприимчивости человека и патогенности возбудителя не является абсолютной в связи с возможностью одновременного проявления патогенных свойств одного изолята сальмонелл для различных видов животных, птицы и человека.

Важными факторами развития сальмонеллёзной инфекции у человека можно считать географическую предопределенность, климатические условия, видовую структуру сельскохозяйственных животных, а также уровень социально-экономического состояния населения.

Влияние первого фактора объясняется тем, что в мире распространённость и этиологическое значение сероваров сальмонелл имеют определенные границы – ареал инфекции. Например, на территории Российской Федерации наибольший ущерб для отрасли овцеводства представляет серовар *Salmonella abortusovis*, в то время как для Великобритании наибольшую опасность представляют серовары подвида *S. diarizonae*, а для Новой Зеландии – *S. brandenburg* и т.д. Экономические отношения и трансграничное движение животных в отрасли позволяли экспортировать и импортировать животных, что само по себе является значительным риском заноса «нетипичных» сероваров сальмонелл.

Помимо географической серотиповой предрасположенности в возникновении и развитии сальмонеллёзной инфекции у людей имеют культурные обычаи. Так, для стран Индокитая и Латинской Америки имеется риск возникновения заболевания при употреблении в пищу субпродуктов рептилий, которые зачастую являются носителями сероваров сальмонелл подвида *S. arizonae*. Учитывая распространение в США, Канаде и странах Евросоюза аризооноза индеек, угроза инфицирования человека с продуктами индейководства реальна.

По имеющимся данным наибольшей восприимчивостью к аризонозу обладают новорожденные, маленькие дети, ВИЧ-инфицированные люди, а также восприимчивость к аризонозу возрастает при иных заболеваниях, сопровождающихся снижением иммунного статуса. Переболевшие аризоонозом пациенты зачастую впоследствии приобретают неврологические осложнения, потерю слуха, гидроцефалию и т.д.

Для нашей страны инфицирование людей наиболее характерно посредством пищевых связей. Доминирующим сероварианом, вызывающим пищевые токсикоинфекции человека является *S. enteritidis*, второй по значимости – *S. typhimurium*. Следует отметить, что *S. enteritidis* – адаптированный возбудитель первичных сальмонеллезов у птиц – кур, фазанов, экзотической вольерной птицы, а также у молодняка крупного и мелкого рогатого скота, реже – у свиней; *S. typhimurium* – адаптированный возбудитель первичных сальмонеллезов у уток, гусей и других

водоплавающих птиц, голубей, перепелов, синантропной птицы, многих представителей дикой и зоопарковой фауны, менее – у кур, а также молодняка свиней, крупного рогатого скота [10, 13, 15, 18]. Таким образом, у двух основных возбудителей пищевого токсикоза человека сальмонеллезной этиологии отмечен широкий ареал обитания среди сельскохозяйственных животных и птицы. Распространенное микробоносительство и субклинические формы обуславливают высокую вероятность контакта восприимчивых птиц и человека с инфицированием сальмонеллой [31].

В отношении климатического фактора стоит иметь отметить, что возможность круглогодичного пастбищного содержания животных приводит к увеличению рисков инфицирования окружающей среды и дальнейшей передаче возбудителя к человеку. Данный аспект осложняет проведение лечебно-профилактических мероприятий ввиду возможности длительного сохранения возбудителя в окружающей среде.

Несмотря на некую видовую предрасположенность сероваров сальмонелл, они способны вызывать заболевание у всех видов животных. Таким образом, прогнозирование рисков развития сальмонеллёза среди людей осложняется всевозможными путями передачи возбудителя и экобиологическими цепями [6, 17].

Таблица 1 – Чувствительность изолятов *Salmonella typhimurium* к антибактериальным препаратам разных групп

Препарат	n	B	C	H	У
Ампициллин	27	3 (11,1%)	7 (25,9%)	1 (3,7%)	16 (59,3%)
Эритромицин	28	0	2 (7,1%)	5 (17,9%)	21 (75,0%)
Неомицин	27	0	0	5 (18,5%)	22 (81,5%)
Линкомицин	27	0	1 (3,7%)	1 (3,7%)	25 (92,6%)
Тетрациклин	27	1 (3,7%)	0	4 (14,8%)	22 (81,5%)
Канамицин	27	2 (7,4%)	1 (3,7%)	5 (18,5%)	19 (70,4%)
Рифампицин	27	0	2 (7,4%)	2 (7,4%)	23 (85,2%)
Тобрамицин	24	2 (8,3%)	7 (29,2%)	4 (16,7%)	11 (45,8%)
Левомицетин	27	5 (18,5%)	9 (33,3%)	9 (33,3%)	4 (14,8%)
Байтрил	28	7 (25,0%)	8 (28,6%)	8 (28,6%)	5 (17,8%)
Амоксиклав	27	3 (11,1%)	7 (26,0%)	13 (48,1%)	4 (14,8%)
Гентамицин	27	2 (7,4%)	4 (14,8%)	8 (29,6%)	13 (48,2%)
Офлоксацин	28	5 (17,9%)	7 (25,0%)	7 (25,0%)	9 (32,1%)
Имипенем	17	14 (82,4%)	3 (17,6%)	0	0
Белкоспира	18	0	0	12 (66,7%)	6 (33,3%)
Стрептомицин	25	0	2 (8,0%)	4 (16,0%)	19 (76,0%)
Тилозин	27	0	7 (26,0%)	10 (37,0%)	10 (37,0%)
Цефазолин	25	4 (16,0%)	4 (16,0%)	8 (32,0%)	9 (36,0%)
Колистин	24	0	2 (8,3%)	6 (25,0%)	16 (66,7%)
Карбенициллин	25	0	3 (12,0%)	3 (12,0%)	19 (76,0%)
Метронидазол	25	0	0	1 (4,0%)	24 (96,0%)
Доксициклин	26	0	1 (3,9%)	5 (19,2%)	20 (76,9%)
Фурагин	26	9 (34,6%)	6 (23,1%)	9 (34,6%)	2 (7,7%)
Цефалексин	28	3 (10,7%)	4 (14,3%)	9 (32,1%)	12 (42,9%)
Клотримазол	26	2 (7,7%)	2 (7,7%)	5 (19,2%)	17 (65,4%)
Азитромицин	27	2 (7,4%)	3 (11,1%)	12 (44,5%)	10 (37,0%)
Клафоран	24	8 (33,3%)	6 (25,0%)	5 (20,8%)	5 (20,8%)
Норфлоксацин	22	4 (18,2%)	3 (13,6%)	10 (45,5%)	5 (22,7%)
Ципрофлоксацин	25	3 (12,0%)	2 (8,0%)	12 (48,0%)	8 (32,0%)
Флубактин	23	1 (4,4%)	3 (13,0%)	11 (47,8%)	8 (34,8%)
Мономицин	11	0	1 (9,1%)	0	10 (90,9%)

Условные обозначения:
n – число исследованных изолятов,
B – высокочувствителен, число изолятов (% к общему числу исследованных изолятов сальмонелл);
C – среднечувствителен, число изолятов (% к общему числу исследованных изолятов сальмонелл);
H- низкочувствителен, число изолятов (% к общему числу исследованных изолятов сальмонелл);
У – устойчив к антибиотику: число изолятов (% к общему числу исследованных изолятов сальмонелл).

Опасность инфицирования человека сальмонеллами связана, прежде всего, с уровнем санитарного состояния, которое во многом определяется уровнем социально-экономического благополучия населения страны и не имеет равного значения, ввиду

чего в первую очередь заболеванию среди людей подвержены малообеспеченные лица. Данное явление не означает, что представители такой социальной группы приобретают испорченные продукты, а лишь является следствием того, что наиболее дешёвым и массовым продуктом из продуктовой корзины являются мясо птицы и яйца, которые, в свою очередь, имеют наибольшую подверженность к сальмонеллообсемененности [26].

Приведённые факторы имеют наибольшее значение в степени развития сальмонеллёзной инфекции среди людей, но во всех случаях массовость инфекции зависит от объёмов производимой продукции и уровнем её контроля.

Исследования последних лет указывают, что среди циркулирующих штаммов сальмонелл произошел серьезный дрейф в сторону множественной антибиотикорезистентности. Не эффективными становятся препараты группы резерва, что в случае заражения и заболеваемости у людей представляет серьезную угрозу жизни и здоровью [16, 33].

Мониторинг лекарственной устойчивости возбудителей – важнейшее условие эффективного лечения. По его результатам выделяют препараты первой линии, резерва и глубокого резерва. Необходимость знания картины антибиотикорезистентности необходима для планирования схем лечения с учетом современных достоверных данных [9, 27].

Мы провели исследования антибиотикорезистентности диско-диффузным методом у 28 изолятов *Salmonella typhimurium*, выделенных от птиц европейской части России. Спектр определения составлял по большинству изолятов не менее 25 антибактериальных препаратов различных фармакологических групп.

Полученные данные характеризовали множественную лекарственную устойчивость у всех изучаемых образцов, кроме имипенема (тиенама). Высокую чувствительность к имипенему выявили у 14 из 17 исследованных изолятов, что составляет 82,4%, у остальных 3 изолятов отмечена средняя чувствительность. По другим группам антибиотиков не выявлено преобладания чувствительности изолятов (см. таблицу 1).

Как видно из представленных в таблице 3 данных, высокая антибиотикорезистентность у циркулирующих сальмонелл стала серьезной проблемой. Отмечено преобладание низкой чувствительности и устойчивости сальмонелл к препаратам пенициллиновой группы, в т.ч. усиленным клавулановой кислотой, к макролидам (эритромицину, тилозину, белкоспире, содержащей спирамицин и полиеновый колистина сульфат), линкомицину и колистину. Азитромицин (сумамед) – полусинтетический антибиотик из класса азалидов (близок к макролидам), оказался низкоактивным или не активным в отношении тестируемых бактерий в 81,5% случаев.

Из большой гаммы исследованных аминогликозидов также не отмечено эффективных групп и препаратов: к неомицину низкая чувствительность или устойчивость сальмонелл составляет 100% исследованных изолятов, к канамицину – 88,9%, к тобрамицину – 62,5%, к гентамицину – 77,8%, к стрептомицину – 92%, к мономицину – 90,9%. Такие же результаты низкой чувствительности и резистентности отмечены к тетрациклину и доксициклину (группа тетрациклинов), к рифампицину (группа ансамицинов), к метронидазолу и клотримазолу (производные имидазола).

Препараты фторхинолонового ряда имели разброс результатов активности от наибольшей у байтрила (энрофлоксацина) до наименьшей у флубактина. Данные слабой активности преобладали как у норфлоксацина (68,2%), так и у фторхинолонов второго порядка – ципрофлоксацина (80%) и офлоксацина (57,1%). Антибиотики цефаллоспоринового ряда первого поколения цефазолин и цефалексин оказались для более половины изолятов также слабоактивными или неактивными, и только у цефаллоспоринов третьего поколения (клафоран, цефтриаксон) отмечено преобладание высокой активности к тестируемым изолятам *S. typhimurium* [5].

Заключение. Угроза инфицирования человека посредством пищевых связей или опосредованного контакта с синантропной птицей возбудителями сальмонеллеза

является серьезной медико-социальной проблемой. Лечение токсикоинфекций или сальмонеллеза будет представлять трудности выбора эффективного средства в связи со множественной антибиотикорезистентностью циркулирующих полевых штаммов возбудителя. В связи с этим назрела проблема переориентирования медикаментозных подходов в лечебно-профилактических мероприятиях при сальмонеллезе птиц.

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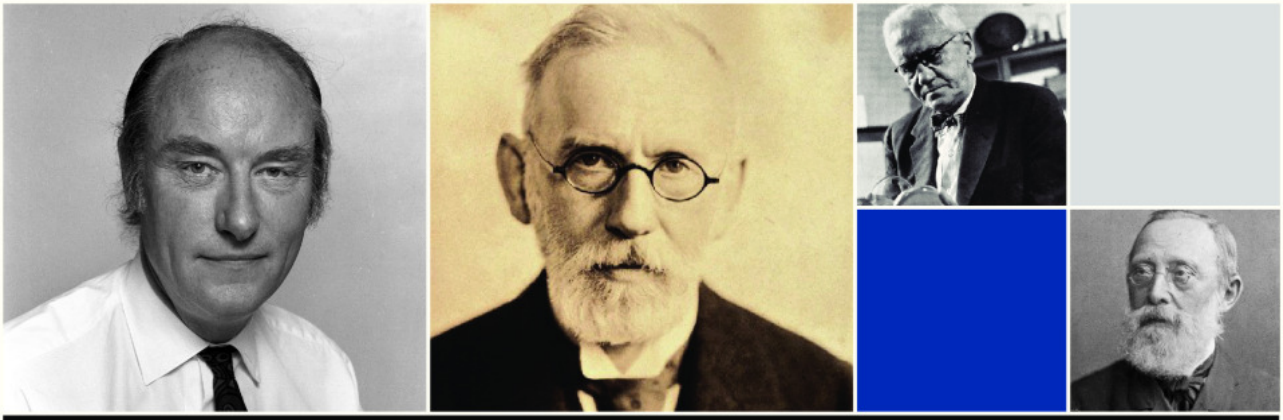

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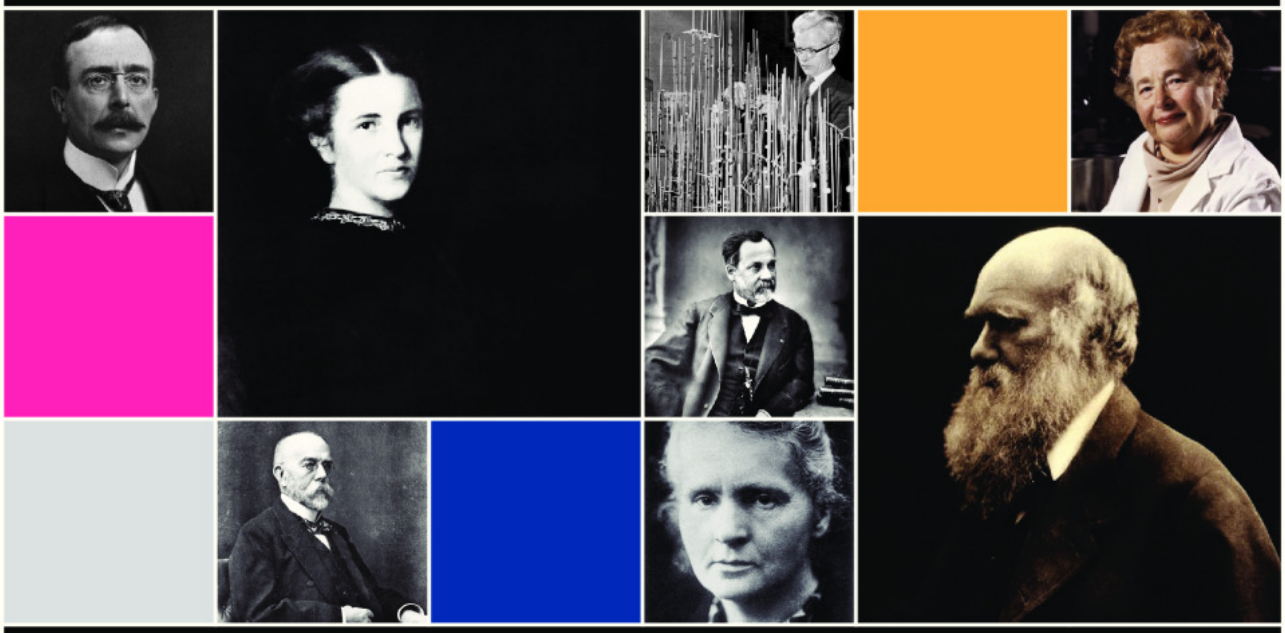

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