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## Section 1. Accounting

*Danilkova Svetlana,  
Ph D., (in Economic sciences),  
associate professor, DipIPFM (UK)  
Polessky State Univeresity  
E-mail: Danilkova\_svetlana@mail.ru*

### INTERNAL AUDIT IN THE REPUBLIC OF BELARUS: LEGAL REGULATION AND EVALUATION

**Abstract:** the article deals with the problems of legal regulation of internal audit in the Republic of Belarus. Recommendations to the external auditor on the evaluation of the internal audit service and the possibility of using its results are proposed.

**Keywords:** internal audit, legal regulation, qualification requirements, internal audit service.

*Данилкова Светлана,  
канд., экон., наук, доцент, DipIPFM (UK)  
Полесский государственный университет,  
E-mail: Danilkova\_svetlana@mail.ru*

### ВНУТРЕННИЙ АУДИТ В РЕСПУБЛИКЕ БЕЛАРУСЬ: ПРАВОВОЕ РЕГУЛИРОВАНИЕ И ОЦЕНКА

**Аннотация:** В статье рассмотрены проблемы правового регулирования внутреннего аудита в Республике Беларусь. Предложены рекомендации внешнему аудитору по оценке работы службы внутреннего аудита и возможности использования ее результатов.

**Ключевые слова:** внутренний аудит, правовое регулирование, квалификационные требования, служба внутреннего аудита.

Одним из наиболее действенных инструментов оценки эффективности деятельности организации становится внутренний аудит. Возрастающий интерес к внутреннему аудиту обусловлен рядом факторов: наличие службы внутреннего аудита является нормативным требованием для определенных организаций; внутренний аудит становится частью корпоративного управления и признаком надежности деятельности организации. Следовательно, для развития внутреннего

аудита складываются подходящие условия, что, в свою очередь, требует развития его правового регулирования.

В законодательстве Республики Беларусь зачастую происходит отождествление понятий внутренний аудит и внутренний контроль. Так, в ст. 59 Закона Республики Беларусь «О хозяйственных обществах» указано, что для осуществления внутреннего контроля финансовой и хозяйственной деятельности общее собрание

участников хозяйственного общества избирает ревизора или ревизионную комиссию в случае, если избрание такой комиссии предусмотрено настоящим Законом и (или) уставом хозяйственного общества. К компетенции ревизионной комиссии (ревизора) хозяйственного общества относится проведение ревизий по всем или нескольким направлениям его деятельности либо проверок по одному или нескольким взаимосвязанным направлениям или за определенный период этой деятельности, осуществляемой хозяйственным обществом, его филиалами и представительствами [1]. Таким образом, внутренний контроль реализует избранная ревизионная комиссия, то есть внутренний контроль проводится эпизодически, лицами, чья квалификация и профессиональный уровень не позволит защитить интересы собственника. Далее ст. 61 вышеуказанного нормативного акта устанавливает, что для проведения постоянного внутреннего контроля финансовой и хозяйственной деятельности хозяйственного общества (внутреннего аудита) в соответствии с его уставом может быть создана контрольно-ревизионная служба, порядок работы которой устанавливается соответствующим локальным нормативным правовым актом хозяйственного общества, утвержденным общим собранием его участников. Следовательно, внутренний контроль (он же внутренний аудит) реализует созданная контрольно-ревизионная служба, что свидетельствует об отождествлении внутреннего контроля и внутреннего аудита и требует определения содержания данных понятий, их места и роли.

Банковский кодекс Республики Беларусь определяет, что банк обязан организовать внутренний контроль, обеспечивающий надлежащий уровень надежности, соответствующий характеру и объемам осуществляемых банковских операций. Головная организация банковской группы и (или) банковского холдинга обязана организовать систему внутреннего контроля за рисками на консолидированной основе [2]. Здесь законодатель

требует наличия внутреннего контроля, но не определяет его содержание. Вместе с тем, в нормативных актах, регулирующих банковскую деятельность, указаны функциональные рамки внутреннего контроля – обеспечение надлежащего уровня надежности [3].

Устав Национального банка Республики Беларусь устанавливает, что внутренний контроль финансовой и хозяйственной деятельности в Национальном банке осуществляется службой внутреннего аудита, которая проводит аудит деятельности его структурных подразделений и организаций не реже одного раза в два года [4].

Следовательно, согласно изложенных нормативных правовых актов можно сделать вывод о том, что в Республике Беларусь законодательно определено создание службы внутреннего аудита лишь в банковской сфере, отождествлены понятия внутреннего аудита и внутреннего контроля. Данное обстоятельство обусловлено тем, что отсутствует научное обоснование значения, места и роли внутреннего аудита в системе контроля организации.

Постановлением Межпарламентской ассамблеи государств-участников содружества независимых государств от 16.04.2015 г., № 42–13 «О модельном законе «О внутреннем аудите в организациях государственного сектора» определены принципы и правовые основы осуществления внутреннего аудита в организациях государственного сектора, а также приведен порядок регулирования отношений, возникающих в процессе формирования, планирования, проведения внутреннего аудита и составления аудиторского отчета [5]. Таким образом, законодатель предполагает создание и функционирование службы внутреннего аудита как одного из подразделений организации. В данном акте дано определение внутреннего аудита, однако автор считает, что сущность его сведена к проверке законности деятельности, в то время как Международный институт внутренних аудиторов определяет вну-

трений аудит как деятельность по предоставлению независимых и объективных гарантий и консультаций, направленных на совершенствование деятельности организации. Вместе с тем, в модельном законе сформирован принцип независимости службы внутреннего аудита, который подразумевает, что служба внутреннего аудита подотчетна руководителю организации государственного сектора и должна быть независима от других структурных подразделений главного распорядителя бюджетных средств в планировании своей работы, выполнении внутреннего аудита и подготовке аудиторских отчетов. Наряду с этим указаны требования, предъявляемые к внутренним аудиторам, однако, автор считает, что недостаточно отражены профессиональные требования в области внутреннего аудита, что может отразиться на качестве работы. Следует также при разработке национального законодательства о внутреннем аудите четко и в полном объеме определить функции службы внутреннего аудита. По мнению автора, надо дополнить функции указанные в модельном законе такими как: разработка ежегодных планов внутреннего аудита; оценка достоверности и достаточности бухгалтерской, финансовой и другой социально значимой информации; периодичность представления отчетов мониторинга выполнения планов; предоставление консультативной и методологической поддержки службам внутреннего аудита нижестоящих организаций и др.

Согласно национального правила аудиторской деятельности «Использование результатов работы внутреннего аудитора», утвержденного постановлением Министерства финансов Республики Беларусь от 07.02.2001 г., № 9 (с изм. и доп.) внешний аудитор перед принятием решения о использовании результатов работы внутреннего аудитора должен провести предварительную оценку его работы. Однако, по мнению автора, ряд направлений оценки, предусмотренные нормативным актом, требуют кон-

кретизации и дополнений (рисунок). Так, изучая организационный статус внутреннего аудита кроме установления наличия Устава (Регламента) о службе внутреннего аудита следует определить существование Кодекса этики внутренних аудиторов. В нем целесообразно указать этические правила поведения внутренних аудиторов, как в процессе осуществления профессиональной деятельности. Наличие Кодекса и соблюдение его принципов внутренними аудиторами будет способствовать росту доверия к результатам работы внутренних аудиторов, уверенности собственников имущества в эффективности вложенных средств и повышению авторитета профессии внутреннего аудитора в обществе. Кроме того, организационный статус включает соблюдение принципов профессиональной деятельности внутренними аудиторами, таких как объективность и независимость. Однако, автор считает, что не следует ограничивать количество принципов, необходимо получить аудиторские доказательства соблюдения иных принципов профессиональной деятельности, что позволит внешним аудиторам сформировать мнение о понимании значения и роли внутреннего аудита собственниками имущества и руководителями организации.

Особое внимание следует обратить на профессиональную компетентность внутреннего аудита. Вышеуказанное национальное правило аудиторской деятельности определяет установление и соблюдение квалификационных требований внутреннего аудитора. Однако, в связи с отсутствием в Республике Беларусь правовой базы, механизма подготовки специалистов в области внутреннего аудита субъектам хозяйствования весьма сложно определить квалификационные требования. Автор считает, что необходимо основываясь на модельном законе «О внутреннем аудите в организациях государственного сектора» разработать закон Республики Беларусь «О внутреннем аудите», в котором следует указать.

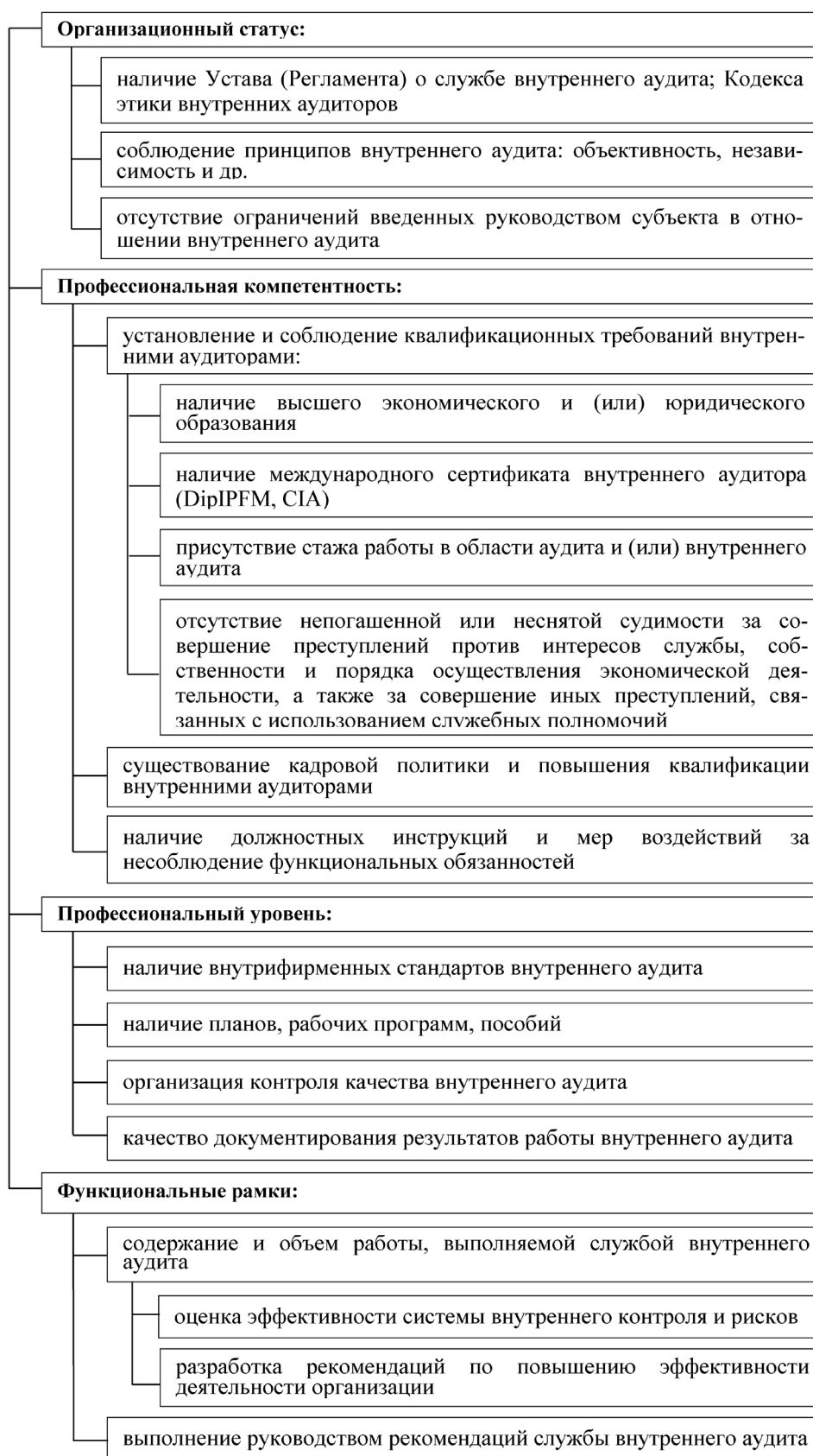


Рисунок 1. Модель предварительной оценки работы внутреннего аудита

Профессиональные требования внутренних аудиторов. К ним можно отнести: наличие высшего экономического и (или) юридического образования; присутствие международного сертификата внутреннего аудитора; стажа работы в области аудита и (или) внутреннего аудита; отсутствие непогашенной или неснятой судимости за совершение преступлений против интересов службы, собственности и порядка осуществления экономической деятельности, а также за совершение иных преступлений, связанных с использованием служебных полномочий. Соблюдение данных требований позволит обеспечить условия добросовестного выполнения должностных обязанностей внутренними аудиторами, создать и развивать систему подготовки и переподготовки кадров в области внутреннего аудита. Следует уточнить, что в настоящее время в Республике Беларусь нет возможности получения международных дипломов внутреннего аудитора, поэтому на начальном этапе можно применять дистанционное обучение на курсах Института внутренних аудиторов Российской Федерации.

Оценивая профессиональный уровень внутреннего аудита, следует обращать внимание не только на наличие внутрифирменных стандартов (регламентов) работы внутреннего аудита, но и их качество: на сколько они детализированы, отвечают реальному положению дел, отражают организационно-производственную специфику и бизнес-процессы субъекта хозяйствования, доступны ли они внутренним аудиторам, понятны ли и применяются ли в деятельности внутренних аудиторов, обновляются ли и дополняются ли в связи с изменениями на макро- и микроуровнях. Высказывая мнение о профессиональном уровне внутреннего аудита недостаточно констатировать факт организации контроля качества его работы. Важно оперативно оценить эффективность контрольных мероприятий по установлению качества внутреннего аудита, а именно несут ли они систематический характер и (или) проводятся эпизо-

дически, формально, результаты документально не оформляются и выводы по ним не делаются.

Изучая функциональные рамки внутреннего аудита субъекта хозяйствования, следует конкретизировать содержание и объем работы службы внутреннего аудита, а именно оценить эффективность системы внутреннего контроля и предпринимательские риски, составлять матрицы рисков, разрабатывать рекомендации по их снижению и повышению эффективности деятельности организации. Предложенные рекомендации внутреннего аудита бесполезны, если руководство субъекта хозяйствования и его сотрудники игнорируют их. Следовательно, необходимо установить как руководство и сотрудники реагируют на рекомендации внутреннего аудита и выполняют их.

Таким образом, если результаты предварительной оценки работы внутреннего аудита по предложенной автором дополненной модели имеют положительные ответы, то результаты работы службы внутреннего аудита следует использовать внешним аудитором, что позволит уменьшить объем аудиторских процедур. И наоборот, получение отрицательных результатов по вышеуказанным направлениям и элементам работы службы внутреннего аудита свидетельствуют о том, что не следует использовать результаты работы внутренних аудиторов. Наличие не столь категоричных положительных и отрицательных ответов может свидетельствовать о выборочном подходе использования результатов работы службы внутреннего аудита, что является профессиональным суждением внешнего аудитора. Вместе с тем, наличие эффективной службы внутреннего аудита позволяет субъекту хозяйствования избегать негативных последствий в финансово-хозяйственной деятельности и снизить расходы по проведению внешнего аудита, повысить доверие у потенциальных инвесторов, акционеров и ожидания собственников имущества в перспективах развития бизнеса.

На основании проведенного исследования можно сделать вывод о том, что в Республике

Беларусь необходимо разработать нормативное обеспечение по внутреннему аудиту, в котором следует раскрыть его экономическую сущность, определить организационное подчинение службы внутреннего аудита, установить единые требования, предъявляемые к внутренним аудиторам, функции службы внутреннего аудита,

обусловить права, обязанности и ответственность внутренних аудиторов, предопределить отчетность внутренних аудиторов, что позволит разграничить понятия внутреннего аудита, внутреннего контроля и ревизии, определить его предметную область и развивать внутренний аудит в стране.

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*Duong Thi Quynh Lien,*  
*Ph D., Faculty of Economics, Vinh University*  
*E-mail: quynhliendhv@gmail.com*

## **THE IMPACT OF ERP ON THE ORGANIZATION OF THE ACCOUNTING INFORMATION SYSTEM AT VIETNAMESE BUSINESSES**

**Abstract:** Applying information technology in management in general and accounting in particular is an indispensable trend of enterprises in the context of economic integration today. Enterprise Resource Planning (ERP) software is a tool to integrate business processes of enterprises on the basis of using the centralized database. With a new management mindset, ERP is considered as an optimal solution to help businesses improve their capacity in the current competitive tendency and fierce is being interested in many businesses. This article deals with ERP and the impact of ERP on the organization of accounting information systems in Vietnamese enterprises.

**Keywords:** Accounting, accounting information, organization of accounting information system.

ERP is a term related to information systems integration and business processes including functional modules that are installed according to the purpose of the business. ERP is backed by interoperability software that helps businesses plan and manage critical parts of their business processes including production planning, purchasing, inventory management, dealing with supplier, customer service and order tracking. In Vietnam, the ERP market is becoming more and more active, many enterprises have demand for ERP applications to change the management mode of their production and business activities, but not all enterprises have the knowledge profound in this field.

### **1. The interaction between ERP and accounting information systems [1; 2; 3; 8]**

#### **In terms of management information systems**

ERP is a system that integrates the whole information system of the whole enterprise including: sales information system, production information system, purchasing information system, financial information system accounting information and human resources information system.

One of the striking features of ERP is the linkage of the system. With this feature, functional departments in the enterprise are easily linked and share informa-

tion with each other. When using ERP, information is reflected in real time, continuously and timely.

In terms of management information systems, both ERP and accounting information systems have similarities in the functional model that an information system needs to be: data collection, processing, and archiving. Data is intended to provide information to ERP users with an impact on the accounting information system and vice versa. The accounting information system wants to process data that needs to be retrieved from other systems. This data is stored in the database. Shared Databases of ERP When the accounting information system processes data it generates information. This information is provided to multiple audiences, multiple levels of administration and is integrated in the ERP system. This will create outlining various information flows: horizontal information and vertical information For vertical information flow s supports the decision of the different levels of governance: including the decision is structured, semi-structured decisions and decisions without structure.

#### **Considering the analysis and control of data**

In the ERP environment, in order to be able to analyze and control data well, accountants need to have certain knowledge of information technology,

knowledge of the business and business processes of the enterprise, understanding About the difference between ERP and traditional accounting.

### ***Knowledge of information technology***

If in accounting software, accounting can be the starting point of all data processing processes, the ERP environment is quite the opposite. The data processing process starts from another department and the accountant will next. Remain those data, conduct analysis on the available database, and collect additional data for your own departmental processing. Accountants need to have knowledge of information technology, namely ERP knowledge, how to exploit and analyze data from other departments, how to process and store data in the system. ERP system.

### ***Understanding the business and business process***

Each business has its own characteristics and strategies, different business characteristics. Therefore, although many enterprises may use the same ERP, but does not mean that the process is the same. Business process of the business. Influence the analysis and control of data. Input data is collected on the basis of information needs of each department and throughout the system. The initial input does not affect the function itself but also directly affects the function. In the ERP environment, the process of analyzing and controlling data is related to the elements of activity including: resources, events and people (REA model).

### ***Understanding the difference between ERP and traditional accounting***

Compared with traditional accounting in Vietnam, the ERP system has some differences: flexible account structure, the presence of intermediary accounts, the use of single entries inverted to adjust the system, the Entries are created automatically and controlled into multiple layers through the approval process, requiring accountants to follow the process.

## **2. The impact of ERP on the organization of the accounting information system [4; 5; 6;7; 9; 10]**

### **Process changes**

#### ***Data collection***

When organizing the accounting information system in the ERP environment, the corporate voucher system can be affected in many ways: Form of voucher (may be displayed on the screen / printed from the system), serial number is established. In addition, in the course of operation, the enterprise can use the intermediary account to control the process closely but still ensure the provision of financial reports as prescribed.

In addition, the structure of the account system is set up more flexible, detailed management object is also controlled through various code systems.

### ***Data processing***

Because ERP is a general structure of many modules, there are some fundamental differences in data processing:

*Difficult to observe professional traces:* if in the manual environment, a wrong entry can be made according to regulations and leave traces. However, in ERP it is difficult to observe business traces, so the accountant needs to enter the accounting entries to be able to control. This means that all accounting adjustments are recorded through the system including the content, timing and adjustment module.

*Up-to-date:* The characteristics of ERP are data sharing and use of shared databases, so once a journal is updated once, it affects a lot of data throughout the system. Accounting data will affect not only the accounting module, but also other modules such as purchasing, sales, production, human resources.

*Some functions performed automatically:* ERP for automatic copy of some journals. In order to do this, the system needs to be programmed to ensure time savings for routine operations that are routine and less frequent. Automatic way in the system: when recording revenue, automatically recorded cost or automatically carry out monthly depreciation.

*Complete operation:* For ERP, the system is designed for process management, so the starting point of a component is the result of information processing by another department. the department / department in the business is very tight, the job

responsibilities are also divided and shown clearly in the implementation process.

*Installation of some control features:* Due to the specificity of the ERP is composed of many modules and high linkages, so if a mistake of a module will affect the whole system. Therefore, to ensure the results of accounting reliable, many procedures are implemented such as: access control system, total debt generation = total incurred ... .

### ***Provide information***

The ultimate aim of the organization of the accounting information system is to provide useful information for decision-making. With the ERP system, this provision affects many different aspects: content, time, object, and use of information.

*Content:* Due to the impact of the initial data collection, the content provided includes both financial and non-financial information. Information is provided consistently, fully and continuously.

*Mode:* In the ERP system, due to the application of new technologies and centralized database management, it allows for the provision of information at a variety of levels: from high levels of detail to low levels of detail. The system also performs flexibly according to the object and forms diversity (printed on paper / on the screen, can be in the form of tables, charts) and can be accessed from different places.

*Time:* When using ERP, enterprises can know information from time to time. Whenever information is needed, it can be met on the basis of process consistency. High-timeliness is a prominent feature of the ERP system in helping the decision-making process of the manager more effectively. thereby increasing the competitive advantage of the business.

*Suppliers and users of information:* Because of the shared nature of ERP, anyone who is authorized and licensed to use the system can provide / retrieve information easily.

### ***Control***

#### ***Overall control***

**Access Control:** This is a very important issue because ERP uses a generic and linked database.

If an unauthorized user accesses all the data in the company.

**Functional separation:** Designers / programmers and users should be separated, data and data are separated. Clear division of duties of each person, department in the ERP system.

**Storage control:** involves two basic elements: storage and backup equipment. In particular, enterprises need to clearly and specifically regulate the individual and organize the time plan. save, method, responsibility in the backup process.

**Process Compliance:** ERP is a highly compliant system, a function that will not perform if the previous functionality is not implemented. When implementing an ERP, a clear, details and dissemination to the whole enterprise together with related responsibilities.

#### ***Application control***

**Data source control:** Several control procedures are required for each application, such as logical, limited, automatic, full, format, mark, capacity Currently, many ERP systems have used POS, electronic data transmission to reduce personal errors and cross check between departments. together.

**Process control:** There are a number of mandatory requirements for process control such as data integrity constraints, reporting of abnormalities, automatic processing control, review of process execution. Settling according to rules.

**Control of processing results:** It is important to ensure that the results are correct and that the results are correct. This also depends on the decentralization of the system, the setting of regulations and the strengthening of the solution. network security.

### **Changes in the organizational structure of the accounting system**

#### ***Personnel structure***

The structure of personnel in the accounting department depends on the organizational structure of the company, the workload, characteristics and orientation of information technology application in the management of the enterprise. Application of

ERP can introduce new requirements for personnel in the accounting system. There are 4 possible cases for this problem:

*First*, the enterprise retains all of its employees and does not recruit new employees. In this case, the company believes that the former employee may be knowledgeable of the organization's activities, however, training and enhancement of the employee's ability to adapt to the new environment.

*Second*, the enterprise retains all its employees and recruits new employees. In this case, due to the complex nature of the job and the volume of work, the company has to increase the number of employees. Meet the requirements of process compliance, schedule of completion of work, thereby ensuring the promptness of the information supply.

*Third*, businesses will fire off some of their former employees and recruit new staff. The ERP environment requires both employees and managers to have certain knowledge of the organization, skills and proficiency of the technology information during the work.

*Fourth*, the business sacked a number of former employees and did not recruit new employees. This situation may occur is due to in the ERP environment, the original data collection process mainly re-

lated to other departments, Accountants are involved in processing, providing information and control.

Change in the way we work, corporate culture is a big issue that any business must face. Although personnel may change, their qualifications, knowledge and skills need to be improved. This is also a human factor challenge that enterprises need to pay attention when deploying and applying ERP.

**Division of responsibility**

The division of responsibilities is done on the basis of the workload, organizational characteristics, management requirements and complexity of the operations. business.

In the ERP environment, an on-site operation may be performed by multiple accountants or an accountant may be responsible for multiple simultaneous accounting operations but still ensure control, no duplication and no abandonment. Each section should have a description of the job description of the following: scope, responsibilities, work (regular and periodic), relations, evaluation criteria.

**Permissions access**

When using ERP, there are 3 functional groups that closely relate to accounting, namely, declarations, input and information.

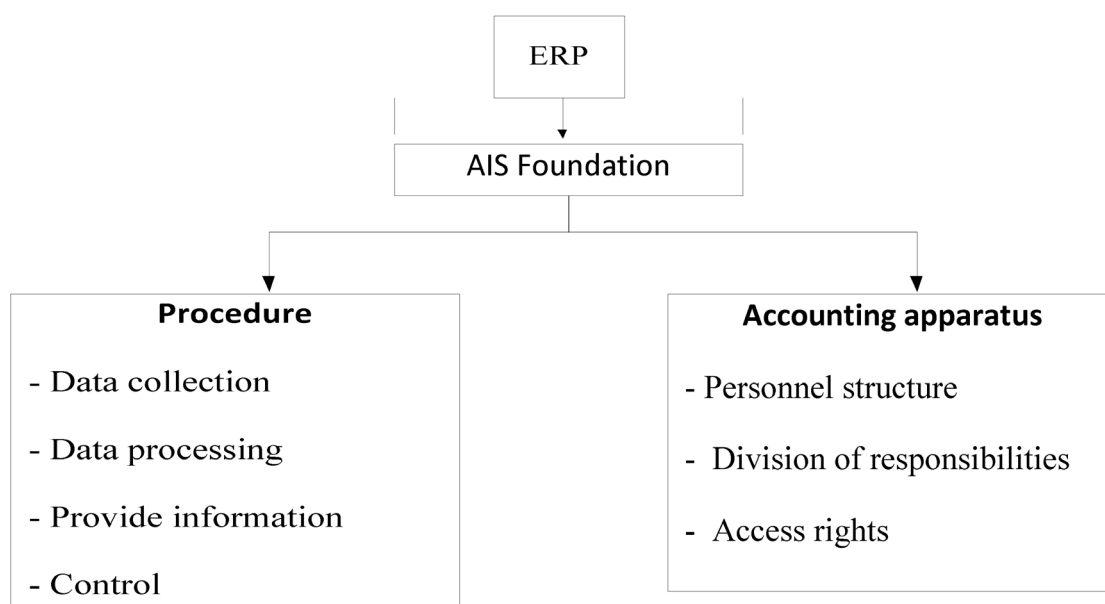


Diagram 1. Impact map of ERP to organization of accounting information system

*Declaration:* includes general information declaration and list of objects. The object list is usually updated regularly during the operation of the business such as suppliers, customers, goods, budget ... This declaration is usually assigned to the individual responsible for each individual, its influence may relate to one or more parts of the accounting and other modules.

*Input:* including input balances and input numbers. In the ERP system, the accounting data generated by the accounting is significantly reduced due to the inheritance of data of other modules. but there are some data available that are not authorized to modify.

*Provide information:* For each section of accounting, access rights are strictly controlled on the rights: view, add, edit, delete. Therefore, even in the accounting module, if not. Similarly, the sales and purchase module may not be able to view the accounting module and vice versa if it is not licensed system.

As such, ERP has played an increasingly important role in enhancing its competitiveness and benefiting businesses through the ability to integrate information and business processes effectively. It includes many functional modules, stored in a centralized database that allows enterprises to plan and manage resources, using information in multiple dimensions. When applying ERP, organizing the accounting information system is an important task to do, this is not just the internal work of the accounting department but also affects the whole business. Businesses need to focus on both organizational content (including data collection, data processing, information provision, control, accounting apparatus) and appropriate organizational processes from the systems analysis phase. up to the operating stage of the system.

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## Section 2. Mathematical and instrumental methods of economics

*Amirov Imran Balamirza oglu,  
Pirverdiyeva Sabina Alvyz Kyzy,  
Sumgait State University  
E-mail: imran\_amirov@mail.ru*

### **ECONOMIC EVALUATION OF THE ABILITY OF THE DEVELOPMENT OF METALLURGICAL ENTERPRISES**

**Abstract:** Ultimate goal development of the metallurgy industry in the preparing article and is to investigate of the dependence their towards to fund of basic production between investment. Ability of developing here independently on the 2008–2016<sup>th</sup> years have been valued.

Proof have been having ability of independent developing with mathematical methods in the result of the investigation.

**Keywords:** metallurgy, industry, organization, development, investment, growth, product output, basic funds.

*Амиров Имран Баламирза оглы,  
Пирвердиева Сабина Алвиз кызы,  
Сумгаитский Государственный Университет  
E-mail: imran\_amirov@mail.ru*

### **ЭКОНОМИЧЕСКАЯ ОЦЕНКА СПОСОБНОСТИ РАЗВИТИЯ МЕТАЛЛУРГИЧЕСКИХ ПРЕДПРИЯТИЙ**

**Аннотация:** Основная цель подготовленной статьи состоит в исследовании зависимостей между развитием металлургической промышленности и направленных инвестиций в их основные производственные фонды. Здесь также проведены оценки способности самостоятельного развития металлургических предприятий на период 2008 ÷ 2016 гг.

В результате исследования доказано математическими методами способность обладание самостоятельного развития металлургической промышленности Азербайджана.

**Ключевые слова:** металлургия, промышленность, предприятия, развития, инвестиция, прирост, выпускаемая продукция, основные фонды.

Для нормального урегулирования экономической деятельности и оценки способности разви-

тия металлургических предприятий используются нижеследующие показатели:

- объем среднегодового изменения выпуска продукции хозяйствующих субъектов ( $\Delta Y$ );
- среднегодовое изменение направленные инвестиционные вложения на основные фонды ( $\Delta I$ ) и т.д.

Зависимость инвестиционных изменений направленные на основные фонды металлургических предприятий от производства выпускаемых продукции в этих же предприятиях определяются в следующем линейном уравнении:

$$\Delta I = (a_0 + a_1 \Delta Y)$$

В этом уравнении  $\Delta I$  – изменения направленных инвестиций на основные фонды;  $\Delta Y$  – изменения выпускаемых продукции в хозяйствующих субъектах; коэффициент  $a_1$  – показатель акселерации  $a$ ;  $a_0$  – предел инвестиционных изменений направленные на основные фонды от производственных побочных источников вне производства в среднем расчете. Показатель акселерации, как коэффициент показывает приросты инвестиций, направленные на экономику в текущем периоде за счет формирования увеличения какой доли выпускаемой продукции в предыдущем периоде. Эту зависимость можно выразить так

$$a_t = [\Delta I_t / (\Delta Y_{(t-1)} - \Delta Y_{(t-2)})]$$

В этом выражении  $\Delta Y_{(t-1)}$  – прирост объема выпускаемой продукции в экономике страны ( $t-1$ )

периода;  $\Delta Y_{(t-2)}$  – увеличение объема выпускаемой продукции в экономике страны в периоде ( $t-2$ );  $\Delta I_t$  – увеличение инвестиций направленные на экономику страны в текущем  $t$  – ым периоде [1, с. 393].

В вышеуказанной зависимости оценка показателя акселерации  $a$  ограничивается в интервале  $[-1 \leq a \leq 1]$ . Обозначение показателя акселерации в интервале  $[0 < a \leq 1]$  показывает увеличение какой доли выпуска продукции направлено на прирост инвестиций. Значение показателя акселерации в интервале  $[-1 < a < 0]$  показывает потенциальную возможность направленную на увеличение инвестиций в основные фонды за счет прироста выпускаемой продукции. Но эти средства показывает ненаправленность на прирост инвестиций. По этой причине происходит снижение направляемых инвестиций на основные фонды. Значение показателя акселерации  $a = 0$  выражает не изменение направляемых инвестиций на основные фонды за счет увеличения выпускаемой продукции в хозяйствующих субъектах, то есть  $\Delta I = 0$ . В этом случае можно считать, что изменения направленных инвестиций на основные фонды предприятия формируются за счет побочных финансовых источников от производства продукции.

Таблица 1. – Общий выпуск продукции и инвестиционные вложения на основной капитал в металлургических предприятиях на период 2008÷2016 гг.

Показатели	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	2	3	4	5	6	7	8	9	10
1. Инвестиции на основной капитал млн.ман.	30,04	19,7	21,5	100	54,4	51	2,3	5,2	1,3
2. Объем промышленной продукции(работ, услуг), текущими ценами на соответствующие года, млн. ман.	348,9	88,8	135,2	195,6	347,1	305,2	281,2	212,6	287,6

Источник: Составлен на основе данных Государственного Статистического Комитета Азербайджанской Республики [2, с. 469]

За период 2008÷2016 гг. металлургических предприятиях для оценки инвестиционных вложений на основные фонды за счет увеличения производства продукции используем приведенные данные в таблице 1 [2, с. 469]

При исследовании зависимости изменения направленных инвестиций на основные фонды в металлургических предприятиях  $\Delta \dot{I}$  от изменений выпускаемой продукции  $\Delta Y$  учитывается временной фактор. Так как, с целью развития экономических отраслей за счет прироста произведенной продукции в текущем году инвестиции на увеличение основных фондов как правило направляется на следующий год. В результате, в связи с развитием в текущем  $t$ -году прирост направляемых инвестиций  $\Delta \dot{I}_t$  на основные фонды создается за счет прироста выпускаемой продукции  $\Delta Y_{t-1}$  предыдущем ( $t-1$ ) году.

В связи с вышеуказанным зависимость изменение инвестиции связанное с развитием  $t$ -ом году направленное на основные фонды в  $t-1$  году от изменений выпускаемой продукции разыскивается в форме линейного уравнения:

$$\Delta \dot{I}_t = (a_0 + a_1 \cdot \Delta Y_{(t-1)})$$

В этой зависимости  $\Delta \dot{I}_t$  – прирост инвестиций направленные на увеличение основные производственные фонды в  $t$ -ом году;  $\Delta Y_{(t-1)}$  пророст объемов выпускаемой продукции в году  $t-1$ ;  $a_1$  – показатель акселерации. Показатель акселерации  $a_1$  показывает количество направленных инвестиций на основные фонды за счет увеличе-

ния объема выпускаемой продукции в прошлом ( $t-1$ )-ом периоде [3, с. 9].

В линейном уравнении коэффициенты  $a_0$  и  $a_1$  определяется

$$\begin{cases} a_0 \cdot n + a_1 \cdot \Sigma(\Delta Y) = \Sigma(\Delta I) \\ a_0 \cdot \Sigma(\Delta I) + a_1 \cdot \Sigma(\Delta Y)^2 = \Sigma(\Delta I \Delta Y) \end{cases}$$

с решением системными уравнениями.

Коэффициенты  $a_0, a_1$  в системном уравнении определяется посредством программы Матчап методом Крамера. С этой целью в линейном уравнении вычисляется  $\Delta$  главный детерминант и детерминанты  $\Delta_0, \Delta_1$  связанные с коэффициентами  $a_0$  и  $a_1$ . Коэффициенты определяются посредством деления дополнительных детерминантов на главный детерминант:

$$a_0 = \alpha_0 = \frac{\Delta_0}{\Delta}; \quad a_1 = \frac{\Delta_1}{\Delta}$$

В линейном уравнений точность угаданных значений коэффициентов  $a_0$  и  $a_1$  проверяется с помощью становления на месте оценки в первую уравнению в системе уравнений.

В металлургических предприятиях на период 2010 ÷ 2016-е годы инвестиционные вложения на основные фонды за счет увеличения выпускаемой продукции оцениваются в нижеследующей последовательности.

Таблица 2. – Показатели оценки способности независимого развития металлургических предприятий на период 2008 ÷ 2016 гг.

№	Годы	$\Delta \dot{I}_t$	$\Delta Y_{(t-1)}$	Показатели расчета		
	$n = 7$			$Y$	$X$	$x^2$
1.	2010	1,8	260,1	3,24	468,18	-15,525752
2.	2011	78,5	-46,4	6162,3	-3642,4	-0,163972
3.	2012	-45,6	-60,4	2079,4	2754,2	0,537708
4.	2013	-3,4	151,5	11,56	515,1	5,10364
5.	2014	-48,7	24	2371,7	-1168,8	-3,69242
6.	2015	2,9	68,6	8,41	198,94	-5,927772
7.	2016	-3,9	-75	15,21	292,5	1,26946
8.	$\Sigma$	-18,4	19,4	10652	-582,24	-18,399108

Источник: расчеты произведены на основе данных Государственного Статистического Комитета Азербайджанской Республики



На основе данных таблицы 2 составлен нижеследующие системы уравнений

$$\begin{aligned} 7a_0 + 19,4a_1 &= -18,4 \\ 19,4a_0 + 10652a_1 &= -582,2 \end{aligned}$$

При решении системы уравнений определены коэффициенты  $a_0$  и  $a_1$

$$\begin{aligned} \Delta &= \begin{vmatrix} 7 & 19,4 \\ 19,4 & 10652 \end{vmatrix} = 74187,64 \\ \Delta_0 &= \begin{vmatrix} -18,4 & 19,4 \\ -582,7 & 10652 \end{vmatrix} = -184693 \\ \Delta_1 &= \begin{vmatrix} 7 & -18,4 \\ 19,4 & -582,2 \end{vmatrix} = -37184,44 \end{aligned}$$

$$a_0 = \Delta_0 / \Delta = -2,48954; a_1 = \Delta_1 / \Delta = -0,05012$$

В зависимости показателя акселерации  $\alpha$  ограничивается в интервале

$[-1 \leq \alpha \leq 1]$ . Оценка показателя акселерации в интервале  $0 < \alpha \leq 1$  показывает какая доля увеличение выпускаемой продукции направлена на прирост инвестиций. А оценка показателя акселерации в интервале  $-1 < \alpha < 0$  показывает потенциальные возможности прироста инвестиций на основные фонды за счет увеличения выпускаемой продукции. Но это показывает не направленность средств на прирост инвестиций. По этой же причине происходит снижение инвестиций на основные фонды и это проверяется с помощью уравнений:

$$\begin{aligned} 7a_0 + 19,4a_1 &= -18,4 \\ 7 \cdot (-2,48954) - 4,1 \cdot (-0,05012) &= -18,3992 \end{aligned}$$

Средне квадратное отклонение  $s = (\Delta \dot{I}_t - \Delta \dot{I}) = (18,4 - 18,399108) = 0,000892$ . Точность расчетов 0,999 или 99,9% [4, с. 101].

Таким образом, в Азербайджане за период 2010 ÷ 2016 гг. в металлургической промышленности увеличение инвестиций можно выразит за счет прироста продукции так:

$$\Delta \dot{I}_t = -2,488954 - 0,05012 \Delta Y_{t-1}$$

В полученном уравнении показатель акселерации  $a_1 = -0,05012$ . На основе этого индекса считается что, в исследуемом периоде предприятий металлургической промышленности обладают способностью самостоятельного развития. А получение отрицательной оценки коэффициента  $a_0$  ( $a_0 < 0$ ) показывает, что направление инвестиций в этих периодах в этой отрасли сопровождается уменьшения инвестиций. Это уменьшение ясно показано в диаграмме [5].

**Научная новизна статьи:** исследовано способность самостоятельного развитие действующих предприятий металлургических предприятий. Здесь также, как один из стратегических отраслей не нефтяного сектора, обоснованы развития предприятий металлургических, на основе экономико-математических методов.

**Значимость внедрения:** может обеспечить современное развитие производство металлургической промышленности, успешной деятельности наших предприятий в конкурентной борьбе и повышение экономической эффективности.

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## Section 3. Management

*Qurbonova Lolahon Abdulhadimovna,  
Phd., researcher, National University of Uzbekistan*

*Sattarova Guljahon,  
student, Andizhan State University,  
E-mail: naumenko06@mail.ru*

### THE PLACE OF ELITOLOGY IN THE MANAGEMENT AND MARKETING SYSTEM

**Abstract:** In this article possible prospects for the development of elitology as a branch of economic science are considered. Economic elitology is a rather new concept, but today without economic concepts of elitology the development of theoretical and practical foundations of business, management and marketing at all levels of ownership of property, obtaining any profit, meeting consumer demand for goods and services, manifesting economic interests, efficient production of goods and services are not seems possible. On this background, the study of the role of elitology in these processes seems particularly relevant.

**Keywords:** elitology, elite theory, economic elitology, management, marketing, marketing technologies.

*Курбонова Лолахон Абдулхадимовна,  
Национальный университет Узбекистана,  
Ташкент, Узбекистан*

*Саттарова Гулжахон,  
факультет иностранных языков, 2 курс  
Андижанский государственный университет  
Андижан, Узбекистан  
E-mail: naumenko06@mail.ru*

### МЕСТО ЭЛИТОЛОГИИ В СИСТЕМЕ МЕНЕДЖМЕНТА И МАРКЕТИНГА

**Аннотация:** В данной статье рассматриваются возможные перспективы развития элитологии как отрасли экономической науки. Экономическая элитология понятие достаточно новое, но сегодня без экономических концепций элитологии развитие теоретических и практических основ бизнеса, менеджмента и маркетинга на всех уровнях владения собственностью, получения

любой прибыли, удовлетворения спроса потребителя в товарах и услугах, проявления экономических интересов, эффективного производства товаров и услуг не представляется возможным. На этом фоне изучение роли элитологии в данных процессах представляется особо актуальным.

**Ключевые слова:** элитология, теория элит, экономическая элитология, менеджмент, маркетинг, маркетинговые технологии.

Возникнув в лоне политических и социальных наук, элитология изначально рассматривалась как наука, рассматривающая формирование элит, системы управления государством, инжиниринга в системе управления и т.п. Однако, к середине XX столетия наметился достаточно серьёзный уклон в сторону изучения элитологических теорий и концепций применительно к менеджменту в экономической сфере общества.

Вообще экономическая сфера общества предполагает в своём основании чёткую систему управления всеми её элементами. А значит, речь должна идти и о соответствующе системе элит, способных управлять экономическими процессами, как на региональном, так и на глобальном уровнях. Современная мировая экономика зависит не только от внутренних изменений, но и от внешних. Стоять особняком в условиях глобального рынка и глобализационных процессов невозможно.

На базе элитологических исследований возникло специальная наука – экономическая элитология. В своём учебном пособии, посвященном основам этой дисциплины, И. В. Кондратович определяет её как направление социально-экономической науки, изучающее сущностно-функциональные особенности элит и закономерности экономической деятельности различных элитных групп в системе общественных отношений. Объектом экономической элитологии являются субъекты элиты и элитные группы, выполняющие совместную деятельность по созданию материальных и духовных ценностей, определяющих идеологические установки общества, влияющие на социально-политическую, экономическую, культурную, научную и др. сферы общественной жизни, нуждающиеся в организации и управле-

нии. Предмет экономической элитологии – экономические особенности субъектов элит и элитных групп, их функциональное предназначение, система управленческих отношений, действий и взаимодействий [1; 6].

Экономическая элитология как направление социально-экономической науки напрямую взаимосвязана с такими дисциплинами, как: экономика интеллектуального труда, теория труда, экономика труда и др.

Экономическая элитология также связана со смежными отраслями знаний, такими как социология, политология, менеджмент, теория управления, управление персоналом. При подходе с этих позиций становится очевидной необходимость экономической элитологии [1; 6].

С точки зрения маркетинговых ходов экономическая элитология позволяет выстроить чёткую схему продвижения своих талантов и определения целей для достижения. С одной стороны, элитологические тенденции в маркетинге и менеджменте слабо уловимы, однако это только лишь видимость. С другой стороны, нельзя не отметить тот факт, что во главе практически всех крупных мировых маркетинговых кампаний стоят холдинговые олигархи, которые являются выходцами из высшего, элитарного сословия. Именно они могут диктовать выгодные для них самих и в принципе приемлемые для среднестатистического потребителя условия приобретения товаров и услуг. Это обуславливается тем, что должен быть соблюден некий экономический баланс между максимально возможным повышением стоимости товаров и услуг при условии существования максимально возможного желания приобрести эти товары и услуги у производителя. Это бесценный талант

маркетолога, причём он не передаётся конечно же по наследству, а приобретается. Но занять нишу в высших эшелонах элитарной экономики занять под силу не каждому. Это удел избранных, а значит, мы имеем дело с элитами в экономике.

Большое значение для элитологии имеет система рекрутирования. Это очень важный момент в любой отрасли элитологии. Однако в настоящее время возможностей влиться в число элиты намного больше, чем например век назад. Если раньше необходимо было либо быть выходцем из высшего сословия, либо иметь родственника из высшего сословия, либо вступить брак с представителем высшего сословия и т.п., то в наши дни

нужно иметь пробивной характер, целеустремлённость и желание двигаться по карьерной лестнице. В экономической сфере это неотъемлемые части успешного дела. Также большой потенциал имеет представитель элиты с высоким уровнем развития предпринимательских способностей, который не останавливается на достигнутом, а стремится к покорению новых вершин.

Таким образом, необходимо отметить, что в экономической элитологии главное значение имеет не происхождение человека, а его экономический талант, предпринимательские способности, целеустремлённость и владение всеми умениями менеджера и маркетолога.

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Rong Ji,  
 St. Andrew's Episcopal School  
 E-mail: becky.ji719@gmail.com

## DEVELOPMENT OF A MODEL TO IMPROVE BUSINESS PROFITABILITY

**Abstract:** Data from the consumer credit risk domain provided by CompuCredit was used to build binary classification models to predict the likelihood of default. This project compares two of these models, one uses four variables, and the other one uses twelve variables. Although the original dataset had several hundred predictor variables and more than a million observations, I chose to use rather simple models. My goal was to develop a model with as few predictors as possible, while not going lower than a concordant level of 65%. Two models were evaluated and compared based on efficiency, simplicity, and profitability. Using the selected model, cluster analysis was then performed in order to maximize the estimated profitability. Finally, the analysis was taken one step further through a supervised segmentation process, in order to target the most profitable segment of the best cluster.

**Keywords:** business profitability; model; data; financial product.

### 1. Introduction

For any business in the world, profitability is a key indicator of the success of a business. In order to develop a model to predict the profit of a business, a large number of variables can be required to build a robust model. However, this will reduce the efficiency of the model. If a model with a small number of variables can be developed while still keeping the model robust is a significant improvement. The first objective of this study is to develop a model that can predict the default of a financial product with a small number of variables; the second objective is to estimate the profitability that can be generated by this model.

### 2. Data and Method

Datasets from a financial institute is used.

#### 2.1 Logistic Regression Model

Before the model is built, random samples were taken from the dataset to create two independent files, one is a training file and the other one is a validation file. The model is built with logistic regression by defining binary variable to predict the likelihood of default.

Logistic regression is a part of a category of statistical models called generalized linear models, and it allows one to predict a discrete outcome from a set of variables that may be continuous, discrete, dichotomous, or a combination of these. Typically, the dependent variable is dichotomous and the independent variables are either categorical or continuous.

To develop the predictive model for mortgage delinquency, stepwise logistic regression was conducted using SAS version 9.2. In this study, a cutoff of P value < 0.05 was used for adding new variables. If an account is over 30 days delinquent (value of variable Current Loan Delinquent Status is  $\geq 1$ ), the outcome variable Delinquent is coded as 1, otherwise it is coded as 0. Logistic regression relates changes in the natural logarithm of the odds of being depressed to the changes in the independent variables [7].

The logistic regression model can be expressed with the formula:

$$\ln(P/P-1) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \dots + \beta_n * X_n$$

where  $P$  is the probability of being depressed,  $\beta_0$  is a constant,  $\beta_1$  through  $\beta_n$  are the regression

coefficients and  $X_1$  through  $X_n$  are the independent variables, such as age, sex, factors of physical activity, factors of dietary habit, factors of physical activity, factors of smoking, factors of alcohol use, factors of drug use, etc. For simplicity, the left-hand side of the equation is often referred to as “the logit”. The interpretation of the coefficients describes the independent variable’s effect on the natural logarithm of the odds, rather than directly on the probability  $P$ .

To facilitate interpretation,  $e^{\beta_n}$ , a transformation of the original regression coefficient  $\beta_n$  can be derived, which can be interpreted as follows:

If  $e^{\beta_n} > 1$ ,  $P/(1-P)$  increases.

If  $e^{\beta_n} < 1$ ,  $P/(1-P)$  decreases.

If  $e^{\beta_n} = 1$ ,  $P/(1-P)$  stays unaffected.

After the logistic regression model was obtained, the observations in the training dataset were scored, the predicted probabilities of being depressed were ranked and deciled,  $KS$  was calculated, and gain chart was presented.

### 2.2 Model validation

The holdout dataset was scored with the logistic regression model, the predicted probabilities of being depressed were ranked and deciled, Kolmogorov-

Smirnov (abbreviated as  $KS$ ) was calculated, and gain chart were presented. If the  $KS$  of the validation dataset is close to the  $KS$  of the training dataset, the model is considered stable.

The goal is to build a model with as few predictors as possible, while not going below a concordant level of 65%. Hundreds predictors were initially placed into a model, using the backward selection option in the Proc Logistic procedure. Variables showing no effect were removed. Variables were selected based on the highest Chi-Square value. Several models were developed and tested.

### 2.3 Model Comparison

Through the process of model development and validation, two models were selected for comparison. The two models were compared both on efficiency and profitability. Profitability reports were generated for each model using a profitability function. The cost of simplicity was an important factor in determining which model would be the best.

## 3. Results and Discussion

### 3.1 Four-Variables Model

The four-variables logistic regression model is developed and the results are as follows.

Table 1. – Analysis of Maximum Likelihood Estimates

Parameter	Parameter Description	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-0.05250	0.25820	0.04	0.8389
X1	Utilization of all revolving bankcard trades	1	0.00058	0.00025	5.23	0.0223
X2	Highest utilization on Any Single Bank Revolving Trade	1	0.00099	0.00039	6.46	0.0111
X3	Total Collection/Charge Off/Repossession Dollars Within 12 Months	1	0.00005	0.00002	10.57	0.0011
X4	Percent of Trades Never Delinquencies or Derogatory	1	-0.03620	0.00310	136.36	< 0.0001

### Four-Variables Model Performance

All four variables are significant in the level of 0.05. The model can achieve percent of concordant 68.8 and Area Under Curve 0.688.

Table 2. – Association of Predicted Probabilities and Observed

<b>Responses</b>			
<b>Percent Concordant</b>	68.8	<b>Somers' D</b>	0.377
<b>Percent Discordant</b>	31.1	<b>Gamma</b>	0.378
<b>Percent Tied</b>	0.2	<b>Tau-a</b>	0.147
<b>Pairs</b>	2.082.730	<b>c</b>	0.689

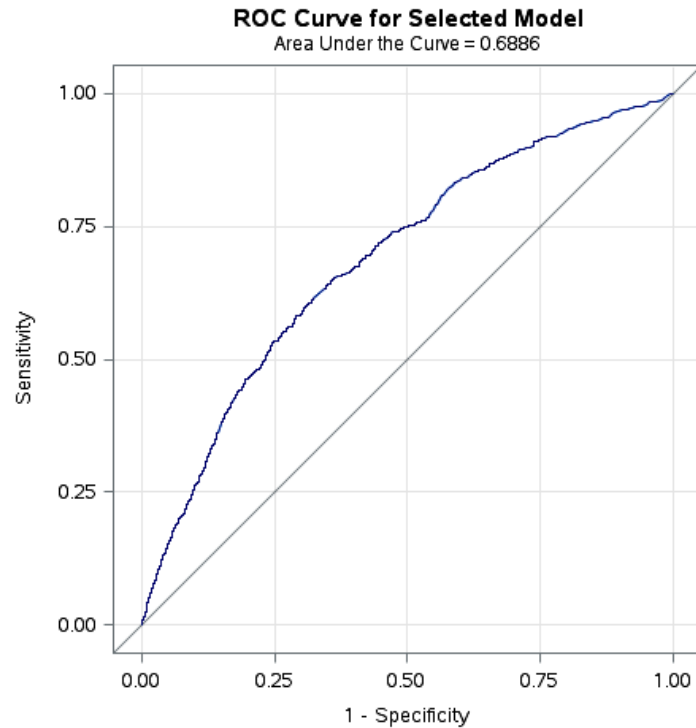


Figure 1.

The gains table is tabulated as below that KS achieves 0.542

Table 3.

<b>De-cile</b>	<b>Freq</b>	<b>Cum_Freq</b>	<b>Default</b>	<b>Cum Default</b>	<b>Mean Default</b>	<b>Cum Default Rate</b>	<b>Default Capture Rate</b>	<b>Min Score</b>	<b>Max Score</b>	<b>Mean Score</b>	<b>KS</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
1	245	245	80	80	0.327	0.327	0.439	0.172	1.000	0.356	0.366
2	245	490	46	127	0.190	0.259	0.693	0.082	0.170	0.116	0.533
3	246	736	20	147	0.080	0.199	0.801	0.049	0.082	0.062	0.542
4	245	982	6	153	0.025	0.155	0.835	0.038	0.049	0.043	0.470
5	246	1.227	9	162	0.038	0.132	0.885	0.031	0.038	0.034	0.416
6	245	1.473	15	177	0.062	0.120	0.969	0.029	0.031	0.029	0.399

1	2	3	4	5	6	7	8	9	10	11	12
7	245	1.718	3	180	0.011	0.105	0.984	0.027	0.029	0.028	0.307
8	245	1.963	2	182	0.009	0.093	0.996	0.026	0.027	0.026	0.212
9	246	2.209	1	183	0.003	0.083	0.999	0.025	0.026	0.025	0.108
10	246	2.455	0	183	0.000	0.074	1.000	0.025	0.025	0.025	0.000
Total	2.455	2.455	183	183	0.074	0.074	1.000	0.025	1.000	0.074	0.542

### Calculation of the Profitability of the Four-variables Model

If we think when the predict default probability is greater than a given number, then it would be a bad account; otherwise, it would be a good account. We can assign GoodBad to the scored data.

An example here is if we are using the cutoff probability of 0.116 from the mean score at first 2 decile, we can classify the model development data into 4 categories: ERROR1, ERROR2, VALID1 and VALID2. The profitability can be listed in the below table.

Table 4.

Outcome type	Percentage	n	profit	pper1000
ERROR1	17%	571	(\$105.833.14)	(\$185.347.01)
ERROR2	10%	327	\$0.00	\$0.00
VALID1	9%	295	\$0.00	\$0.00
VALID2	64%	2078	\$506.009.54	\$243.507.96
Total	100%	3271	\$400.176.39	\$122.340.69

Here ERROR1 is a category that we assign the account be good but it actually a bad account, then we loss \$105.833.14 on 571 accounts. It is equivalent that we loss \$185.347.01 on 1000 accounts; ERROR2 is a category that we assign the account be bad but it actually a good account, then we don't lose money, neither earn money; VALID1 is a category that we assign the account be bad and it actually a bad account, then we successfully avoid loss; VALID2 is a category that we assign the account

be good and it actually a good account, then we successfully earn \$506.009.54 on 2078 accounts. It is equivalent that we earn \$243.507.96 on 1000 accounts. This is a winning business that we earn \$400.176.39 on the total 3271 accounts; that is equivalent that we earn \$122.340.69 on 1000 accounts.

### 3.2 Twelve-Variables Model

A logistic regression model using 12-variables can be established by as below.

Table 5. Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard	Wald	Pr > ChiSq
			Error	Chi-Square	
1	2	3	4	5	6
Intercept	1	-1.63090	0.38640	17.81	<.0001
X1	1	0.00138	0.00032	19.16	<.0001
X2	1	0.00716	0.00170	17.66	<.0001
X3	1	0.00006	0.00002	10.45	0.0012



<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
<b>X4</b>	1	-0.01380	0.00441	9.82	0.0017
<b>X5</b>	1	-0.01310	0.00435	9.11	0.0025
<b>X6</b>	1	0.08310	0.02800	8.83	0.003
<b>X7</b>	1	0.00777	0.00270	8.31	0.0039
<b>X8</b>	1	0.00000	0.00000	7.44	0.0064
<b>X9</b>	1	0.16170	0.06240	6.71	0.0096
<b>X10</b>	1	0.07540	0.02930	6.62	0.0101
<b>X11</b>	1	0.03660	0.01600	5.24	0.0221
<b>X12</b>	1	-0.00001	0.00001	4.94	0.0263

### Twelve-Variable Model Performance

All 12 variables are significant in the level of 0.05.

The model can achieve percent of concordant 72 and Area Under Curve 0.72.

Table 6. – Association of Predicted Probabilities and Observed

<b>Responses</b>			
<b>Percent Concordant</b>	72	<b>Somers' D</b>	0.44
<b>Percent Discordant</b>	28	<b>Gamma</b>	0.44
<b>Percent Tied</b>	0	<b>Tau-a</b>	0.171
<b>Pairs</b>	2.082.730	<b>c</b>	0.72

The ROC curve for comparison is plotted as

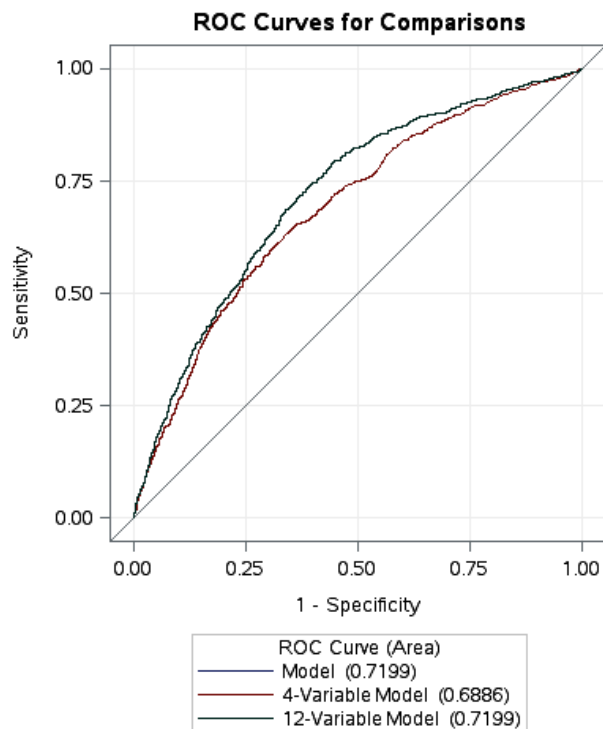


Figure 2.

The ROC curve shows that there is a bit difference between the probabilities of the two models, especially when 1-Specificity is between 0.25 and

0.75. Will this difference a big impact on probability on profitability? We will further explore the gains table, tabulated as below.

Table 7.

De-cile	Freq	Cum_Freq	De-fault	Cum Default	Mean Default	Cum De-fault Rate	Default Cap-ture Rate	Min Score	Max Score	Mean Score	KS
1	245	245	97	97	0.398	0.398	0.532	0.207	1	0.400	0.467
2	246	490	42	139	0.170	0.284	0.760	0.101	0.207	<b>0.143</b>	0.606
3	246	736	17	156	0.067	0.211	0.851	0.062	0.101	0.079	0.595
4	245	981	12	168	0.050	0.171	0.918	0.038	0.062	0.047	0.560
5	246	1227	7	175	0.029	0.143	0.957	0.023	0.038	0.030	0.493
6	245	1472	4	179	0.015	0.121	0.977	0.015	0.023	0.019	0.408
7	246	1718	1	180	0.004	0.105	0.982	0.010	0.015	0.012	0.305
8	245	1964	1	181	0.004	0.092	0.988	0.006	0.010	0.008	0.203
9	245	2209	2	183	0.008	0.083	0.999	0.003	0.006	0.005	0.108
10	246	2455	0	183	0.001	0.074	1	0.000	0.003	0.002	0.000
Total	2455	2455	183	183	0.074	0.074	1	0.000	1	0.074	0.606

The Gains and Lift charts show only a small advantage of the 12-variable model over the simpler one. KS achieves 0.60.6.

#### Calculation of the Profitability of the Twelve-variables

Similar to 4-variable model profitability calculation, if we think when the predict default probability is greater than a given number, then

it would a bad account; otherwise, it would be a good account. We can assign GoodBad to the scored data. An example here is if we are using the cutoff probability of 0.143 from the mean score at first 2 decile, we can classify the model development data into 4 categories: ERROR1, ERROR2, VALID1 and VALID2. The profitability can be listed in the below table.

Table 8.

outcome type	pct	n	profit	pper1000
<b>ERROR1</b>	0.16631	544	<b>(\$98.427.90)</b>	<b>(\$180.933.65)</b>
<b>ERROR2</b>	0.0963008	315	\$0.00	\$0.00
<b>VALID1</b>	0.0984408	322	\$0.00	\$0.00
<b>VALID2</b>	0.6389483	2090	\$510.778.27	\$244.391.52
	1	3271	\$412.350.37	\$126.062.48

Here ERROR1 is a category that we assign the account be good but it actually a bad account, then we loss **\$98.427.9** on 544 accounts. It is equivalent that we loss **\$180.933.65** on 1000 accounts; ERROR2 is a category that we assign the account be bad but it actually a good account, then we don't lose money, neither earn money; VALID1 is a category that we

assign the account be bad and it actually a bad account, then we successfully avoid loss; VALID2 is a category that we assign the account be good and it actually a good account, then we successfully earn \$510.779.27 on 2090 accounts. It is equivalent that we earn \$244.391.52 on 1000 accounts. This is also winning business that we earn \$412.350.37 on the

total 3271 accounts; that is equivalent that we earn \$126.062.48 on 1000 accounts;

The profit difference on 1000 accounts base is \$3.721.79. Whether to use 4-variables model or use 12-variables model would depend on how much it could cost in complexity when increase number of predictors from 4 to 12.

#### 4. Conclusion

The research paper built two logistic models to increase profitability through simplicity on con-

sumer lending business. Two models are compared in predicting the likelihood of default. Two models were evaluated and compared based on concordance, AUC, KS, efficiency, simplicity, and profitability. It indicates that simple model can improve the efficiency of a business, while still maintaining the profitability. In practice, the business decision of adopting a simple model will depend on the cost and incremental complexity to implement the model.

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## Section 4. World economy

*Korganashvili Larisa,  
doctor of economic sciences, professor  
Ivane Javakhishvili  
Tbilisi State University, Georgia  
E-mail: l.korganashvili@yahoo.com*

### GLOBAL COMPETITIVENESS AND URBANIZATION OF GEORGIA

**Abstract:** Global competitiveness is important in the sustainable development of the national economy. At present, Georgia ranks 67<sup>th</sup> in the global competitiveness rating of the World Economic Forum, and on the level of urbanization it is on the 137<sup>th</sup> position in the rating of the United Nations Department of Economic and Social Affairs. In Georgia, 53.5% of the population is urban and 46.5% rural. The purpose of this study is to show the impact of urbanization on Georgia's global competitiveness and to identify the impulses that contribute to the country's further economic development. The paper analyzes trends in the development of global competitiveness and urbanization of Georgia, summarizes and systematizes data on the socio-economic development of large cities of the country, shows the functions of cities of different sizes in the Georgian economy, the positive and negative aspects of urbanization, the possibility of increasing the global competitiveness of the national economy under the influence of urbanization. Based on the analysis, conclusions and recommendations have been made that contribute to the country's sustainable economic growth and its success in world markets. The findings will also be useful for the development of urban policies and for the proper management of these processes.

**Keywords:** competitiveness, urban, urbanization, economic development, Georgia.

#### Introduction

100 years ago, on May 26, 1918, Georgia gained independence, which existed until February 1921. On April 9, 1991, on the basis of the results of the nationwide referendum, the Supreme Council of the Republic of Georgia adopted the Act on the Restoration of State Independence, which proclaimed the Independence Act of 1918 and moved to a new stage of its historical development with the transition from a centralized economic system to a market economy. As a result of the transformation, old political and economic structures were eliminated, active cooperation in the political, economic, cultural and other

fields with many countries of the world began, the structure of the Georgian economy changed significantly. If in 1990 the share of agriculture in the country's gross domestic product (GDP) was 31.7%, industry – 33.1% and services – 35.2%, then in 2016 they accounted for 9.0%, 24.9% and 66.1% respectively [1]. According to the preliminary data, in 2017, Georgia's GDP at current prices amounted to 15164.5 mil. USD (by 5.0% more than the previous year), GDP per capita – 4078.5 USD [2]. Despite more than 25 years passed since the proclamation of independence, the country has serious economic problems and the national economy is character-

ized by insufficient competitiveness [3]. One of the main problems in the formation of market relations in Georgia is that the transformation was mainly spontaneous, with trial and error methods, without taking into account the characteristics of the transition period and analysis of social development. As a result, the country still has serious socio-economic and demographic problems, the national economy is characterized by insufficient competitiveness, and the demographic situation and the level of urbanization have changed significantly [4].

The purpose of this study is to analyze the tendencies of the development of global competitiveness and urbanization of Georgia, to summarize and systematize data on the socio-economic development processes of large cities of the country, to show the functions of cities of different sizes in the Georgian economy, the positive and negative aspects of urbanization, the possibility of increasing the global competitiveness of the national economy under the influence of urbanization.

### **1. Transformation of Georgia in conditions of state independence and its global competitiveness**

Each country seeks common goals for the development of civilization, but it goes its own way, proceeding from its national interests, economic development, culture peculiarities, the mentality of the people, etc. Sovereign development of Georgia began with the conditions of a catastrophic economic recession. In 1994, the country's GDP fell to the lowest level and amounted to 32.4% of the 1990 level, hyperinflation averaged more than 3000%, which is almost three times higher than the inflation rate in the post-Soviet countries over the same period [3]. In the years 1991–1995 radical changes took place in Georgia: the transformation of the financial and budgetary and monetary spheres, the privatization of state property, the reform in health care, education, the social sphere, etc. In 1995, the national currency, Lari, entered circulation. To take the country out of the crisis, Georgia has accepted the conditions and standards of economic activity proposed by the International

Monetary Fund. As a result of their implementation, it was able to achieve economic growth [4: 5].

To assess the outcome of the transformation of sovereign Georgia, various international ratings can be used. Among them are the followings: The Bertelsmann transformation index, which consists of two components: the status index and the management index. According to the status index in 2018, Georgia ranks 42<sup>nd</sup> among 129 developing countries and countries with economies in transition, including 37<sup>th</sup> in political transformation and 47<sup>th</sup> in economic transformation. According to the management index, it is on the 33<sup>rd</sup> place. In accordance with the Bertelsmann transformation index, Georgia is among the successful countries [6]. Inclusive Development Index – in 2018, 32<sup>nd</sup> in the ranking of 78 developing countries [7]. Index of economic freedom – in 2018, 16<sup>th</sup> among 180 countries – is part of a group of mostly free states [8]. In the Human Development Index Georgia is 70<sup>th</sup> among 188 countries in the 2015 rating [9]. In the World Bank's index for ease of doing business, Georgia is the 9<sup>th</sup> among 190 countries in 2018 rating [10]. In the index of involvement in international trade, Georgia is in the 41<sup>st</sup> place among 136 countries in the 2016 rating [11]. Social Progress Index – 53<sup>rd</sup> place among 128 countries in the rating of 2017 [12]. The index of global competitiveness – 67<sup>th</sup> among 137 countries in the rating of 2017–2018 [13].

At the present stage, the country's competitiveness is the main indicator reflecting the state of its economy, its position on the world market and the standard of living of the population. The World Economic Forum defines competitiveness as the set of institutions, policies, and factors that determine the level of productivity of an economy that can achieve [14]. In an open economy, all countries, as subjects of the world market, have equal rights, but because of the asymmetry of the development of countries, the real picture looks quite different. Politically influential and economically strong states achieve high competitiveness through strategic leadership and

monopolization of markets. On the other hand, less developed countries and regions pay “rents of backwardness” with their natural resources, human capital, environmental quotas, etc. The existing disparities between developed and developing countries (especially in the production and use of high-tech products) are expressed in different levels of global competitiveness [15; 16].

Starting with the 2011–2012 ranking, Georgia’s global competitiveness tended to improve, but in the Global Competitiveness Index (GCI) 2017–2018, the situation changed and the country moved from the 59<sup>th</sup> place to the 67<sup>th</sup>. GCI score range across the 12 pillars is presented as follows: 1<sup>st</sup> pillar: Institutions – 50<sup>th</sup> place, 2<sup>nd</sup> pillar: Infrastructure – 69<sup>th</sup> place, 3<sup>rd</sup> pillar: Macroeconomic environment – 48<sup>th</sup> place, 4<sup>th</sup> pillar: Health and primary education – 69<sup>th</sup> place, 5<sup>th</sup> pillar: Higher education and training – 87<sup>th</sup> place, 6<sup>th</sup> pillar: Goods market efficiency – 50<sup>th</sup> place, 7<sup>th</sup> pillar: Labor market efficiency – 53<sup>rd</sup> place, 8<sup>th</sup> pillar: Financial market development – 63<sup>rd</sup> place, 9<sup>th</sup> pillar: Technological readiness – 70<sup>th</sup> place, 10<sup>th</sup> pillar: Market size – 100<sup>th</sup> place, 11<sup>th</sup> pillar: Business sophistication – 99<sup>th</sup> place and 12<sup>th</sup> pillar: Innovation – 118<sup>th</sup> place [13]. The above data show that the country is facing serious problems of further development and it does not have sufficient resources to switch to an innovative model of economic development based on knowledge [17; 18; 19].

## 2. The processes of urbanization and their impact on Georgia’s global competitiveness

Urbanization is a multilateral socio-economic, demographic and geographical process of urban growth, increasing the proportion of the urban population and their role in the development of society. Today, 55% of the world’s population live in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world’s population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa [20]. The processes of urbanization in independent Georgia began spontaneously against the background of a changing demographic and economic situation. In 2017, compared to 1989, the country’s population decreased by 1687.1 thousand people. One of the main reasons for this was the intensive migration of the population abroad. At the same time, the share of the urban population in the total population decreased from 55.4% to 53.7%. The highest proportion of the urban population (47.8%) was in 2003–2005 (Table 1). According to the level of urbanization in the ranking of The United Nations Department of Economic and Social Affairs, Georgia is on the 137<sup>th</sup> position.

Table 1. – Number of population of Georgia (at the beginning of the year)

Years	Total population, thsd	Urban, thsd	Rural, thsd	In total population, %	
				Urban	Rural
1	2	3	4	5	6
1989	5400.8	2991.3	2409.5	55.4	44.6
2002	4371.5	2284.8	2086.7	52.3	47.7
2003	4342.6	2266.8	2075.8	52.2	47.8
2004	4315.2	2252.5	2062.7	52.2	47.8
2005	4321.5	2257.5	2064.0	52.2	47.8
2006	4401.3	2310.4	2090.9	52.5	47.5
2007	4394.7	2308.9	2085.8	52.5	47.5
2008	4382.1	2303.8	2078.3	52.6	47.4
2009	4385.4	2309.1	2076.3	52.7	47.3

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
2010	4436.4	2350.5	2085.9	53.0	47.0
2011	4469.2	2371.3	2097.9	53.1	46.9
2012	4497.6	2391.7	2105.9	53.2	46.8
2013	4483.8	2410.8	2073.0	53.8	46.2
2014	4490.5	2411.7	2078.8	53.7	46.3
2015*	3713.7	2122.9	1590.8	57.2	42.8
2016	3720.4	2128.5	1591.9	57.2	42.8
2017	3718.2	2128.6	1589.6	57.2	42.8

\* In 2015–2017 the data is based on the results of the Population Census of November 5, 2014. The 2014 General Population Census results revealed the necessity of re-estimation of basic demographic data of previous years. Currently, Geostat implements the reestimation of the main demographic indicators of previous years, whereby the harmonization of historical data with 2014 Census data will be available. Source: Geostat. [http://geostat.ge/cms/site\\_images/\\_files/yearbook/Yearbook\\_2017.pdf](http://geostat.ge/cms/site_images/_files/yearbook/Yearbook_2017.pdf), p. 18 [21]

In Georgia, there are more than 100 cities and towns, but out of them only 4 cities have a population of more than 100 thousand people. As of the beginning of 2017, 1083.8 thousand people lived in Tbilisi – 29.15% of the total population and 50.92% of the urban population of Georgia, though in 2002 Tbilisi accounted for 24.74% of the total population and 47.34% of the urban population of Georgia. According to the 2002 census, 186.0 thousand people

lived in the city of Kutaisi (the center of Western Georgia and the Imereti region) and it was the second city of the country, however, as the data of 2017 and the 2014 census show, it lost the place to Batumi, the capital of the Adjarian Autonomous Republic. In 2017, the Batumi share was 4.18% of the total population and 4.18% of the urban population, Kutaisi – 3.96% and 6.92% respectively, and Rustavi – 3.40% and 5.93% (table 2).

Table 2. – Population in cities Tbilisi, Batumi, Kutaisi and Rustavi (at the beginning of the year, thsd)

	<b>2002*</b>	<b>2014*</b>	<b>2017</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Total population, thsd.	4371.5	4490.5	3718.2
Urban population, thsd.	2284.8	2411.7	2128.6
Tbilisi, thsd	1081.7	1078.3	1083.8
Share in total population,%	24.74	24.01	29.15
Share in the urban population,%	47.34	44.71	50.92
Batumi, thsd	121.8	152.8	155.5
Share in total population,%	2.79	3.40	4.18
Share in the urban population,%	5.33	6.34	7.31
Kutaisi, thsd	186.0	147.6	147.2
Share in total population,%	4.25	3.29	3.96
Share in the urban population,%	8.14	6.12	6.92
Rustavi, thsd	116.4	125.1	126.3
Share in total population,%	26.6	2.79	3.40

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Share in the urban population,%	5.09	5.19	5.93
Population in 4 <sup>th</sup> cities	1505,9	1503,8	1512,8
Share in total population,%	34.45	33.49	40.69
Share in the urban population,%	65.90	62.35	71.07

*\*According to the population census.*

Source: Geostat. Yearbook (2017) [http://geostat.ge/cms/site\\_images/\\_files/yearbook/Yearbook\\_2017.pdf](http://geostat.ge/cms/site_images/_files/yearbook/Yearbook_2017.pdf), pp. 34–36 [21]

In 2017, in four major cities of the country (Tbilisi, Batumi, Kutaisi and Rustavi), there were 1512.8 thousand people. (40.69% of the total population and 71.07% of the urban population), in 2014–1503.8 thousand people. (33.49% and 62.35% respectively), in 2002–1505.9 thousand people (33.49% and 62.35% respectively) (Table 2). These data indicate the uneven distribution of the population by region, as well as the growing concentration of the population in large cities and especially in the capital of Tbilisi, which is the most urbanized city of Georgia. The high concentration of the population in Tbilisi can be explained by the massive migration of the population (both from rural and urban settlements) to the capital to improve living conditions, as well as the number of refugees. According to the Ministry of Internally Displaced Persons from the Occupied Territories, by September 2014, the number of refugees was 259.247 people and more than a third of them settled in Tbilisi.

Large cities are the centers of growth of the national economy. It is proved that there is a direct link between urbanization and GDP growth. This is primarily associated with the possibility of using economies of scale and specialization, increasing in-

vestment attractiveness and changing market conditions. In large cities, human capital is usually concentrated, better living conditions and opportunities for employment are created, an opportunity arises for the formation of a “smart city”, etc. Accordingly, a well-planned urbanization process contributes to economic growth and, ultimately, to the global competitiveness of the country.

### **Conclusion**

The sustainable economic development of Georgia depends on its global competitiveness, which is increased by urbanization. The processes of urbanization in Georgia are spontaneous, which leads to uneven development of the regions of the country, the abandonment of a number of settlements, especially in mountainous areas.

In the long term, the processes of urbanization in Georgia will deepen and develop, since cities can make people’s lives easier. In order for the benefits from the concentration of the population to exceed its costs, the government of the country must take control of these processes into its own hands. Only in this case, urbanization can influence the increase of Georgia’s global competitiveness.

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## Section 5. Finance

Sultanov Serik,  
Almaty Management University, Kazakhstan  
E-mail: 8234767@gmail.com

### ISLAMIC BANKING IN KAZAKHSTAN AND ITS FINANCIAL INSTRUMENTS IN THE CONTEXT OF THE CONCEPT OF THE POTENTIAL MODEL OF THE FINANCIAL SYSTEM

**Abstract:** The article is devoted to the peculiarities of the development of Islamic model of the financial system in the modern world. The goals, arguments for and against the introduction of Islamic banking both in the world as a whole and in Kazakhstan in particular, and the use of Islamic financial instruments are analyzed. The prospects of expanding Islamic financial products in the Republic of Kazakhstan are considered.

**Keywords:** Islamic banking, Islamic financial instruments, Islamic business, Sharia law, Musharaka, sukuk.

#### *Formulation of the problem*

In the economic literature until recently, researchers identified two models of financial systems:

- market (stock) or Anglo-American;
- Banking or Euro-continental, or German-Japanese.

At the beginning of the 21<sup>st</sup> century, considering the economic shifts in the Muslim financial world, the scientific community began to talk about the formation of an Islamic model of a financial system based largely on a religious basis using Islamic law – the Sharia. Islamic financial institutions have developed activities on an international scale, and Western-style financial institutions have instead established branches in Muslim countries. During the global financial crisis of 2008, Islamic banks practically did not suffer, and in the conditions of liquidity crisis their services were in great demand. Therefore, in the current conditions of the introduction of Islamic finance is an urgent issue of the economic policy of non-Muslim countries.

**Analysis of recent research.** The analysis of Islamic banking and its financial instruments involved such foreign researchers as L. Alnaser, M. Tsihak, I. Saba, M. Yun. Among domestic scientists who dedicated their works to this subject, it is necessary to name first of all such scientists and experts as V. Korneev, A. Snezhko, A. Stankov, etc. But today it is difficult for scientists to make unambiguous predictions as to how widely Islamic banks will spread in Kazakhstan or when Kazakh financial institutions will begin to provide services using Islamic financial instruments.

**The purpose of the article** is to elucidate the specifics and prospects for the development of Islamic banking and the role of Islamic finance in the context of current trends in international economic and political relations between the Muslim and Western worlds.

**Main results of the study.** Recently, the Islamic financial model has increasingly attracted the attention of the scientific community. The growth of Islamic banks, based on Shariah laws, especially against the

backdrop of the financial crisis and its consequences, looks contrasting.

Despite the fact that the fundamental concepts of Islamic banking are rooted in history for 1400 years, real Islamic financial institutions have emerged quite recently. The first Islamic savings bank Mit Garm Bank originated in Egypt in 1963. It served the peripheral areas of the country, using the conservation of the population for the issuance of loans on the basis of joint participation. [5, p. 272].

At the same time, such an Islamic bank appeared in Malaysia, so that Muslims could postpone the Hajj. But the actual beginning of the development of Islamic banks is 1975, when the Islamic Development Bank was established in Saudi Arabia, and the Islamic Bank of Dubai in the United Arab Emirates.

There are two factors that contributed to the establishment of Islamic banking:

- 1) revenues from oil exports by the Persian Gulf countries;
- 2) the revolution in Iran 1979.

The centers of Islamic finance are the following countries:

- Iran, where there are no Western banks at all. In the year 2009. Iranian banks accounted for 40% of the total assets of the 100 largest Islamic banks, and Bank Melli Iran is considered the largest among them. Iran accounts for \$235 billion of Islamic financial assets. According to the Top 500 Islamic Finance Institutions rating of Tae Banker, seven of the first 10 positions are held by Iranian financial institutions;
- Saudi Arabia and the United Arab Emirates, which account for more than half of the Islamic banking assets of the countries of the Council for Cooperation of the Persian Gulf countries;
- Bahrain, where the largest number of Islamic banks are concentrated – 35;
- Malaysia, which is considered to be the innovative center of the Muslim financial world (a vivid example of this is again the special offshore zone Labuan) and outstrips the development of this area of the Persian Gulf country for almost a decade.

Today in Malaysia there are five banks that provide exclusively Islamic financial services, and 14 foreign banks, including HSBC, Oversea-Chinese and Standard Chartered, offer services that comply with Sharia law [7; 15].

According to the report Kuwait Finance House Research Ltd, in September 2010. Islamic banking accounted for 16.6% of the banking assets of the countries of the Gulf Cooperation Council, and in Kuwait – 34.3%. As of the end of March 2010, the largest Islamic banks in the region are Al Rajhi Bank in Saudi Arabia and Kuwait Finance House in Kuwait with assets of \$46 billion and \$40 billion, respectively [5].

According to Euromoney Islamic Finance Review, the Islamic finance sector demonstrates the highest growth rates on the planet – 15–20% annually, and during the crisis – at least 10%. Islamic banking is practiced by more than 400 financial institutions in 75 countries around the world with total assets of approximately \$815 billion and an annual turnover of \$11 trillion. It is expected that by 2019 the total assets of Islamic banks and financial institutions in the RK will grow to \$1 trillion. [9, p. 10]. Moreover, there are 400 Muslim direct investment funds operating in different countries with over \$5 billion in management and 250 mutual funds (\$50 billion), although this is a drop in the bucket compared to \$22 trillion. in the management of mutual funds around the world.

At the same time, Ernst & Young predicts that the market for asset management under Sharia law will show growth once financial stability is restored [5]. According to the estimates of the experts of the Islamic Financial Services Authority in Kuala Lumpur (Malaysia), the Islamic financial industry, which arose in the 1970s, as a niche industry, by 2020 can increase its assets to \$2.8 trillion. [9, p. 10].

It is logical to ask: what is the secret of success? Let's highlight several reasons:

- First, the Sharia principles prohibit creditors from entering into risk transactions, that is, investing in “virtual” assets, such as derivative financial

instruments or derivatives, that contributed to the crisis of the Western financial system. All financial transactions are connected with the transactions of tangible assets, so the probability of “soap bubbles” is minimal. Banks are characterized by high liquidity and a high coefficient of capital adequacy.

- Secondly, when the bank issues a loan of “musharaka”, it acts as a participant in the borrower’s transaction and shares with it both profits and losses. In Europe, this is called leveraged buy-out lending.

- Third, for the accumulation of resources, instead of traditional deposit accounts, contracts on mutual trust are used, that is, instruments that are not paid in advance and are made on the basis of the distribution of prospective profits with the financial institution.

- Fourth, Islamic banks should avoid the situation of uncertainty – “Garar”, which threatens big losses, therefore they maintain a high level of reserves and participate in special cooperative insurance.

- Fifthly, during the crisis and post-crisis narrowing of the credit market, due to lack of liquidity in the West, Islamic banks had excess liquidity, which was secured by the growth of petrodollar revenues, caused by a record jump in oil prices [7, p. 14].

To all certain economic advantages, it can be added that Sharia law prohibits Islamic banks to finance the production of alcohol, tobacco, pork, the gambling industry and pornography, which obviously preserves the morality of society. [3]

These and some other rules make Islamic banking more effective than the American-European, which was proved during the last global financial crisis. This fact is recognized even by the IMF, which sees the secret of success in an individual approach to client companies, which allows a more qualitative assessment of the risks and that Islamic banks are interested not only in the receipts of payments for credit, but also in the profits of the debtor company. Therefore, they select borrowers more carefully than they do in the West. According to the IMF study “Islamic Banks and Financial Stability”, which exam-

ined the results of the activities of 77 Islamic and 397 traditional banks in 12 years, it turned out that small Islamic banks with assets do not exceed \$1 billion, A third more effective than Western financial institutions such the same size and a quarter – those whose assets crossed the mark of \$1 billion [2].

The most important current direction of Islamic banking is the development of the medium-term debt securities segment – Islamic sukuk bonds. Sukuk is considered an alternative to syndicated financing.

The world market sukuk fell from \$39 billion in 2007. up to \$7.6 billion, in 2009, in 2010. We note that the positive dynamics resumed at the updated stage: for the first half of 2017, the gross issue of sukuk was \$1.95 trillion. (in annual terms, \$30 billion). [5].

It is characteristic that Malaysia accounts for 2/3 of this market.

To consolidate the success of the Malay financial institutions have decided to offer two new products on the Kuala Lumpur Stock Exchange:

- The first is the Commodity Murabahah, which will allow you to invest in palm oil trading;

- The second – which will allow accepting and lending bonds in compliance with Shariah rules.

To trade sukuk seeks to join Japan. The agency Moody’s assumes the volume of their sales in the market of this country in the amount of \$0.5 billion. Hong Kong, Singapore and Indonesia also show interest in this tool.

At the same time, it should be noted and the negative properties of the sukuk market. In times of crisis, it was more vulnerable than other bond markets. According to the agency S & P, for the period 2016–2017 gg. the volume of corporate and government sukuk sales fell by 56%, while for traditional international bonds the negative dynamics did not exceed 5% [4, p. 23].

The new strategy of Islamic banks is currently focused on small and medium-sized enterprises, which is partly due to economic benefits, on the one hand, and on the other hand, means that the previous strategy of targeting individual large-cap enterprises and

giant corporations does not meet the obvious goals the development of Islamic banking [5].

Despite significant successes, it is possible to single out a number of problems of the Islamic model of banking activity and corresponding financial instruments directly in the Republic of Kazakhstan:

- Low capitalization – the average size of the capital of the majority of Islamic banks does not exceed \$25 million – compared to Western banks [8, p. 5];
- Unification of the financial instruments used, the predominance of large, including family, owners, investors in equity, the absence of small proprietors and speculators, which indicates the closed and limited liquidity of markets where the Islamic financial model is used;
- Difficult access to business information, which limits the ability of the interested party to analyze the quality of financial management of Islamic financial institutions, their risks and the structure of assets;
- Lack of proper regulatory framework, which must take into account the requirements of activities within the financial system of another country and simultaneously comply with the norms of the Shariah [7, p. 15];
- The absence of unified bodies for the management of Islamic financial institutions [14].

Note that Islamic banks provide services in the US, Europe, and Asia.

Some believe that the main object here is the United States, where capital flows from the Middle East through Britain and Luxembourg [9, p. eleven]. But equally important is London, where five Islamic banks operate reliably, led by the Islamic Bank of Britain, founded in 2004. Last in the midst of the crisis in September 2008, it began to attract new customers by launching a mortgage lending program under Sharia law. Characteristically, most of the traditional British banks have introduced so-called Islamic windows, where financial services are provided under the Sharia. At the present stage, the government is also actively discussing the issue of issuing sukuk. In fact, today it is the UK that is the center of Islamic

banking in the North Atlantic, which is the merit of the Labor Party [3]. In other European countries there are also good prerequisites for the development of Islamic financial instruments. It is primarily about Germany, Sweden and Belgium, where 3–4% of the population are Muslims, and especially France, where their share is 10%; after them the native inhabitants will also be drawn [9, p. eleven].

However, it should be noted that as a result of the crisis, the experts consider the Asia-Pacific region, which accounts for 60% of the assets of Islamic banks, is approximately \$600 billion as a result of the crisis [6]. Investors from Saudi Arabia, the United Arab Emirates, Bahrain, Qatar are already sending their capital to such countries as China, India, Indonesia. Western banks, including HSBC, Citibank, Deutsche Bank, Societe Generale, also open branches in Muslim countries [1, p. 20].

Islamic banking is also being introduced by developing countries. For example, in Ethiopia, the National Bank is completing the development of a Sharia-compliant banking regulation. And in Tanzania, Stanbic Bank and the National Trade Bank issued their own Islamic financial instruments. Many other African countries consider it possible to host branches of Middle Eastern banks on their territory. A new strategy of targeting small and medium-sized enterprises will find application in Africa, because the sector of large corporations is still small there [5].

Islamic finance has not bypassed the post-Soviet space, where, above all, Russia, Azerbaijan, Kyrgyzstan and Uzbekistan should be mentioned. So, in Russia in 2000. The first Islamic bank Badr-Forte was opened on the territory of the CIS. He specializes primarily in the financing of trade with countries in Asia and Africa [7, p. 15].

Speaking about Kazakhstan, it should be noted that Kazakh “Bank TuranAlem” (BTA) is actively engaged in attracting resources and financing using Islamic instruments. In particular, in July 2007, syndicated borrowing in the markets of the Middle

East and Malaysia totaled \$250 million. In early 2009, amendments were adopted to the Kazakh legislation, which allowed working with Islamic financing instruments. According to Fattah Finance, in February 2009, the first company specializing in providing services in accordance with the principles of Sharia was created. In November 2009, the Kazakh authorities announced that the Ministry of Finance, with the help of the GSCC Bank, will issue Islamic sukuk bonds for the first time in the history of the country.

In addition, it is planned to open in Kazakhstan a bank “Al-Hilal”, a subsidiary of Al Hilal Bank from the UAE [13].

In the near future, the activities of Islamic financial institutions can be extended throughout the territory of Kazakhstan. Following the banking products in Kazakhstan, a takaful insurance system may appear. From the usual insurance takaful differs in that the company does not take risks, but only acts as the administrator of the fund, formed from the funds of participants. The State Commission for Regulation of Financial Services Markets of the Republic of Kazakhstan notes that today the takaful companies in the country can not work in

full force – they are hampered by legislative restrictions. The insurance company has to keep most of the clients’ money in instruments, on which interest is charged by Islam, including on deposits and in securities [21]

However, nothing prevents the insurer from entering into an individual contract with a bank or an investment company that will not conflict with the norms of the Sharia or the laws of the Republic of Kazakhstan. By the way, in Kazakhstan today the reinsuring risks of takaful companies from Egypt, Libya, Sudan, Malaysia and other Muslim countries, whose activities are regulated by the Shariah [11].

**Conclusions.** The practice of Islamic banking in the context of the formation of the traditional services sector, but under the new mechanisms, spreads quite quickly. In conditions of maintaining high oil prices and expanding capital markets, Islamic finance is increasingly affecting world financial markets. In our opinion, in the short term, Islamic financial institutions will expand at a rapid pace across the whole of Kazakhstan, for which there is already soil and a corresponding need. And the experience of Islamic banks deserves attention of the banking management of Kazakhstan.

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## Section 6. Economic security

*Muratova Shokhista,  
Higher military customs institute,  
Ph D., in Economics, the department of  
Classification and certification of goods  
E-mail: shohista11@mail.ru*

### **PRIORITY DIRECTIONS OF THE CUSTOMS AUTHORITIES IN ENSURING THE ENVIRONMENTAL SAFETY OF THE GOODS AS THE OBJECT OF THE STUDY OF CUSTOMS EXPERTISE**

**Abstract:** The article analyzes the general principles of environmental policy of the Republic of Uzbekistan as a whole, as well as the direction of the customs authorities in ensuring the environmental safety of the goods as the object of research of customs expertise. The importance of ensuring the environmental safety of the goods when they are released into the customs territory of the Republic of Uzbekistan is noted. Particular importance is paid to the problem of countering counterfeit products. To protect against counterfeit, the proposed protection system, consisting of several directions.

**Keywords:** environmental safety, environmental policy, customs control, customs expertise, identification of goods, counterfeit and falsified products.

High environmental pollution. Depletion of natural resources. Deterioration of our habitat quality. We hear this almost every day and have already managed to get used to such messages. However, more and more, we hear something else: the environmental management system, the environmental safety of products, resource-saving technologies, the company's environmental image, etc. These concepts are still not very familiar to the public, but they are causing increasing interest among manufacturers. Environmental problems have reached the level of the relationship "producer-consumer", "enterprise-state", "product-market".

The world, and first of all, the European community has already put forward a number of requirements for organizations trading with the countries of the European Union. These are mandatory and recommendatory norms relating to building man-

agement systems in the enterprise in the field of environmental safety, social responsibility, product quality. Rules – international standards – are the basis for voluntary certification of finished products or management / control systems in an enterprise.

Currently, almost all countries of the globe, including the Republic of Uzbekistan, are experiencing many environmental problems. These include soil, water and air pollution, global warming and the greenhouse effect, the accumulation of industrial waste. Recently, the environmental safety of food and basic necessities has become particularly urgent. Increasingly, manufacturers of these goods are neglecting their quality, using contaminated raw materials and simplified production technologies. And if within the country standards of quality requirements for goods and measures to combat counterfeiting are developed, then a certain part of imported products



is a potential danger. The most common violation of environmental safety is found among food products: meat (especially poultry meat), canned fish, confectionery products, vegetable oil and alcoholic beverages. Among non-food items, perfume-cosmetic products, detergents, children's toys, sewing and knitwear, leather shoes, video and audio products most often do not meet the environmental safety standards. For a global and effective fight against them, governments develop their own environmental policies.

Environmental policy is an organizational and regulatory and control activity of society and the state, aimed at protecting and improving the natural environment, effectively combining the functions of nature use and nature protection and ensuring normal human activity [1, 98–101].

Given the complexity of the implementation of environmental policies, it is important to outline the range of systemic problems that require priority attention. For an objective assessment of the effectiveness of environmental policy implementation, you can use several criteria:

- first, these are indicators of the state of health of the population – life expectancy, the correlation between birth rate and death rate, the dynamics of the age and sex distribution of the population in the country in general and in regions in particular;
- secondly, these are indicators of the level of development and effectiveness of the environmental management system, first of all – the systems of non-depleting (balanced) environmental management;
- thirdly, these are indicators of the state of the environment, figuratively speaking, indicators of the state of health of the environment – the level of pollution of the air basin, water bodies, land resources, the scale of recreational zones and protected areas, the richness of biological diversity.

A simple analysis shows that the criteria for this triad are closely interrelated: human health is influenced by the quality of the environment, and both the population health indicators and the en-

vironmental health indicators depend on the level of development of the environmental management system [2, 106].

At present, the state environmental policy of the Republic of Uzbekistan is determined by the concept of sustainable development, which is enshrined in the Law of the Republic of Uzbekistan of December 9, 1992 “On Nature Protection”. The main principles, objectives and measures of environmental policy are determined by:

- legislation of the Republic of Uzbekistan (Constitution of the Republic of Uzbekistan; decrees of the President of the Republic of Uzbekistan; resolutions of the Cabinet of Ministers of the Republic of Uzbekistan; normative legal acts of authorized ministries, departments and committees on nature protection; international legal acts on environmental protection, which participants are the Republic of Uzbekistan);

- programs of the Government of the Republic of Uzbekistan in the field of economic restructuring and economic growth, including the Action Strategy for the five priority areas of the country's development in 2017–2021;

- target programs;

- state standards and other regulatory acts.

To ensure environmental safety for the health of our population, as well as environmental safety, clothing, household appliances, food and non-spread alien species and genetically modified organisms, the environmental policy of the Republic of Uzbekistan is designed to produce imported products into the customs territory of the Republic of Uzbekistan.

The environmental policy of the Republic of Uzbekistan with the release of imported products into the customs territory of the Republic of Uzbekistan is carried out by customs control authorities.

Customs control is considered as a set of activities that are carried out by customs authorities within their jurisdiction in order to ensure compliance with the customs legislation, the provisions of international treaties [3, 65–68].

Currently, when declaring goods in the freight customs declaration, in the system of customs authorities of the Republic of Uzbekistan, the following methods of protecting commodity markets have found practical application, in particular: mandatory certification of products and confirmation of its compliance; the risk management system in the customs sphere; the customs register of intellectual property; law enforcement practice.

The fight against undeclared goods is of great conceptual importance in the activities of customs, which is an effective executive body to combat violations in the field of imports to the republic, the spread of counterfeit products and parallel imports. However, it should be noted that the state customs authorities work only with respect to the declared goods, indicating in the cargo customs declaration information on the manufacturer and the name of the trademark, since this information is important in solving issues of protection of intellectual property. Ensuring intellectual property rights by customs authorities is based on the provisions set out in Chapter 56 “Protecting Intellectual Property Rights” of the Customs Code of the Republic of Uzbekistan, international treaties and other obligations. In the practice of the customs authorities, according to the main provisions of Chapter 24 of the Customs Code of the Republic of Uzbekistan “Risk Management System”, a mechanism for forming a risk profile is implemented, i.e. bringing to the customs posts information about those companies that systematically import counterfeit goods into the republic.

A special place in the implementation of modern principles and mechanisms of the system of combating counterfeit goods is taken by customs expertise, which is a procedural action aimed at identifying goods and consisting in conducting research, giving an expert opinion on the basis of special knowledge in the field of science, technology, or craft. The purpose of the customs examination is to identify the goods: to control the correct classification of goods in accordance with the HS;

in the products of their processing; to enforce intellectual property rights.

One of the reasons for the appointment of an examination is to check the quality of the cargo being transported, including foodstuffs and consumer goods. In cases where a customs officer has a suspicion of non-compliance of goods with sanitary or environmental standards, and a deviation from compliance with national and international standards is established, an examination is required.

Examination of the definition of counterfeit and falsified products is a procedure aimed at detecting signs of counterfeit goods or unlawful use of registered trademarks, as well as providing for the solution of the following issues: determination of counterfeit/falsification; confirmation of the authenticity of products; determination of changes in the composition of falsified or counterfeit products, its properties and qualities; identification of signs of counterfeit and falsification.

It is important to note that the problem of counterfeiting counterfeit products is complex. One of the reasons for its wide distribution, despite the existing legislative acts in the republic, can be called a weak mechanism in developing an established intellectual property management system. In this regard, it seems appropriate and necessary to improve government regulation, strengthen the fight against corruption, strict discipline, verification and proper control [4, 275–279].

To protect against counterfeit, it is necessary to develop a protection system that should include work in several directions, in particular:

- create a unified system for collecting and storing data on licenses issued to companies and products, which are assigned certain identification numbers;
- require manufacturers to indicate in the barcodes of all goods sold in a marked form, information about the license or product identification number, so that consumers can use electronic means to access a single database and verify the authenticity of the product being purchased, that is, its licensing and belonging to the specified company;

- require manufacturers to issue labels containing a similar bar code;
- taking into account the expansion of trade and economic relations of our country at the international level, the introduction of modern technical means to ensure the management of information resources tracking will allow at the border to establish the fact of goods belonging to the category of counterfeit;
- improve the level of consumer competence and literacy;

- strengthening the control and personal responsibility of customers purchasing certain types of goods related to intellectual property.

Thus, the presented material is an evidence base of the need to develop and improve measures for the implementation of comprehensive measures to counter the illicit trafficking of counterfeit and falsified products by the customs authorities of the Republic of Uzbekistan.

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## Section 7. Population economics

Wang Yuzhe,  
Cushing Academy  
E-mail: [wyz1307@gmail.com](mailto:wyz1307@gmail.com)

### CRIME RATE PREDICTION USING HOUSE PROPERTIES VIA ARTIFICIAL NEURAL NETWORK VERSUS LINEAR REGRESSION MODELS

#### **Abstract:**

**Objective:** This study aimed to build a predictive model for crime rate based on 13 house features using artificial neural network versus linear regression models.

**Methods:** Boston housing data was used for this study and it is publicly available at <https://archive.ics.uci.edu/ml/datasets/Housing>. Per capita crime rate by town was the outcome of interest and three other features were used as predictors, namely, 1) proportion of residential land zoned for lots over 25,000 sq.ft., 2) proportion of non-retail business acres per town, 3) Charles River dummy variable (= 1 if tract bounds river; 0 otherwise), 4) nitric oxides concentration (parts per 10 million), 5) average number of rooms per dwelling, 6) proportion of owner-occupied units built prior to 1940, 7) weighted distances to five Boston employment centers, 8) index of accessibility to radial highways, 9) full-value property-tax rate per \$10,000, 10) pupil-teacher ratio by town, 11)  $1000(\text{Bk} - 0.63)^2$  where Bk is the proportion of blacks by town, 12) % lower status of the population, 13) Median value of owner-occupied homes in \$1000's. All the records were randomly assigned into 2 groups: training sample (75%) and testing sample (25%). Two models were built using training sample: artificial neural network and linear regression. For artificial neural network, the input layer has 13 inputs, the two hidden layers have 5 and 3 neurons and the output layer has a single output. Mean squared errors (MSE) were calculated and compared between both models. A cross validation was conducted using a loop for the neural network and the `cv.glm` function in the `boot` package for the linear model. A package called "neuralnet" in R was used to conduct neural network analysis.

**Results:** For testing sample, the MSE was 93.5 for the linear regression and 64.7 for the artificial neural network. Artificial neural network performed better clearly. In cross validation, the average MSE for the neural network (37.0) is lower than the one of the linear model (43.12) although there seems to be a certain degree of variation in the MSEs of the cross validation. This may depend on the splitting of the data or the random initialization of the weights in the net.

**Conclusions:** In this study, we built a predictive model for crime rate using neural network and compared its performance with a more population approach-linear regression. This study suggests

that it is possible to develop a reproducible and transportable predictive instrument for crime rate using common available housing features.

**Keywords:** crime rate, prediction model, linear regression and neural network.

## 1. Introduction

Based on a review of the extant literature and discussions with various officials at all jurisdiction levels across the country, it is highly doubtful that any serious, systematic forecasting of crime rates is done anywhere. It is safe to say that the current approach to forecasting crime, insofar as it exists, is extremely crude, for example, mapping crimes by police precinct or beat, and then assigning more resources to the areas with the most hits in the past.

Public safety is the most important metric for elected officials, especially at the local level, and allocating scarce crime fighting resources efficiently is an essential element of achieving this goal [1]. There are several potential reasons for this failure that come to mind. The first reason is that existing tools may simply be insufficient to provide meaningful forecasts. Technical forecasting, using economics models, computer technology, and mapping tools, is a modern phenomenon [2] and these methods are unproven, occasionally difficult to interpret, and occasionally expensive to set up and operate, especially for communities with tight budgets.

An artificial neural network (ANN), often just called a “neural network” (NN), is a mathematical model or computational model based on biological neural networks, in other words, is an emulation of biological neural system. This model has been used in other medical areas but not used to predict retinopathy among diabetes patients to our best knowledge. We are unaware of any studies in the literature that have integrated housing features commonly available using Artificial Neural Network. We compared the

Variables:

- |          |   |
|----------|---|
| 1. CRIM  | per capita crime rate by town   |
| 2. ZN    | Proportion of residential land zoned for lots over 25.000 sq.ft.      |
| 3. INDUS | proportion of non-retail business acres per town                      |
| 4. CHAS  | Charles River dummy variable (= 1 if tract bounds river; 0 otherwise) |

performance of Artificial Neural Network with linear regression in terms of predictive ability.

## 2. Data and methods

Boston housing data was used for this study and it is publicly available at <https://archive.ics.uci.edu/ml/datasets/Housing>. Per capita crime rate by town was the outcome of interest and three other features were used as predictors, namely, 1) proportion of residential land zoned for lots over 25.000 sq.ft., 2) proportion of non-retail business acres per town, 3) Charles River dummy variable (= 1 if tract bounds river; 0 otherwise), 4) nitric oxides concentration (parts per 10 million), 5) average number of rooms per dwelling, 6) proportion of owner-occupied units built prior to 1940, 7) weighted distances to five Boston employment centers, 8) index of accessibility to radial highways, 9) full-value property-tax rate per \$10.000, 10) pupil-teacher ratio by town, 11)  $1000(\text{Bk} - 0.63)^2$  where Bk is the proportion of blacks by town, 12) % lower status of the population, 13) Median value of owner-occupied homes in \$1000's. All the records were randomly assigned into 2 groups: training sample (75%) and testing sample (25%). Two models were built using training sample: artificial neural network and linear regression. For artificial neural network, the input layer has 13 inputs, the two hidden layers have 5 and 3 neurons and the output layer has a single output. Mean squared errors (MSE) were calculated and compared between both models. A cross validation was conducted using a loop for the neural network and the `cv.glm` function in the `boot` package for the linear model. A package called “neuralnet” in R was used to conduct neural network analysis.

5. NOX nitric oxides concentration (parts per 10 million)  
 6. RM average number of rooms per dwelling  
 7. AGE proportion of owner-occupied units built prior to 1940  
 8. DIS weighted distances to five Boston employment centers  
 9. RAD index of accessibility to radial highways  
 10. TAX full-value property-tax rate per \$10,000  
 11. PTRATIO pupil-teacher ratio by town  
 12. B  $1000(B_k - 0.63)^2$  where  $B_k$  is the proportion of blacks by town  
 13. LSTAT % lower status of the population  
 14. MEDV Median value of owner-occupied homes in \$1000's

### 3. Results:

The per capita crime rate by town was 3.21 in the training group, and 4.84 in testing group; overall it was 3.61.

Table 2. – Crime Rate And House Properties In Training and Testing Groups

Variable	Training Group (N=380)				Testing Group (N=126)				Overall Group (N=506)			
	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max
CRIM	3.21	7.44	0.01	73.53	4.84	11.36	0.01	88.98	3.61	8.6	0.01	88.98
ZN	12.52	24.49	0	100	7.87	19.05	0	95	11.36	23.32	0	100
INDUS	10.84	6.89	0.46	27.74	12.02	6.72	0.74	27.74	11.14	6.86	0.46	27.74
CHAS	7%		0	1	6%		0	1	7%		0	1
NOX	0.55	0.12	0.39	0.87	0.56	0.11	0.4	0.87	0.55	0.12	0.39	0.87
RM	6.28	0.72	3.56	8.78	6.31	0.66	4.93	8.4	6.28	0.7	3.56	8.78
AGE	68.47	27.65	6.2	100	68.9	29.73	2.9	100	68.57	28.15	2.9	100
DIS	3.87	2.17	1.14	12.13	3.56	1.9	1.13	9.19	3.8	2.11	1.13	12.13
RAD	9.19	8.51	1	24	10.63	9.24	1	24	9.55	8.71	1	24
TAX	401.11	164.98	187	711	429.72	177.79	188	711	408.24	168.54	187	711
PTRATIO	18.47	2.16	12.6	22	18.43	2.19	13	21.2	18.46	2.16	12.6	22
B	363.47	81.93	2.52	396.9	336.17	112.95	0.32	396.9	356.67	91.29	0.32	396.9
LSTAT	12.55	7.23	1.73	37.97	12.97	6.9	2.96	30.81	12.65	7.14	1.73	37.97
MEDV	22.54	8.98	5	50	22.51	9.86	5	50	22.53	9.2	5	50

Proportion of residential land zoned for lots over 25,000 sq.ft., nitric oxides concentration (parts per 10 million), weighted distances to five Boston employment centers, index of accessibility

to radial highways,  $1000(B_k - 0.63)^2$  where  $B_k$  is the proportion of blacks by town were significant predictors for crime rate per capita by town ( $p < 0.05$ ).

Table 3. – Linear Regression Model To Predict Crime Rate Per Capita By Town

	Estimate	Std. Error	T value	Pr(> t )	
1	2	3	4	5	6
ZN	0.04	0.02	2.35	0.019	*
INDUS	-0.08	0.08	-1.10	0.273	
CHAS	-0.49	1.04	-0.47	0.641	

1	2	3	4	5	6
NOX	-10.25	4.79	-2.14	0.033	*
RM	-0.56	0.53	-1.05	0.292	
AGE	0.01	0.02	0.69	0.492	
DIS	-0.77	0.25	-3.08	0.002	**
RAD	0.51	0.08	6.24	0.000	***
TAX	0.00	0.00	-0.48	0.629	
PTRATIO	-0.12	0.17	-0.72	0.474	
B	-0.02	0.00	-5.96	0.000	***
LSTAT	0.12	0.07	1.78	0.077	.
MEDV	-0.10	0.05	-1.79	0.074	.

\*\*\*: <0.001; \*\*, <0.01; \*, <0.05; <0.10

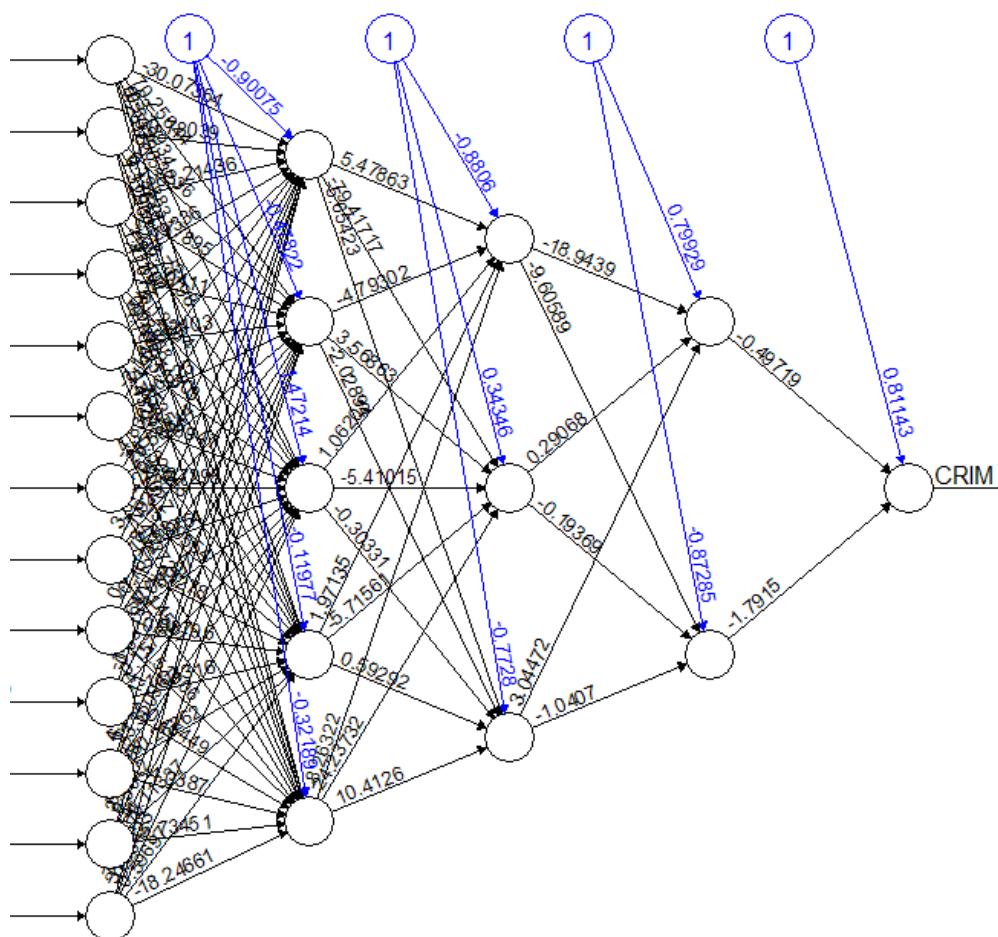


Figure 1. Artificial Neural Network For Crime Rate Per Capita By Town

The black lines show the connections between each layer and the weights on each connection while the blue lines show the bias term added in each step. The bias can be thought as the intercept of a linear

model. The net is essentially a black box so we cannot say that much about the fitting, the weights and the model. Suffice to say that the training algorithm has converged and therefore the model is ready to be used.

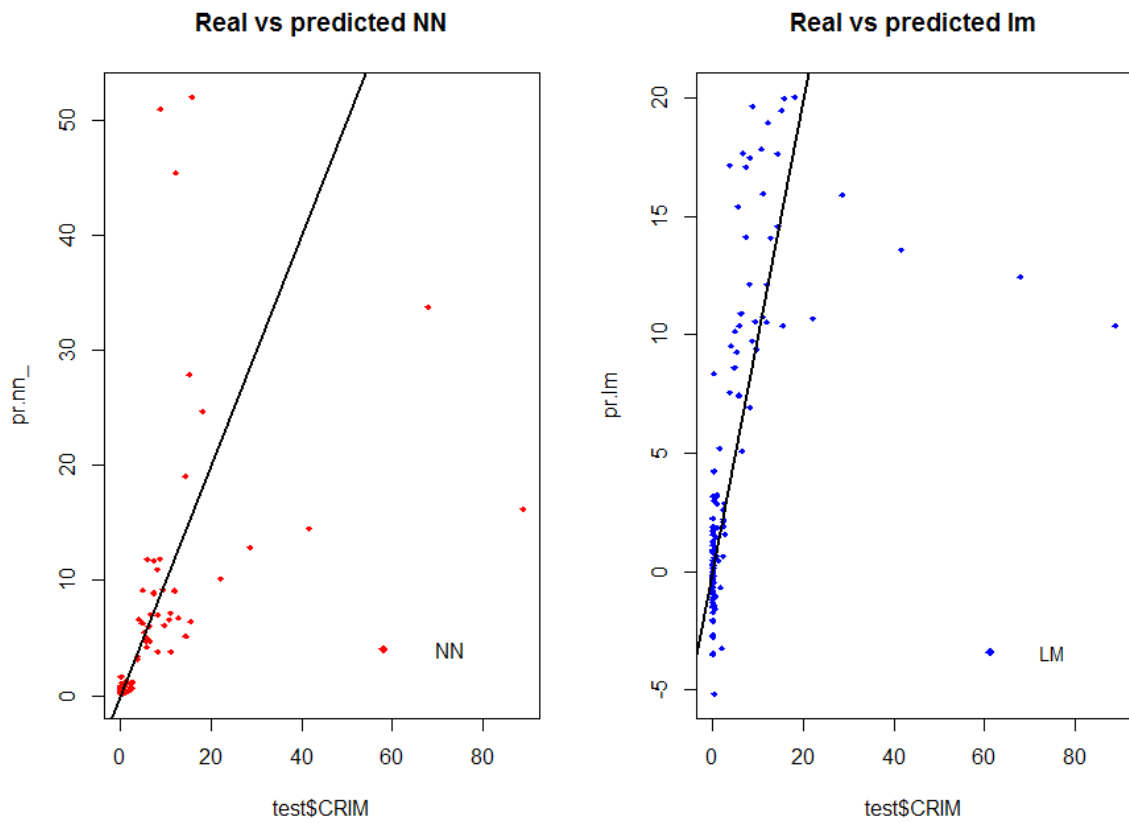


Figure 2. Real vs Predicted Crime Rate In Artificial Neural Network And Linear Regression Model

**CV error (MSE) for NN**

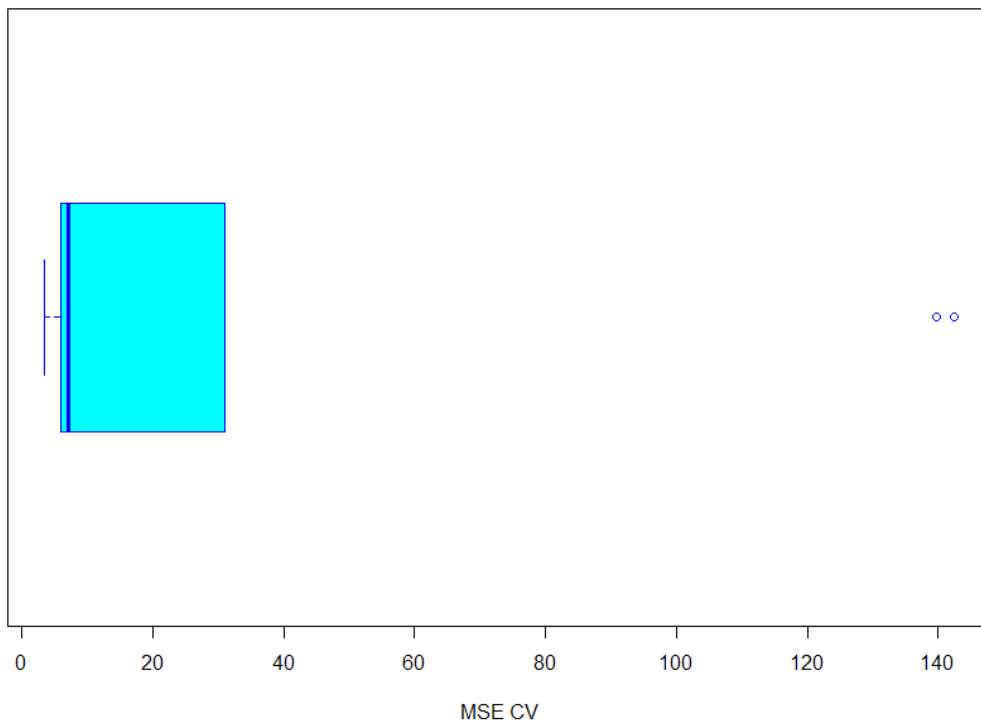


Figure 3. MSE for Artificial Neural Network for Testing Group



By visually inspecting the plot we can see that the predictions made by the neural network are (in general) more concentrated around the line (a perfect alignment with the line would indicate a MSE of 0 and thus an ideal perfect prediction) than those made by the linear model.

Cross validation is another very important step of building predictive models. In cross validation, the average MSE for the neural network (40.6) is lower than the one of the linear model (43.18) although there seems to be a certain degree of variation in the MSEs of the cross validation. This may depend on the splitting of the data or the random initialization of the weights in the net.

#### 4. Discussion

Crime predictions can be developed through both qualitative and quantitative methods. Qualitative approaches to forecasting crime [3], such as environmental scanning, scenario writing, or Delphi groups, are particularly useful in identifying the future nature of criminal activity. In contrast, quantitative methods are used to predict the future scope of crime, and more specifically, crime rates. A common quantitative method for developing forecasts is to extrapolate annual crime rate trends developed through time series models. This approach also involves correlating past crime trends with factors that will influence the future scope of crime, in particular demographic and macro-economic variables.

In this study, we built a predictive model for crime rate using neural network and compared its

performance with a more population approach—linear regression. This study suggests that it is possible to develop a reproducible and transportable predictive instrument for crime rate using common available housing features.

According to the linear regression, proportion of residential land zoned for lots over 25,000 sq.ft., nitric oxides concentration (parts per 10 million), weighted distances to five Boston employment centers, index of accessibility to radial highways,  $1000(Bk - 0.63)^2$  where Bk is the proportion of blacks by town were significant predictors for crime rate per capita by town.

There are limitations of this study. One of them was associated with artificial neural network method. This method employed deep machine learning method to explore the nonlinear association between crime rate and house properties; however the nonlinear association make it very hard to interpret the results, specially the association between the rate and individual predictors. Other predictors of crime rate were not available in this database.

In conclusion, we used both artificial neural network and linear regression model to predict the crime rate per capita by town. We found that artificial neural network performed better than linear regression which is the traditional method when build a predictive model. We believe that deep machine learning could be used in crime rate prediction. This might be helpful to improve this public safety issue in the future via better resource allocation.

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## Section 8. Economics, organization

*Boshota N. V.,  
PhD., in Economics, senior lecturer  
at the Department of Finance  
Mukachevo State University*

### TRENDS OF DEVELOPMENT OF TOURISM MARKET IN UKRAINE AND THE WORLD

**Abstract:** The article investigates the current trends of the world tourism market, its realities and prospects. The current state of the tourist services market in Ukraine and its components, in particular, tourist infrastructure, is considered. The problems and prospects of development of tourism activity in Ukraine are outlined.

**Keywords:** tourism market, service, development, income, infrastructure, economy, effect.

*Бошота Н. В.,  
кандидат экономических наук,  
старший преподаватель кафедры финансов  
Мукачевский государственный университет  
E-mail: pappww@gmail.com*

### ТЕНДЕНЦИИ РАЗВИТИЯ ТУРИСТИЧЕСКОЙ РЫНКА В УКРАИНЕ И МИРЕ

**Аннотация:** В статье исследованы современные тенденции мирового туристического рынка, его реалии и перспективы. Рассмотрено современное состояние рынка туристических услуг в Украине и его составляющие, в частности туристическая инфраструктура. Выделены проблемы и перспективы развития туристической деятельности в Украине.

**Ключевые слова:** туристический рынок, услуга, развитие, доход, инфраструктура, экономика, эффект.

В настоящее время туризм является одним из значительных источников доходов для многих стран мира. Вклад туризма в экономическое благосостояние страны зависит от качества предоставляемых услуг и доходов от туристической деятельности. Управление туристической деятельностью тесно связано с социально-экономическим развитием страны. Вот почему политика устойчи-

вого развития туризма должна достичь баланса между культурными ценностями, природными достопримечательностями и экономическими результатами. Создание ценности в туристической сфере может быть определено специализацией через создание продуктов, ориентированных на конкретные сегменты рынка. Создание туристических продуктов – это процесс, который требует

применения различных элементов и предусматривает несколько шагов. Начальный шаг – это место, где учитываются все основные элементы, после чего продукт создается и на конец определяется рынок, где он станет частью туристического спроса и его можно будет употребить.

Исследованием туристического рынка в Украине занимается значительный круг ученых. В частности, Василюк Н. В. и Мельник И. М. рассматривают особенности и современные аспекты функционирования рынка туристических услуг [1]. Изучению различных подходов к определению понятия туризма и анализа системы туризма, ее подсистем и характеристик в Украине посвящена работа Ковальчук С. В. и Миколишин В. В. [2]. Лендел О. Д. определяет в своей работе направления развития инфраструктуры рынка туристических услуг региона [3]. Монографическое исследование Мельниченко А. А. и Шведун В. А. посвящено особенностям развития индустрии туризма в Украине [4]. Мельник Р. А. и Щир И. В. провели анализ туристической отрасли в мире, в частности, международные туристические доходы и поступления [5]. Влияние туристического сектора на экономику страны и государство в целом, а также проблемы и перспективы развития туристического рынка в Украине исследованы в статье Сички И. И. [6].

Однако ряд вопросов, связанных с современными тенденциями развития отечественного туристического рынка остаются нерешенными.

Целью статьи является исследование современного состояния отечественного туристического рынка, потенциала и тенденций его развития.

Туризм является ключевым сектором экономического развития и создания рабочих мест во всем мире. В 2016 году доходы в туристической сфере составили 2,3 трлн. дол. США, также было создано 109 млн. рабочих мест по всему миру. Общие доходы со смежными с туризмом отраслями составили 7,6 трлн. дол. США в мировой экономике и создано 292 млн. рабочих мест в 2016 году. Это

составляет 10,2% мирового ВВП и примерно 1 из 10 всех рабочих мест. Следует отметить, что туризм включает лиц, которые путешествуют как с целью отдыха, так и в служебных целях на внутреннем и международном уровнях. В 2016 году 76,8% всех расходов составили путешествия с целью отдыха и 23,2% – на деловые поездки. По структуре внутренние туристические поездки составляли 72%, а международные поездки только 28%. Прямой вклад от туризма в мировой ВВП вырос на 3,1% в 2016 году. Это больше, чем мировая экономика в целом, которая выросла на 2,5%. Итак, в течение шести лет подряд туристический сектор по своим темпам превзошел мировую экономику [7].

Украина имеет удивительный и богатый туристический потенциал, который может быть использован для организации различного рода туристических услуг. Страна имеет уникальный туристический потенциал, отдельные достопримечательности доисторических времен с уникальными природными ландшафтами, которые могут иметь важную туристическую роль. Вот почему большое внимание должно уделяться развитию туризма и расширению соответствующей инфраструктуры как одного из приоритетных направлений социально-экономического развития страны.

Сегодня туризм считается одним из самых развитых секторов экономики, который способствует:

- увеличению доходов местных бюджетов;
- повышению жизненных стандартов;
- созданию новых рабочих мест;
- созданию новых туристических услуг;
- активизации социально-экономического развития;
- получению доходов;
- привлечению иностранных инвестиций;
- активизации деятельности центров народного творчества и т.п.

Рынок туризма и субъекты хозяйствования (турагенты, туроператоры) создают возможность приобрести туристический продукт кли-

ентам, которые хотят путешествовать. Таким образом, туристический рынок объединяет туристические продукты и их потребителей, создает экономические отношения между ними. Основными целями туристического рынка являются: организация процесса оказания туристической услуги; туристические расходы и потребительские цены; экономическое обоснование материальных затрат.

Можно выделить следующую классификацию туристических услуг:

- место жительства (страна) туристов к временному месту (страна) и обратно;
- услуги питания (рестораны, кафе, бары);
- экскурсионное обслуживание (услуги переводчика и гида);
- рекламные услуги (туристические маршруты, транспортные средства и места жительства);
- туристические и культурные потребности (экскурсии, театры, концертные залы, музеи, галереи, исторические и культурные памятники, тематические парки, парки развлечений, заповедники, фестивали, спортивные мероприятия и визиты и т.п.);
- удовлетворение потребностей бизнеса и науки (конгрессы, конференции, симпозиумы, встречи, семинары, фестивали, выставки и т.д.);
- информационные услуги;
- средства коммуникации (интернет, междугородние и международные связи, факс и другие средства связи);
- другие услуги (паспорт и виза, страхование, услуги гидов и др.);
- брокерские услуги;
- бытовые услуги (ремонт одежды и обуви, аренда авто и т.д.);
- спортивно-оздоровительные объекты (спортивные сооружения, лицензии на охоту и др.)
- природное, историческое и культурное наследие;
- туристическое страхование и медицинское обслуживание.

Структура затрат на поездки учитывает затраты на туристические путешествия в среднем на 50 процентов (турпакет), 30 процентов от приобретения дополнительных туристических услуг, в то время как 20 процентов – это покупка сувениров и подарков.

Роль туризма является ценной предпосылкой подготовки туристической индустрии страны для более интенсивного развития. По этой причине в Украине большое внимание уделяется туризму, продвижению и расширению соответствующей инфраструктуры как одного из приоритетных направлений социально-экономического развития государства. Можно выделить основные способы организации проектов с целью усиления инфраструктуры туристической индустрии, например улучшение инженерных сооружений путем реконструкции дорог, которые соединяют наиболее популярные туристические зоны, строительство гостиниц, ресторанов для туристов.

Согласно данным Государственной службы статистики Украины, в течение 2014–2017 гг. динамика общего количества туристов, что были обслужены туроператорами и турагентами, постоянно увеличивалась и составляла в конце 2017 г. 1,16 по отношению к базовому году расчетного периода. При этом, за последние два года выбранного периода динамика количества иностранных туристов, которые пользовались данными услугами, также выросла в 2,31 и 1,13 раза соответственно, но доля их в общем количестве лиц, воспользовавшихся услугами туроператоров и турагентов, составила лишь 1,41% в 2017 г. [8].

Объекты размещения являются жизненно важной и основной частью туристического продукта и важной особенностью общего туристического имиджа страны. Многие страны признали важность гостиничной индустрии по отношению к туризму и предоставляют привлекательные стимулы гостиничным предприятиям.

В Украине количество гостиниц и аналогичных средств размещения с 2013 по 2017 гг.

уменьшилось с 3582 до 2474, что в процентном выражении составляет 30,9%. Всего в Украине, по данным Госкомстата, на конец 2017 г. насчитывается 4,113 тыс. заведений общей вместимостью 359,0 тыс. мест, которые ежегодно обслуживают около 6,7 млн. человек, 77% из которых воспользовались услугами гостиниц [8].

Общая тенденция последних лет в гостиничной индустрии страны предполагает рост количества небольших частных гостиниц. Сегодня большинство таких гостиниц имеют в среднем 50 номеров. Привлекательность строительства небольших гостиниц для частного сектора заключается в небольшой сумме инвестиций, необходимых для строительства, высоком уровне заполняемости номерного фонда и относительно низкой стоимости эксплуатации. Эта тенденция сначала появилась как альтернатива крупным международным гостиничным сетям со своим традицион-

ным дизайном, современным административным стилем, большими комнатами. Несмотря на конкуренцию малых отелей, роскошные отели также приобретают популярность среди туристов.

Быстрое развитие экономики и внешняя торговля Украины способствовали быстрому развитию транспортной системы, усилению транзитного потенциала и диверсификации международных транспортных коридоров, что также является жизненно важным фактором для сектора туризма.

Итак, поскольку туризм стимулирует развитие инфраструктуры страны, он оказывает сильный мультипликативный эффект и способствует диверсификации экономики, поддерживает местную культуру и охрану окружающей среды. Это очень актуально для Украины, где индустрия путешествий и туризма должна стать ведущей отраслью, с огромными возможностями в туризме и разнообразием туристических достопримечательностей.

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## Section 9. Economic theory

*Griselda Çela,*  
*PhD candidate, Branch Manager/Ass. Professor*  
*Credins Bank sh.a, Tirana (Albania)/Faculty of Economy,*  
*University of Tirana, Albania*  
*E-mail: griselda\_cela@hotmail.com*  
*Lorena Balili, PhD, lecturer,*  
*University of Tirana, Tirana, Albania*  
*E-mail: lorena.balili@gmail.com*

### THE THEORIES OF FOREIGN DIRECT INVESTMENT AND THE CASE OF ALBANIA

**Abstract:** The use of FDI According to the World Bank, FDI is one of the critical elements in developing the private sector in lower-income economies and thereby, in reducing poverty. The theory of FDI, assume a two-country model — one being the investing country and the other being the host country — and the price of capital being equal to its marginal productivity, they explain that capital moves freely from a capital abundant country to a capital scarce country and in this way, the marginal productivity, of capital tends to equalize between the two countries. FDI is considered less prone to crisis because direct investors typically have a stronger long-term perspective when engaging in a host country. The main focus of this paper will be the situation on FDI in Albania, which is the actual situation and what will be the possibilities in the future. Albania is a country with plenty of unused of economic area and has plenty space for FDI.

**Keywords:** FDI, Capital, Economic Area, Albania.

#### **Introduction**

Foreign direct investment (FDI) is an important factor in acquiring investments and grow the local market with foreign finances when local investment is unavailable. There are various formats of FDI and companies should do a good research before actually investing in a foreign country. It has been proved that FDI can be a win-win situation for both the parties involved. The investor can gain cheaper access to products/services and the host country can get valuable investment unattainable locally. There are various vehicles through which FDI can be acquired and there are some important questions the firms must answer before actually implementing a FDI strategy.

#### **FDI — Definition**

FDI, in its classic definition, is termed as a company of one nation putting up a physical investment into building a facility (factory) in another country. The direct investment made to create the buildings, machinery, and equipment is not in sync with making a portfolio investment, an indirect investment. In recent years, due to fast growth and change in global investment patterns, the definition has been expanded to include all the acquisition activities outside the investing firm's home country. FDI, therefore, may take many forms, such as direct acquisition of a foreign firm, constructing a facility, or investing in a joint venture or making a strategic alliance with

one of the local firms with an input of technology, licensing of intellectual property.

### Types of FDI

Strategically, FDI comes in three types

- **Horizontal**
- **Vertical**
- **Conglomerate**

FDI can take the form of **greenfield entry** or **Foreign takeover**, Foreign takeover is often called **mergers and acquisitions** (M&A).

### The advantages of FDI

FDI is an important source of externally derived finance that offers countries with limited amounts of capital get finance beyond national borders from wealthier countries. For example, exports and FDI are the two key ingredients in China's rapid economic growth.

According to the World Bank, FDI is one of the critical elements in developing the private sector in lower-income economies and thereby, in reducing poverty.

### Vehicles of FDI

- **Reciprocal distribution**
- **Joint venture and other hybrid strategic alliances**
- **Portfolio investment** This is another form of strategic alliance, sometimes called **shadow alliances**.

### FDI — Basic Requirements

As a minimum requirement, a firm will have to keep itself abreast of global trends in its industry. From a competitive perspective, it is important to be aware if the competitors are getting into a foreign market and how they do that. It is also important to see how globalization is currently affecting the domestic clients. Often, it becomes imperative to expand for key clients overseas for an active business relationship. New market access is also another major reason to invest in a foreign country. At some stage, export of product or service becomes obsolete and foreign production or location becomes more cost effective. Any decision on investing is thus a combination of a number of key factors including.

- assessment of internal resources,
- competitiveness,
- market analysis, and
- market expectations.

### FDI Theories

FDI theories have been divided under two major heads.

#### MacDougall-Kemp Hypothesis

One of the earliest theories was developed by G.D.A. MacDougall (1958) and subsequently elaborated by M. C. Kemp (1964). Assuming a two-country model — one being the investing country and the other being the host country — and the price of capital being equal to its marginal productivity, they explain that capital moves freely from capital abundant country to a capital scarce country and in this way, the marginal productivity of capital tends to equalize between the two countries. This leads to improvement in efficiency in the use of resources that leads ultimately to an increase in welfare. Despite the fact that the output in the investing country decreases in the wake of foreign investment outflow, national income does not fall insofar as the country receives returns on capital invested abroad, which is equivalent to marginal productivity of capital times the amount of foreign investment. So long as the income from foreign investment is greater than the loss of output, the investing country continues to invest abroad because it enjoys greater national income than prior to foreign investment. The host country too witnesses increase in national income as a sequel to greater magnitude of investment, which is not possible in the absence of foreign investment inflow.

**The theories are divided into three main categories.**

- 1) **Traditional theories**
- 2) **Modern theories**
- 3) **Radical theories**

Traditional theories are based on neo-classical economic and explain FDI in terms of location-specific advantages.

Modern theories emphasize the fact that product and factor markets are imperfect both domestically and internationally and that considerable transactional costs are involved in market solutions. Also they acknowledge that managerial and organizational functions play an important role in undertaking FDI. The radical theories, these take a more critical view of Multinational National Corporation (MNCs).

### 1) **Traditional theory**

#### **Capital arbitrage theory**

The theory states that. Direct investment flows from countries where profitability is low to countries where profitability is high. It means therefore that capital is mobile both nationally and internationally. But sometimes implication is that countries with abundant capital should export and countries with less capital should import. If there was a link between the long-term interest rate and return on capital, portfolio investment and FDI should be moving in the same direction. International trade theory-the country will specialize in production of, and export those commodities which make intensive use of the country's relatively abundant factor.

### 2) **Modern theory**

#### **Product-cycle theory**

New products appear first in the most advanced economy in respond to demand conditions. The maturing product stage is described by standardisation of the product, increased economies of scale, high demand and low price. The standardised product stage is reached when the commodity is sold entirely on price basis. The internalisation theories of FDI. The theory explain that why the cross-border transactions of intermediate products are organized by hierarchies rather than determined by market forces. The theory of appropriability. The theory explains why there is a strong presence of high-technology industries among MNCs

#### **The electric theory of FDI**

The theory tries to offer a general framework for determining the extent and pattern of both for-

eign-owned production undertaken by a country's own enterprises, and that of domestic production owned or controlled by foreign firm. Dunning and Lundan(2008). Robock and Simmonds (1989:48) International Business and Multinational Enterprises 4th Ed. Assert that, the electric theory of international production enlarges the theoretical framework by including both home-country and host-country characteristics as international explanatory factors. It argues that the extent, form, and patterns of international production are determined by the configuration of three sets of advantages as perceived by the enterprises. First Ownership (O) advantage 2nd Location (L) and 3rd Internalization (I) advantage in order for the firm to transfer its ownership advantages across national boundary

#### **Diamond Porter Theory**

Daniels, Radebaugh and Sullivan (2009:287) 12th Edition. International Business: Environment and Operations: Pearson International Edition This is the theory which shows four conditions which is important for competitive superiority: demand conditions; factor conditions; related and supporting conditions and the firm strategy, structure and rivalry. Demand conditions whereby the company start up production at near the observed market for example an Italian ceramic tile industry after World War II: At that time there were post-war housing boom and consumers wanted cool floors because the climate was hot. Another factor is factor conditions which recall natural advantage within absolute advantage theory and the factor-proportions theory

#### **Advantages of FDI**

Foreign Direct Investment (FDI) is one of the most important factors of economic development in the contemporary world. Today, FDI is a basic mechanism of capital flows in the globalized economy, and the key factor for economic development in many countries. Foreign investments are of substantial importance for both the host country and foreign investor. For the host country, foreign direct investment contributes to the growth of business activity, increase



of export, and employment, as well as to initiation or acceleration of the economic growth and development of the country. FDI is a valuable source of capital, but also an advantageous source of new technologies, technical and managerial know-how, and in this way it represents the source of human capital improvement. Firm specific assets, such as capital, technology, technical, managerial and human resource skills, according to some estimations, are scarce and lacking in the most part of developing countries. Apart from the access to global capital market, the benefits from access to goods and services market are also of great importance. FDI serves as a platform for increased export on the global market. In this manner, FDI contributes to additional GDP and economic growth of the host country. FDI is also important for foreign investors as a mode of entry, which facilitates acquisition of assets, and management and control of acquired capital. As multinational companies struggle to do their business in the global market, they are enforced to displace their manufacturing capacities close to those markets. They are not interested in foreign markets only to sell their products, but also to buy low cost raw materials, energy, and labour on those markets. There are different ways to procure foreign capital inflow nowadays. But FDI is considered as the most desirable form of capital inflow to facilitate economic growth of developing countries against other types of foreign capital such as bank debt, portfolio equity investment, loans, etc. Similarly, portfolio equity investments, especially with short time horizon, are affected with capital retraction in the case of macro-economic crises, such as currency crises, inflation, banking crises, etc., and those problems give rise to return on investment fail to be as anticipated. FDI also offers the benefit of risk-sharing with the host country because the cost of capital investment is dependent upon and moves in step with the host country's economic fortunes"

#### **FDI in Albania**

FDI flows towards Albania have been rising steadily since the early 2000s. Today, FDI stock has reached nearly 50% of the country's GDP. These

investments are essentially in the oil, metal ore, infrastructure, construction and telecommunications sectors. The most important FDI in Albania is the investment of TAP, with the value of 1.5 Billion Euro. TAP crossing between Berat district is part of the southern gas corridor, which is one of Europe's major natural gas projects. It will bring gas from the country where it is produced, Azerbaijan to Europe passing through Georgia, Turkey, Greece, Albania and will end in Italy. TAP is also implementing some social investment projects amounting to 14 million euros. Albania has set up reforms to boost FDI. and poorly defined property law. After the implementation of a new law on strategic The State has adopted a tax reform that is advantageous to foreign investors and aims at reducing corruption and administrative difficulties, which can be discouraging to investors. The long-winded procedures to obtain operating licences in the trade, construction and tourism industries have slowed down investment progress. In addition, investments continue to suffer from the lack of infrastructure investment in January 2016, the Albanese government declared in early 2018 it was readying another law to further boost investment. This new law will aim at ensuring compliance with labour, safety and environmental legislation, increase guarantees for investors and set up a new procedure enabling them to start their business quicker. The country wishes to attract investment in the following sectors: energy and mining, transport, telecommunications, infrastructure and urban waste, tourism, agriculture and fisheries. Minimum capital requirements range from USD1 to 50 million (source: Albania Investment Development Agency). Annual FDI inflows in Albania have increased significantly in the last ten years or so, averaging close to USD1 billion per year for the period 2008–2017. FDI inflows amounted to more than USD1 billion in 2017, compared with USD1.12 billion in 2016, and 9.45 billion in 2015.

We have analyzed three main indicators for FDI. The three main elements are Turnover, Investment,

and Employment. We have analyzed these three indicators for Foreign, Joint Enterprise and Resident Enterprises. Employment was (19.1%, 17.7%, 16%), Turnover was (26.9%, 24.6%, 22.7%), Investment was (38.8%, 42%, 46.9%). The structure of the company that invest in Albania are In EU countries, during 2016, **Italy** (49.6% of employment and 25.2% of turnover) and **Greece** (10.9% of employment and 13.2% of turnover) are two countries with the largest share of employment and turnover. **Turkey** covers 10.4% of employment and 12.5% of turnover. It has the biggest impact among Other countries. In Western Balkan countries, Kosovo covers 2.9% of employment and 2.9% of turnover. The largest share is invested by Switzerland (42.4%). For EU countries, Austria (14.8%) and Italy (9.9%) are dominant in the value of investments done during 2016, while for Western Balkan Countries is Kosovo (1.5%).

The main invested sector during 2016, the largest share is in Trade (22.3%) and in Manufacturing (19.0%). During two last years, the largest share of investments was in Electricity, Gas and Water Supply and Wasting Management by respectively 58.3% in 2016.

The structure of turnover realized in each economic activity by main countries during 2016 for foreign and joint enterprises. In Mining and Quarrying industry, the largest share of turnover is realized by enterprises owned from Other countries (93.1%) where Canada is the dominant country with 70,8%. For Accommodation and Food sector the largest share of turnover is realized again by enterprises owned from Other countries (57.9%) where Turkey represents 19.2%. All other activities are dominated from EU countries. Italy dominates in Manufacturing (37.3%), Construction (39.8%), Trade (28.6%) and Services (37.1%). Greece dominates in transport, information and communication

sector (33.7%). Austria dominates in Electricity, gas; water supply and waste management sector (15.9%).

### Conclusion

The most important element for Albania is the future integration in EU enlargement, when most of the new member countries expect that EU accession will have a positive impact on further FDI inflow. In order to increase competitiveness of domestic economy and create favourable environment for attracting FDI, the Albanian government has adopted a tax reform that is advantageous to foreign investors and aims at reducing corruption and administrative difficulties, which can be discouraging to investors. The long-winded procedures to obtain operating licences in the trade, construction and tourism industries have slowed down investment progress. The Albanese government declared in early 2018 it was readying another law to further boost investment. This new law will aim at ensuring compliance with labour, safety and environmental legislation, increase guarantees for investors and set up a new procedure enabling them to start their business quicker. The country wishes to attract investment in the following sectors: energy and mining, transport, telecommunications, infrastructure and urban waste, tourism, agriculture and fisheries. Albania should pay attention especially to attracting FDI of those MNCs, which bring new technologies and recognizable brands, as well as contribute to new employment. In that sense, regulations should be brought that will secure the allocation of tax credits and relief to investors who invest not only in production, but also in R&D activities, training programs for employee, marketing activities, etc. The government should provide all the necessary infrastructure and protection of property rights and intellectual property. All of these should minimize negative effects of high political risks, which are also factors which determinate multinational enterprises from investing in Albania.

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