Integral Management: Key Success Factors in the MER Model

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Abstract: Even though management evolution has been described differently in the literature, many authors agree that in the last two decades we can observe the development of integral management. Many models of integral management have been developed during these years. One of them is the MER Model of integral management, the beginnings of which date back to the years 1992 and 1993. The model has been changed recently. Major changes introduced in the renewed model regard the enterprises' success factors. Some new key success factors were added in the MER model based on new scientific cognitions as well as taking into consideration new developments in the socio-political and economic environment. In this contribution we present the most important features of the renewed model with more detailed explanation of key success factors.

Keywords: integral management; MER Model of integral management; success factor; culture; philosophy; ethics; credibility; entrepreneurship; synergy; ecology; compatibility; efficiency; competitiveness

1 Introduction

The stages of management evolution have been presented differently in the scientific and professional (business) literature. Very often, the stages of management evolution are described as budgeting and controlling, long-range planning, strategic planning, corporate strategic planning and strategic management. Over the past two decades we can observe substantive progress toward the development of integral management. There are many well-known and

recognized models of integral management (e.g., the St. Gallen model) which were developed with the goal of providing a comprehensive and holistic framework for the governance and management of enterprises. In Slovenia, we can observe a similar evolution of integral management almost at the same time as in many other countries. Namely, socio-political and economic changes during the transition from socialist to market economy in Slovenia enabled the transfer of upto-date scientific and research thinking on management from the developed market economies to the academic and professional work of academics and professionals in transition economies. The MER Model of integral management, which is represented in this contribution, is the result of rich international scientific and research cooperation of individuals from mainly university institutions from different (especially European) countries. This cooperation has been coordinated by Slovenian academics and researchers. The beginnings of the creation of the MER Model of integral management (further in the text: the MER Model) date back to the years 1992 and 1993 [1, 7, 12]. The MER Model has been published several times with a special focus on the particularities of the transition period [2, 8, 26]; it has also been presented at conferences [3, 4, 5, 9, 10, 11, 14, 19, 22, 27].

A year ago the decision was made to start thoroughly renewing the MER Model since many changes of conditions in the economic and other social environment in Slovenia and in many other post-socialist countries have been taking place. The renewed MER Model was published at the end of the year 2010 in the book entitled "Integral Management – MER Model" [13] and in proceedings of the MEB 2011 conference [6, 16]. In this "renewed" model many changes were introduced; especially some new success factors were added. In this contribution, the renewed MER Model is presented with a more detailed presentation of scientific observations on key success factors.

2 The Evolution of Integral Management

Management has been presented differently from the evolutionary perspective in the scientific and professional (business) literature. There is also no common agreement among researchers about the beginnings of management. Some researchers have placed the beginnings of management in time periods before Christ; others believe that we can observe the first roots of management in the period of the industrial evolution, which began with the invention of the steam engine in the year 1784 in England. Among the first group of authors is, for example, Müller-Merbach. In his contribution entitled "Philosophie und Führung" (in English: "Philosophy and Management"; see [20]) he scientifically grounded the origins of management in the thoughts and works of philosophers, many of whom lived in the centuries before Christ. He represents the important thinking of Heraklid, Platon, Aristotle, Socrates, Pythagoras, Zenon, Kant, Hobbes, Ehrenfels, Hesse, Aquin, Barkeley, Jonas and others. In the work cited, the author does not explicitly write about the evolution of management; however, he describes the (old) philosophical grounds of leadership, with the beginnings in cultures of different civilizations. According to the opinion of some other authors, the evolution of management has its beginnings in later time periods. For example, Kralj sees the evolutionary beginnings of "real" management in scientific management, which is named "Taylorism" after its creator Taylor [28].

There also exist different opinions and views regarding the type and sequence of the evolutionary changes in management. We compare three broad research studies: one carried out by Hax and Majluf, another carried out by Hahn, and a third conducted by Kralj. The research by Hax and Majluf and the work by Hahn were conducted during the period of the evolution of strategic management [23, 24, 25]. Strategic management was in both research studies defined as the highest evolutionary achievement. However, the evolutionary path to the stage of strategic management is explained differently in the cited literature. Hax and Majluf [24] describe the early stages of the management evolution as budgeting and controlling and long-range planning, and the later stages as business strategic planning, corporate strategic planning and strategic management. On the other hand, Hahn [23] describes the stages of management. The cited authors did not foresee the evolution of integral management, which has been underway in the last two decades.

Among those management researchers who foresaw such an evolution of management was also Slovenian researcher Kralj [29 and earlier publications]. He described four major stages in the evolution of management: empirical, rational, cognitive and integrative management (see [21] for research findings on the presence of the different evolutionary modes/stages in Slovenian enterprises). Kralj was the first Slovenian author who defined integral management, and this was not only via describing its main characteristics, but also by developing its own model of managing the policy of an organization and an enterprise (see: [29 and earlier publications]). In his later work [28], the author places two other Slovenian models of integral management among the important models of integral management, and they are the Tavčar practical model and the Maribor model of integral management.

Some fruitful contributions to the understanding of the evolution of integral management in the international environment are the research works of Mugler and Thommen. We find especially important Mugler's findings that there are many models of integral management developed in different surroundings [30], such as the St. Gallen and the Zürich model of management in Switzerland and the Vienna school of management in Austria (see: [31]), where the MER Model of integral management is of special importance since it incorporates the particularities of enterprises in transition (see: [26]). Among well-known and recognized models from the German-speaking world, Thommen [34] emphasizes

the St. Gallen model and the Zürich model. Thommen defines as models of integral management all those models which incorporates the holistic nature of management phenomenon and all its relevant aspects; that is, the holistic regulation and coordination of an enterprise and all its partial areas as well as the managing of co-workers.

The authors of this contribution find the St. Gallen model as one the most recognized and accepted models of integral management. From an historical and evolutionary point of view, the beginnings of this model coincide with the foundation of the Institute of Management at the Hochschule St. Gallen – HSG in the year 1954 by Hans Ulrich. He was convinced of the necessity of a strong theory of the company. In the year 1968, his book "Die Unternehmung als produktives soziales System" (in English: "The Corporation as a Productive Social System") outlined the basics for a system-oriented education in management. On the basis of his thinking, the first version of the "St. Gallen Management Model" was published in the year 1972, together with Walter Krieg, in a book of the same title.

From the year 1984 to 1994, the institute was headed by Knut Bleicher. During this period, the overall idea of an integrated management approach was shaped, a framework called the "St. Gallen Management Concept". By emphasizing distinct phases of corporate development, it especially focused on the evolutionary conditions and states of management. This concept is based on three management levels highlighted by Hans Ulrich and combines them with what is often regarded as the specific "St. Gallen" demands of successful management: the harmonization of strategic programs, structure, and culture to a common chord. Six editions have made "Das Konzept Integriertes Management" (in English: "The Concept of Integrated Management") an acknowledged standard in management literature.

In the year 1998 the University of St. Gallen initiated a comprehensive project to renew the St. Gallen Management Model. In 2002 these efforts led to the new HSG approach to integral management. With this, the acknowledged St. Gallen concept of an enterprise and of the accompanying management challenges entered its third generation. The latest HSG approach to integral management enhances the original Ulrich model in several respects: (1) there is more importance attached to the ethical, normative dimension of management, (2) the new model reflects the relevance of a process-oriented view of an enterprise, and (3) there is greater emphasis on the interpretative, meaning-based dimension of management. With integrating the levels of strategy, structure and culture, the three main pillars of the second St. Gallen management model developed in the Bleicher era also play an important role in the new model. Finally, the great contemporary issues of interactions (resources, norms and values, concerns and interests) are linked in a new way. This is done to draw more attention to the insight that management is very much about interpreting certain facts and giving meaning to them. The project was conducted by Johannes Rüegg-Stürm, who introduced the

management framework in his book "Das neue St. Galler Management-Modell" (in English: "The New St. Gallen Management Model") [32, 33].

We ascertain that substantial effort was devoted to the development of integral management at the same time in Slovenia and elsewhere. The solutions are comparable, taking into consideration the special socio-political and economic circumstances in Slovenia and former Yugoslavia. For more about this, see in Kralj [28], who created his model for managing the policy of an organization and an enterprise almost at the same time as the St. Gallen model did.

Extensive socio-political changes in former socialist countries during the nineties of the past century have enabled the incorporation of the modern thought on management in the science and profession of management in Slovenia. These changes have enabled the evolution of integral management, with the beginnings in the Maribor model of integral management. However, the long-term development of this model was not possible due to many reasons. It was upgraded with the internationally conceptualize MER Model, which is presented in more detail in this contribution. The MER Model is based on the understanding of integral management as the one which enables the holistic governance and management of an enterprise in all its dimensions from objective, space and time perspectives.

3 The Evolutionary Path of the MER Model of Integral Management

3.1 The Beginnings

The beginnings of the creation of the MER Model of integral management date back to the year 1992 and 1993. In the autumn of 1993, the book entitled "Podjetništvo, politika podjetja in management" (in English: "Entrepreneurship, an Enterprise's Policy and Management") was published by Založba Obzorja (in English: the Publishing House Obzorja) from Maribor [1]. The book was result of cooperation of twenty-two authors from five countries who were not thinking of developing their own model of management during that time. However, the circumstance in the following years has demanded precisely this: cooperation with clear purpose and goals toward developing joint ideas of enterprises' management and development.

3.2 Research Work, Symposiums and Publications

3.2.1 Research Work

The research work on entrepreneurship, the enterprise's policy and management, which started in the year 1992, was successfully continued in the following years. The researchers from Slovenia, who were encouraged by the book published in 1993, published a year later (in the year 1994) another book entitled "Unternehmen im Übergangsprozeß zur Marktwirtschaft mit Fallbeispielen aus Slowenien" (in English: "Enterprises in Transition to a Market Economy with Cases from Slovenia") [7]. The book was published by Linde Verlag (in English: Publishing House Linde) from Vienna. It represents an important element of the integration of research work and thoughts since it is written in German and therefore is applicable for a wider public (not only to Slovenian readers). Nowadays, we are convinced that this book has played an important role in attracting many researchers from abroad to scientific cooperation within the MER research program. From 1992 to 2011 more than 400 academics and other researchers participated in research work focused on the creation of their own model of integral management. During these years many research projects were conducted (see Appendix 1), the main findings of which were published and disseminated to a broad scientific and professional public.

3.2.2 Symposiums

In the early beginnings of the research cooperation in the years 1992 and 1993 the need for meetings "in life" was expressed by the participating researchers. For this reason several international scientific symposiums were organized as a manifestation of cooperation in the scientific and research work. The first symposium was organized and held in the year 1994, and in the following years (until 2011) nine international symposiums entitled "Management in razvoj – MER" (in English: "Management and Development – MER") were successfully organized. 354 academics and professionals participated in these symposiums, presenting and discussing research findings and observations on different topics in the scientific field of the enterprises' management and development. These participants were part of symposiums as authors of written papers in more than 600 cases. There were also researchers who cooperated in the MER research project but for different reasons could not participate at symposiums, and there were professionals who did not deal scientifically with the research topics but were interested in the practical solutions of researched problems.

3.2.2 Publications

New knowledge and research findings of the symposiums and researches have been published in books, journals, and symposium proceedings. The first publication was the aforementioned book published by the Publishing House Obzorja, followed by the book published by the Publishing House Linde from Vienna. There have also been publications published by Versus Verlag (in English: the Publishing House Versus) from Zürich and the publishing house of the Faculty of Business and Economics from Maribor. After setting up the MER Evrocentre in the year 1997, the majority of written materials were published by its publishing house MER Založba. The written and published material on which the MER Model has been conceptualized and developed consists of more than one thousand pages. In the Appendix 2, only a limited number of publications (books, journals and proceeding) is listed; the selection was based on their importance for the creation of the MER Model of integral management.

3.3 Synergy of Participants

In past years academics (researchers and authors of published papers) from Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Belarus, Canada, the Czech Republic, Croatia, Estonia, France, Germany, Hungary, Italy, Poland, Romania, Russia, Slovakia, Slovenia, Switzerland, the Ukraine and the USA have been cooperating in the MER programs. They have come from more than fifty (mainly university) institutions. Thus, scientific doctrines of different universities have influenced the development of the MER Model. In Appendix 3 are listed only those partners who have had a major influence on the development of the MER Model during the time period 1992-2011; a list of all participants would be too long. The coordinators of the MER programs at the MER Evrocentre have been working on the coordination and integration of the research findings of participating researchers that have led to the framework captioned under the name "the MER Model of integral management". An important role in this process has been played by the already mentioned group of researchers (listed in Appendix 3) whose personal engagement during these years has enabled creative team work. This engagement and team work enables the incorporation of scientific doctrines of the participating institutions into the MER Model.

4 The Renewed MER Model of Integral Management

The MER Model is based on the multi-dimensional integration of management with the enterprise and its environment, taking into consideration the enterprise's basic purposes of surviving and developing. The basic features of the MER Model are presented in Figure 1 and discussed in the continuation of the paper.

The MER Model is based on a rich scientific foundation and research observations on management, of which the following are especially important:

a) observations on the differentiation between an enterprise and management as an object and as a subject of the managerial activity, and the co-dependencies between management and an enterprise;

- b) understanding the characteristics of the enterprise's environments (conditions and changes of conditions, needs and expectations), their influences on an enterprise, as well as on the management of an enterprise;
- c) understanding the requisite compatibility of opportunities identified in the environment with the existent and potential capabilities of an enterprise;



Figure 1 The MER Model of Integral Management

- d) the process comprehension of an enterprise; understanding the diversity of enterprises and their influences on the necessary adjustments of management;
- e) understanding the enterprise's life cycle and developmental cycle, the special situations and goals of enterprises, and their influences on the particularities of management;
- f) observations on entrepreneurial, efficient (in profit oriented enterprises also profitable), as well as ethical and credible creation of positive synergy effects for increasing the competitiveness, effectiveness and value of an enterprise.

The description of the MER Model can be summarized in the following three major fields:

- 1) Integral management: its dimensions and special managements, which are presented in Figure 1 by the first circle.
- 2) An enterprise and its environment, which are presented by the second and the third circles in Figure 1.
- 3) Success factors of an enterprise, which are presented by the fourth and the fifth circles in Figure 1.

5 Management

Management as a process, as an institution and as the system of instruments are three dimensions of management which are incorporated into the MER Model. From the system perspective the management is understood in these three dimensions as a partial system and not as a subsystem of an enterprise in which it exists. Management processes, instruments and institutions are horizontally and vertically integrated in a consistent functioning wholeness. The process, instrumental and institutional integration of management is at the same time the fundamental condition for bringing into force all other integration factors.

5.1 Process Dimension

The process dimension of the MER Model is based on the integration of hierarchical levels, basic functions and process functions. Among the hierarchical levels of the management process we distinguish among the political level, the strategic management level and the operational management level. Planning, organizing, directing and controlling are understood within the MER Model as basic functions of the management process and as process functions the preparation of information, decision making and undertaking measures are incorporated into the MER Model. In the continuation, we describe the process dimension in more detail.

Hierarchical levels of the management process

The process dimension of the MER Model is based on understanding the hierarchy of the management process. What is typical of management activities is that the global and developmental definitions of an enterprise are followed by the more detailed, operational definitions. Therefore, there is hierarchical order in:

- defining a vision and a policy of an enterprise at the highest, political level; the enterprise's policy consists of a mission, purposes and basic goals;
- identifying strategic opportunities and developing strategies for implementing the policy at the middle, strategic level;

- planning and allocating resources and operational tasks at the lowest, tactical and operational levels.

Processes at different hierarchical levels, described above, need to be integrated into one holistic and complex process. Therefore, in the MER Model no special attention is given to distinguishing between governance and management processes because of the need for linking and interweaving processes at all hierarchical levels. The need for the integration of governance and management processes into one complex and holistic process is emphasized also in other models of integral management.

Planning, organizing, directing and controlling as basic functions

The management process in the MER Model begins with planning, which is followed by organizing and directing of implementation. Control is not the last step in this sequence. It is needed many times in between and together with planning, organizing, directing of implementation and implementation itself. Planning, organizing, directing and controlling are needed at all hierarchical levels of the management process.

Preparatory information activities, decision making and measures undertaking as process functions

The essence of management processes represents decision making and measures undertaking processes. Both decision making and measures undertaking processes are needed in all stages and at all levels of the management process. Decisions are based on information. The preparation of the needed data and information is based on collecting, processing, storing and communicating data and information. Information processes, like decision making processes, are presented in all basic functions and at all levels of the management process. The purpose of the management processes is achieved by the process of undertaking measures. The realization of measures is always done at the level which is hierarchically lower from the level at which the decision was made. Political decisions are realized by strategies, strategic decisions by structuring of resources, decisions on structuring of resources by making decisions on the operational level and by the realization in the basic processes of an enterprise.

5.2 Instrumental Dimension

Management as an instrumental system consists of values, business and management guiding principles, styles, techniques and management methods. Values as well as business and management guiding principles globally define the relationships between an enterprise, its environment and its employees. They are especially important since the selected management styles and techniques are based on them. Among different management styles, two extremes can be distinguished, the authoritarian and participative management styles; however, in the praxis we can find their combinations. Among different management

techniques we distinguish the following ones: management by objectives, management by exception, management by delegation and management by system. Regarding the management methods, during the process of developing the MER Model, priority has been given to the business planning methods, especially the methods of enterprise's start-up and developmental planning.

5.3 Institutional Dimension

The institutional dimension of the MER Model represents those people who are involved in the governance and management of an enterprise (i.e., governance and management structures). Boundaries between the governance and management structures have been disappearing more and more via the development of the integral management models. Namely, research studies show the growing need for integration of both structures. Among those involved in the governance and management processes, they hierarchically can be distinguished between owners making decisions on the policy of an enterprise, top management making decisions on strategies, middle management making decisions on the optimal allocation of resources (tactics) and first line management making decisions on the distribution of operational tasks.

The definition of the involved individuals carrying out the management functions (i.e., institutional dimension) is done regarding their responsibilities in decision making processes. Management processes consist of, in addition to decision making, planning, organizing, directing and controlling activities (as discussed previously in the text). People involved in these activities are experts within the enterprise, very often also managers or even those from governance structure, if they possess the needed expert knowledge.

In the MER Model special attention is given to managers' personal characteristics, competencies, authority and motivation as well as to organizational models of management. We believe that they are of crucial importance for the long-term survival and success of an enterprise.

6 Enterprise and Environment

An enterprise is understood in the MER Model as the narrow environment in which (and for which) the management is active. Therefore, an enterprise integrates "its own" management with the characteristics of its own reality (activity, processes, resources, organization and structures) in a certain place at a certain time. This integration takes place in an enterprise which finds itself in one of different phases of life, growth and developmental cycle; in the majority of cases, an enterprise is at the same time in more than one phase of the mentioned cycles. From the dynamic perspective, an enterprise is constantly changing and

therefore moving from one phase to another. This dynamic perspective is also incorporated into the MER Model, which provides a framework for the needed integration of the management with the enterprise and its environment.

The integration of the management with philosophy, culture and ethics, as well as with entrepreneurship and ecology, is also of crucial importance for the survival and success of an enterprise, and for this reason it cannot be isolated only to a certain part of an enterprise and/or its environment. This integration of an enterprise with its broader environment (economic, cultural, natural, technological and socio-political sub-environments) is implemented in the operational, market and cognitive spheres of the enterprise's functioning and is manifested as the enterprise's external competence to align the enterprise's potential outputs (i. e., services, products) with the needs and expectations of the environment; this alignment should be done from the objective, time and space perspective. The integration of enterprise's internal factors (i.e., material as well non-material) is manifested as the enterprise for efficient functioning and achieving synergy in all areas. Only in this way will an enterprise be able to satisfy needs and expectations of environment better than its competitors.

The *objective dimension* of the MER model is expressed by its applicability for all types of enterprises (in the broader sense of the term) regardless of their activity, size, legal form, etc. The MER model is designed for enterprises in different life cycle phases, developmental stages and growth stages, of course with certain modifications. These lead to special managements (e.g., start-up management, developmental management, management of an enterprise in bankruptcy, etc.). Such special managements are not isolated parts but partial systems of the integral management. The MER Model is designed also for enterprises which find themselves in special situations or which follow different sets of goals. Typical cases are crisis management, total quality management and innovation management, which also represent partial systems of the integral management. From the time perspective, the MER Model is designed to be used in all time dimensions (for longer as well as shorter time periods); that means with planning for the future and with controlling and intervention measures for the present time (in all cases taking into consideration the cognitions from the past). Regarding the space dimension, the MER Model enables the functioning of management in all three places (market, operational and cognitive) of an enterprise - which means in all dimension of enterprise's environment. In MER solutions, special attention is devoted to small and medium-sized enterprises (also family ones), enterprises in crisis and management particularities of such enterprises; in the MER Model we distinguish among proactive crisis management, cooperative management, change management and management of business opportunities.

7 Key Success Factors of an Enterprise

Key success factors (as well as success itself) are of crucial, strategic importance for all enterprises. Therefore, enterprises should devote a great deal of their attention to these factors. They should identify them and permanently try to improve them. Based on contemporary scientific cognitions and research findings, the following success factors were incorporated into the MER Model: internal and external compatibility of an enterprise, credibility, efficiency, competitiveness, entrepreneurship, synergy, culture, philosophy, ethics and ecology. In the continuation, we explain them in more detail.

7.1 Culture, Philosophy, Ethics and Credibility

An enterprise's culture encompasses values, rules, beliefs and assumptions that are shared by organizational members and that are used in handling and behavior of the especially internal enterprise's stakeholders. The developmental improvement of an enterprise is not possible without a simultaneous change of its culture; the changing of culture (in the head of enterprise's stakeholders!) is usually a very demanding and long-lasting process. The culture of the broader society as well as the culture of an enterprise is very complex. The circle of an enterprise's culture on the level of science, religion, philosophy, art and technique is considered within the MER Model; this circle starts and ends in the environment. The culture based on the contemporary scientific findings, the universal credible (and also responsible) philosophy, the comprehensive artistic way of expression, the friendly techniques of the enterprise's functioning and the enterprise's credible handling of all stakeholders as well as credible behavior of each stakeholder (in the name of and on account of the enterprise) to other stakeholders are incorporated into the MER Model. We strive for such an ethics that results in the holistic credibility of an enterprise. An enterprise which is not credible cannot become (and stay) continuously successful. The realization of the enterprise's credibility is therefore possible only with the ethical behavior of all its stakeholders (see also: [15, 16, 17, 18]). There exists a mutual relationship in the implementation of ethics and credibility. The demand for credible behavior of all enterprise's stakeholders (owners, managers and others) in all circumstances is also incorporated into the MER Model. The credibility must be established and implemented mutually: from the side of an enterprise as an institution toward every stakeholder of the enterprise and from each stakeholder (in the name of and on the account of the enterprise!) toward all other stakeholders.

7.2 Entrepreneurship, Synergy and Ecology

Enterprises cannot be successful in the long term without people who possess the characteristics of entrepreneurs; also enterprises cannot be successful if individuals are entrepreneurial but the conditions within the enterprises are not established to promote entrepreneurship or even hinder the entrepreneurial actions

of employees. Creativity, intuition, imagination, vision, carefulness, courage, honesty, patience, diligence, personal motivation and preparedness to work, persistence, dynamics, initiative, risk-propensity and sense for change, judgmental competences, firmness, decision-making abilities and preparedness for pioneer work are the essence of entrepreneurship. Within the MER Model, we argue that entrepreneurship in an enterprise is needed and is crucial for an enterprise's success; therefore, the conditions must be established in order to encourage entrepreneurial activities among an enterprise's stakeholders, especially among an enterprise's internal stakeholders.

Synergy and the creation of positive synergy effects are considered within the MER Model as the key success factors of every enterprise. The care for the creation of positive synergy effects is permanently present in all dimensions of the MER Model. We believe that an enterprise which achieves negative synergy effects cannot be successful; usually such enterprises decline and die very soon. If an enterprise consciously makes a decision which leads to zero or even negative synergy effects, such a decision must be based on well-grounded reasons, and the enterprise must know how long such situation will last and when the negative or zero effects will be replaced with positive ones.

Regarding the ecology as one of the success factors within the MER Model, we place in the center the enterprise's handling within the environment. In the MER Model we especially emphasize the requisite holistic ecological functioning and behavior of an enterprise. We argue that an environmentally friendly (ecological) philosophy is needed, along with the enterprise's policy, strategies and operative functioning. An enterprise should not consider its ecological efforts as a burden; it should see these efforts as an attempt to improve its competitive position and by this also its performance. An enterprise should strive to raise ecological awareness by its all stakeholders, also external ones. We encourage with the MER Model the credible, ecological directed behavior of enterprises all the time and everywhere.

7.3 Internal and External Compatibility of an Enterprise

The holistic compatibility of an enterprise with its environment is needed in order to be successful. We believe that internal and external compatibility of an enterprise are needed in its vision and policy, in strategies and processes as well as in enterprise's structure. It is necessary to achieve the alignment of previously mentioned with the identified expectations and needs of the environment as well as mutually within the enterprise itself, within the specific time, place, quantity and quality. An enterprise should achieve the compatibility of the environment (i.e., its expectations and needs) with all of the enterprise's processes, components and structures. The alignment is always the process of changing (either of an enterprise or the environment). The faster the enterprises are changing the more successful they become. Within the MER Model, we bring into force the active attitude of an enterprise toward changes and also call attention to the requisite dealing with changes as business opportunities for the enterprise; in this way, we argue the need for introducing two special dimensions of integral management, which are the proactive management of opportunities and change.

7.4 Efficiency and Competitiveness

The efficiency of an enterprise is an important success factor. Regarding the efficiency, the demands for rationality, speed and cost optimization of realization of all activities and processes are in the center of our attention. The main question here is how to work and how to conduct activities, as well as the entire technical. technological and working processes. The efficiency of an enterprise is expressed by the way of carrying out all processes; that means not only by carrying out the basic processes but also the governance and management processes, as well as the information processes. An enterprise should (besides constantly taking care of efficiency) also constantly check whether or not its products (or services) still satisfy the needs of the buyers. This means that an enterprise should make the right things (products or services) in the right way. Efficiency in "doing the right things" is useful and necessary; in doing "the wrong things" efficiency can even be harmful. However, if an enterprise does the right things less efficiently than other enterprises, it will very soon be without the buyers. In such a case an enterprise will no longer be able to exist. In order to become more competitive, an enterprise must recognize (and know) which characteristics of its offer are for the environment (i.e., buyers) of importance (and are also priority) and how to improve them in comparison to its competitors, or how to develop new characteristics of its products and services; that means to develop such characteristics that competitors' products or service do not yet possess. Many approaches of studying the ways of improving competitiveness have been established. Let us remind you of the MER's efforts to bring into force the requisite holistic approach. The idea for establishing an enterprise should not be grounded on its outputs (i.e., the enterprise's offer); an enterprise should be established based on the identification of the needs and expectations of the buyers, then by making the decision on the purposes, goals, business processes and structure of such an enterprise that will be able to provide competitive products (or services) to the market. With the MER Model, we are promoting the holistic credible behavior in the processes of improving the competitiveness of enterprises.

Conclusions

Activities within the MER programs (research, symposiums and publications) have been dealing with enterprises and similar institutions in different environments, in different life stages and in different developmental and business situations a period of almost twenty years. Therefore, internal as well external factors influencing the development and growth of enterprises and similar institutions have been considered. Certain solutions have been proposed for special types of enterprises (e.g., for corporations and enterprises with agricultural

activities) as well as for regional development. A lot of research efforts have been devoted to small and medium-sized enterprises (in short: SMEs) and especially family enterprises, since they possess many developmental and managerial particularities. With certain modifications, the MER Model can be useful and applicable for SMEs and family enterprises as well.

The MER Model has been verified several times during the process of its creation. Very often verifications of different parts of the MER Model were done in the praxis of participating enterprises or by presenting the MER Model at different scientific symposiums and conferences, at faculties and other schools via lectures. Thoughts on the model (or its parts, and not always under the name "MER model of integral management") have been disseminated to many people, especially to those in European countries. The MER Model has been introduced in many books and been reviewed in journals; the most comprehensive presentation of the MER Model is done in an already cited book (i.e., [13]). The written contributions on the MER Model are open to academic and professional discussion and judgment. The opinions, remarks and other responses received have contributed significantly to improving the quality and actuality of the MER Model.

Certain dimensions of the MER Model have already been implemented in some Slovenian companies. These companies cannot be listed by name due to ethical reasons; however, they are described in the cited MER publications. Numerous participants of trainings and other educational events have been using the acquired knowledge on the MER Model to solve business and management problems.

The knowledge on the MER Model of integral management is built in the study programs, especially in those at the Faculty of Economics and Business at the University of Maribor (for more information on the MER model in the study programs see: [4]). Three years later we are even more convinced that the use of the MER Model in the students' study work is important and bring satisfying results; the acquired experiences indicate that the presence of the MER Model in the study programs and the incorporation of the MER Model into the pedagogical process have been successful.

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Appendix 1

The list of important MER research projects

- Co-dependencies between entrepreneurship, enterprise's policy and management
- Transition influences on development of an economy and enterprises
- Particularities of development and developmental management of small and medium-sized enterprises
- Business planning as the component of the management process
- Synergy effects of start-up and developmental management
- Particularities of crisis management in different environments
- Comparative analysis of integral management models with models of strategic management and enterprise's policy
- Integration and cooperation particularities of small and medium-sized enterprises (comparing EU countries with other countries)
- Developmental particularities of family enterprises
- Organizational change in European industry: research on innovation and innovativeness in Slovenia
- Patterns of organizational change in European industry: Ways to strengthen the empirical basis of research and policy
- Business ethics implementation in different enterprise life cycle stages

Appendix 2

The list of important publications

Books:

- Belak, J. et al.: Podjetništvo, politika podjetja in management (Entrepreneurship, Enterprise's Policy and Management), Založba Obzorja, Maribor, 1993
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Appendix 3

The list of partners

- Abteilung für Controlling und strategische Unternehmensführung, Institut für Wirtschaftswissenschaften der Universität Klagenfurt (Department of Controlling and Strategic Management at the University Klagenfurt), Austria
- Akademia Ekonomiczna im. Karol Adamieckiego w Katowicach (University of Economics Katowice), Poland
- Akademia Ekonomiczna im. Oskara Langego we Wrocławiu (Oskar Lange University of Economics Wroclav), Poland
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- Ekonomski fakultet, Sveučilište u Zagrebu (Faculty of Economics and Business, University of Zagreb), Croatia
- Fakulta ekonomiky a manažmentu, Slovak Agricultural University in Nitra (Faculty of Economics and Management, Slovak University of Agriculture, Nitra), Slovak Republic
- Institut für Arbeitswissenschaft, Ruhr-Universität Bochum (Ruhr-University Bochum), Germany

- Instytut Inżynierii Zarządzania, Wydział Informatyki i Zarządzania, Politehnika Poznańska, (Institute of Management Engineering, Department of Informatics and Management, Poznan Technical University), Poland
- Institut für Betriebswirtschaftslehre der Klein- und Mittelbetriebe an der Wirschaftsuniversität Wien (Department of Small Business Management, University of Economics and Business Administration, Vienna), Austria
- Inštitut za management in razvoj, MER Evrocenter (Institute for management and development, MER Evrocentre), Slovenia
- Inštitut za podjetništvo in management malih podjetij, Ekonomsko-poslovna fakulteta Univerze v Mariboru (Institute of Entrepreneurship and Small Business Management, Faculty of Economics and Business, University of Maribor), Slovenia
- Kaiserslautern University of Applied Sciences, Studiengang Mittelstandsökonomie, FH-Campus Zweibrücken (Kaiserlautern University of Applied Sciences, Department of Small Business), Germany
- Keleti Károly Gazdasági Kar, Óbudai Egyetem (Keleti Károly Faculty of Economics, Óbuda University), Hungary
- Lehrstuhl f
 ür Organisation und Personal (Department of Organization and Human Resources), European Business School Schlo
 ß Reichartshausen, Oestrich-Winkel, Germany
- Provozně ekonomická fakulta, Česká zemědělská univerzita v Praze (Faculty of Economics and Management, Czech University of Agriculture Prague), Czech Republic
- Universität für National- und Weltwirtschaft, Sofia (University of National and World Economy, Sofia), Bulgaria
- Wydział Nauk Ekonomicznych i Zarządzania, Uniwersytet Mikołaja Kopernika w Toruniu (Faculty of Economic Sciences and Management, Nicholas Copernicus University Torun), Poland
- Schweizerisches Institut für gewerbliche Wirtschaft an der Universität St. Gallen (Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen), Switzerland

Enterprise Culture as One of the Enterprise's Key Success Factors (Integral Management Approach): Does the Internal and External Cultural Orientation Matter?

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Abstract: Considering the theories and research observations presented in this paper, we can state that organizational culture, with its values and norms, is essential for ensuring the long term success of an enterprise. The present article shows the research conclusions on the impact of enterprise culture on the success of the enterprises observed.

Keywords: MER Model; integral management; enterprise culture orientation; business success; enterprise key success factors

1 Introduction

Enterprise culture is judged by many now as a major determinant in any company's success in terms of performance, especially through improvements in employee morale [28]. Various researches show that enterprise culture, with its values, is of essential meaning via fostering business ethics in the sense of assuring the enterprise's success (e.g. [4, 9, 6, 5, 21, 49]. Hofstede [23, 24] argues that enterprise culture as the collective programming of the mind that distinguishes participants of one enterprise from another. Such collective programming is possible if enterprise culture is considered as the basic assumptions that people in an enterprise hold and share about that enterprise. Those assumptions are implied in their shared feelings, beliefs and values and is embodied in symbols, processes, forms and some aspects of patterned group behaviour. Further, Hofstede [23, 25] argues that enterprise culture is distinct from both individual personality (one person) and human nature (all humans).

Considering the theories and research observations presented in this paper, we can state that organizational culture, with its values and norms, is essential for ensuring the long term success of an enterprise. An enterprise's culture has been

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defined as encompassing the values, rules, beliefs and assumptions in handling and behaviour of an enterprise's (especially internal) stakeholders, which reflects internally as well externally the behaviour of an enterprise. As well as in other relevant scientific literature and research thoughts, as well as in well-known models of enterprise management and governance, enterprise culture is perceived as one of the enterprise's key success factors in the MER Model of Integral Management¹ [7]. Considering the MER Model of Integral Management [7] a given enterprise's key success factors are as follows: compatibility, competitiveness, efficiency, culture, credibility, ethics, ecology, entrepreneurship, synergy, and philosophy.

In accordance with the above stated argumentations, as well as considering the conclusions of various researches on the topic of enterprise culture in relation to enterprise success, our research is aiming to define the differences in enterprises' success considering their culture orientation (customer or employee orientation), meaning whether the observed enterprises are external or internal oriented. The present research is a continuous work considering the research of previously carried-out studies: in their research Belak Jernej [6] argues the importance of holistic ethics planning as a pre-condition for an enterprise's ethical behaviour; Belak, Jernej and Milfelner [9] in their research argue the differences in informal and formal measures of business ethics implementation at different stages of enterprise life cycle; Belak Jernej and Mulej [5] argue that the enterprise climate changes in relation to the enterprise life cycle; the research done by Duh and Belak Jernej [16] reveals the influence of the family on the ethical behaviour of family enterprises; Duh, Belak Jernej and Milfelner [15] carried out research on core values, culture and ethical climate, which explored the differences between family and non-family enterprises. Ethical behaviour, ethical climate and informal and formal measures are important predecessors of enterprise culture, and various lessons for managers can be learned from those studies in how to implement the needed cultural elements. However, less is known about how cultural elements impact enterprise performance in developing industries and whether enterprises with a higher presence of different cultural elements are in fact more successful. The present research is based on the premise that to ensure their success, enterprises must be oriented towards the external environment of its functioning as well as towards the internal environment of its functioning in order to be able to disclose and fulfil the real needs of the environment (market) and to realize and fulfil the needs of the employees (as well as other internal stakeholders) in order to motivate and stimulate their innovative behaviour as much as possible. Only in this way will the long term success of the enterprise be assured.

MER Model of Integral Management was developed by MER Institute for Management and Development, Slovenia

2 Enterprise Culture and Hypothesis Development

Enterprise culture has been defined as encompassing the values, rules, beliefs and assumptions in the handling and behaviour of an enterprise's (especially internal) stakeholders, which reflects internally as well externally the behaviour of an enterprise. The development of an enterprise is not possible without a simultaneous change of its culture; the changing of culture (in the head of enterprise's stakeholders!) is usually a very demanding and long-lasting process. The culture of the broader society as well as the culture of an enterprise is very complex. The MER Model of Integral Management [8] bases the success of enterprise upon its culture, which should (in the name of enterprise success) originate from contemporary scientific findings, a universal credible (and also responsible) philosophy, a comprehensive artistic way of expression, the friendly techniques of the enterprise's functioning and the enterprise's credible handling of all stakeholders, as well as the credible behaviour of each stakeholder (in the name of and on account of the enterprise) to other stakeholders. The enterprise culture is therefore considered as one of the enterprise's key success factors, as is shown in Figure 1.

Enterprise culture is a multifaceted construct, and is defined differently by various authors. Goffman [27] focused on the observed behavioural regularities in people's interactions; Homans [27] discussed the norms that evolve in working groups; Ouchi [35] stressed the philosophy that influences organizational policy; and Van Maaren [27] emphasized the rules for good understanding in an organization. More recently, enterprise culture has been defined as encompassing the assumptions, beliefs, goals, knowledge, and values that are shared by the organizational members [44, 45].

It is today believed that enterprise culture basically provides the framework for implementing and operationalizing various business strategies, and managers therefore need to be conscious of the cultures in which they are embedded and implement strategic changes when necessary. However, enterprises as systems are known for their unwillingness to be promptly (and successfully) transformed; a particularly significant aspect of this being associated with the notion of congruency between internalized and observed values, functioning as a direct link between the lack of cultural congruence, employee turnover, job satisfaction, and commitment to the organization.



Figure 1 The MER Model of Integral Management (Belak Janko, 2010)

Today, enterprise culture typologies are explained in detail. Various types of enterprise have been identified – related to the dynamic nature of the industry concerned [19] and to the size of the organization [18]. Several classifications have been proposed, the most often cited being those of Deal and Kennedy [14], Hofstede [22], Schein [42, 43, 44], and Cameron and Quinn [13]. Hofstede [22] proposed that enterprise culture could be classified by comparing the degree of individualism versus collectivism, the apparent power-distance metric, the tendency towards uncertainty avoidance, and the bias between masculinity and femininity. Kets De Vries (1986), on the other hand, opted to derive his classification from characteristics of the prevailing mentality: the paranoid culture (a persecutory theme), the avoidance culture (a pervasive sense of futility), the charismatic culture (everything revolves around the leader), the bureaucratic culture (depersonalized and rigid), and the politicized culture (leadership responsibility is abdicated).

More recently, Cameron and Quinn [13] have proposed a classification comprising four forms for a culture audit and for comparison purposes – Clan, Hierarchy, Market and Adhocracy. Subsequent research [28] allows the following expansion on these culture types: clan culture, adhocracy culture, market culture hierarchical culture. According to Cameron and Quinn [13] **market culture** (which is important for the empirical study presented herein) works towards clear and rational goals that are achieved through high productivity and economical operation. It tends to be result-oriented and to concentrate on getting the job done. Its members value competitiveness, diligence, perfectionism, aggressiveness, and personal initiative. Its leaders are inclined to be hard-driving producers, focused on outperforming competitors and remaining at the forefront of their field of endeavour by maintaining stability and control. The term "Market" is not to be confused with the marketing function or with customers in the market place. It represents a focus on transactions with external bodies, such as suppliers and customers.

In a context of enterprise's culture external (customer) orientation Webster [48] defines market culture (or marketing culture as he states) as the component of enterprise culture that relates to values and beliefs that help management and employees to understand the marketing function. It sets norms of behaviour in the enterprise and the meaning that is vital for performance of marketing activities. As such, market culture relates to the unwritten policies and guidelines which provide employees with behavioural norms, to the importance the enterprise as a whole places on the marketing function, and to the manner in which marketing activities are executed.

Customer oriented enterprise culture and the marketing concept therefore are similar concepts. The marketing concept is a specific enterprise culture that is accepted by the enterprise and is considered as a bundle of beliefs and values focused on the customers of enterprise, customer oriented goals, on strategy and strategy implementation. Homburg and Pflesser [26] above all stress the importance of values and artefacts that lead to customer oriented culture, such as stories, language, rituals and symbolism. Kohli and Jaworski [29] closely relate customer oriented enterprise culture and the marketing concept, claiming that the marketing concept is considered a business philosophy that puts the customer at the centre of overall activities of the enterprise and that the business philosophy can be contrasted with its implementation, reflected in the activities and behaviours of an enterprise.

Since cultural elements cannot be easily measured empirically, recent marketing literature suggests that one can also capture the effects or activities that are implemented as a result of a customer oriented culture being present in the enterprise. Such constructs for the measurement of a market oriented culture are known from literature as market oriented enterprise culture in accordance with Narver and Slater's [33] definition of market orientation. A customer oriented enterprise

culture is defined as an enterprise's attempt to understand and satisfy customers' needs. It is the kind of culture that stimulates and enables the accumulation of information about customers as well as competitors and in the long term also enables better business performance. As such, it provides psychological and social benefits to employees, leading to a sense of pride in belonging to an enterprise in which all departments and individuals work toward the common goal of satisfying customers and thereby resulting in increased organizational commitment.

As a business philosophy, a market oriented enterprise culture is an entity of three key elements. According to Narver and Slater [33], the enterprises with strong elements of a customer oriented culture demonstrate high customer and competitor orientation, and have strongly interrelated functions. Customer orientation is the key component of market culture which enables managers and employees to understand customer needs and wants, as well as the customers' present and future product value evaluation. Competitor orientation, on the other side, brings understanding of short term competitor strengths and weaknesses and long term competitor strategies. This component is also important since competitor strategies can strongly influence customer wants and needs and their value perceptions, as well as their behaviour. The third component (interfunctional coordination) relates to customer information interchange throughout the enterprise and to the coordination of efforts oriented towards customers. The third component is the most culture related and is also the most difficult to achieve.

The customer oriented enterprise culture should enhance customer-perceived quality by helping to create and maintain superior customer value. Since enterprises with strong market orientation possess the basis for rapid adaptation to customers' manifest and latent needs, this orientation may translate into superior new product success, market share and profitability [2, 34]. The customer oriented enterprise culture of the enterprise has been proposed as a key differentiating resource and a key predictor of firm performance [1].

By drawing the analogy with customer oriented enterprise culture, one can also define the kind of culture that stimulates the application of marketing, human resource management, and allied theories, techniques, and principles to motivate, mobilize, and manage employees at all levels of the company to continuously improve the way they serve external customers and each other. Although some early authors have referred to internal marketing activities as the one that treats employees of the enterprises as internal customers [3], it is reasonable to argue that the cultural view is more suitable to explain in what way satisfied internal customers (employees) can contribute to higher organizational performance. Such culture or behaviour as a result of this culture is frequently defined as internal marketing or internal market orientation in literature (e.g. [30, 20]). According to Lings [30], activities resulting from employee oriented enterprise culture incorporate cultural and behavioural dimension and are referred to as internal market orientation in the sense of identifying the wants and needs of employees as a prerequisite to satisfying the wants and needs of

customers. Employee oriented enterprise culture as displayed by managers should foster employee identification with the organisation, reduce their dysfunctional behaviours and increase behaviours that are compliant with organisational strategies [31]. This means that an employee oriented enterprise culture emphasises management values that stress that employees are a valuable enterprise resource and consideration of factors that determine employee satisfaction.

Since the employee oriented enterprise culture can build a system of employee and management values that guide the company's behaviour towards the goal of improving customer value, such a culture can also influence the market and financial performance of the enterprise in the sense of being related with higher external customer quality perception, external customer satisfaction, market share and sales volume. All four market performance dimensions can be influenced by employee attitudes and behaviours that reduce dysfunctional behaviours and increases behaviours compliant with organisational strategies [31]. Higher employee satisfaction and identification with enterprise is above all important in high contact service environments where higher customer satisfaction can lead to higher market and financial performance [37, 38].

In the sense of Narver and Slater's [34] and Kohli and Jaworsky's [29] concepts, employee oriented enterprise culture can be operationalized as a company's orientation towards: employees (costumers in internal markets), competitors (in the employee market), and as the interfunctional coordination in the internal market. The measurement of these three dimensions shows the presence of the employee oriented enterprise culture. Each of these elements contain: internal market intelligence generation (e.g., the conditions of external employee market and the identification of value exchange), internal market intelligence dissemination (between employees and management) and internal market responsiveness (e.g., actions for delivering employee value).

In internal markets, managers should also concentrate on satisfying the needs and wants of their employees; such internal orientation is one of the pillars for the development of an external oriented enterprise culture. The increased levels of customer oriented enterprise culture and increase the level of symmetry of both types of market cultures consequently results in better strategic response and performance of companies [37]. Internal and external oriented enterprise cultures could be assumed as being among the key organizational resources in creating sustainable competitive advantage [47].

Hence we propose the following hypothesis:

H1: Internal oriented enterprise culture positively impacts external oriented enterprise culture.

The customer oriented culture of an enterprise should enhance customer-perceived quality by helping to create and maintain superior customer value. Enterprises with strong customer orientation possess the basis for rapid adaptation to customers' manifest and latent needs, which may translate into superior new product success, market share and profitability [2, 34, 36]. The customer oriented enterprise culture has been proposed as a key differentiating resource and a key predictor of enterprise performance [1, 32].

Evidently, customers are the primary focus of an external oriented enterprise culture. Such enterprises not only discover customer needs, but also anticipate the future needs as well, and even more importantly, they involve individual departments across the company in acting to meet those needs. Also, external oriented enterprise culture includes behaviours for delivering superior value to customers. Therefore, external oriented enterprise culture is positively related to superior customer value. Kohli and Jaworsky [29] have already proved this proposition. According to Slater and Narver [33], such orientation can also play an important role in growing and fragmented markets since it enhances market share and sales volume, even when buying power is low.

Accordingly, we hypothesize:

H2: External oriented enterprise culture positively impacts customer loyalty.

H3: External oriented enterprise culture positively impacts market share and sales volume.

According to Reichheld [39], when a company is consistently able to offer better value and achieve customer loyalty, market share and sales volume increase, while costs for attracting and serving customers decrease. Superior judgmental performance (e.g., corporate and brand image and reputation, customer satisfaction, and customer loyalty) is a prerequisite for superior objective performance (e.g., market share, sales volume, and profitability). To maximize its long-run performance, the business must build and maintain a long-term mutually beneficial relationship with its buyers [33].

Thus:

H4: Customer loyalty positively impacts market share and sales volume.

Since the cost of obtaining a new customer is very high and the profitability of a loyal customer grows with the relationship's duration, loyalty is one of the keys to long-term profitability [39]. Companies with large groups of loyal customers have large market shares, and market share is positively associated with higher rates of return on investment [40]. Market share leads to profitability due to economies of scale and experience effects. Profit impact of market strategy (PIMS) studies [12] identified product/service quality and market share as the most important factors that influence the percentage of return on sales. Others have also shown market performance to have positive effects on financial performance (e.g., [41]).

Therefore, we propose:

H5: Customer loyalty positively impacts financial performance.

3 Methodology

The measurement instrument for the empirical model verification was developed in three phases. In the first phase, some of the relevant items for the questionnaire were taken from the relevant literature. For the measurement of internal oriented enterprise culture we used some of the items from Gounaris [20] and Lings [30]. External oriented enterprise culture was measured using fourteen items from Narver and Slater's [33] 7-pt. Likert rating scale. Since previous studies indicated that there were some problems with construct validity considering [33] scale, some additional items were added in order to ensure higher consistency of the measure. In the second phase, in-depth interviews were conducted with senior marketing executives in 17 organizations in Slovenia. In the third phase, the questionnaire was examined by 5 expert judges (4 in the field of marketing and marketing resources and 1 in the field of finance) in terms of content validity and in order to avoid redundancy in the questions. In the final study, the items for internal oriented enterprise culture and external oriented enterprise culture were measured on the 7 point Likert scale (from 1 "strongly disagree" to 7 "strongly agree"). 12 items were used for measurement of internal oriented enterprise culture, and the scale for external oriented enterprise culture consisted of 17 items. An additional 7 items were generated for the measurement of market and financial performance. The respondents were asked to evaluate their market and financial performance on a 7 point scale from "much worse" to "much better" in comparison with their key competitors in the period of the past 3 years.

In every company, we identified a single respondent in the position of CEO or member of the management board responsible for marketing, or the marketing director. Key respondents were used, as senior managers have been shown to be generally reliable in their evaluations of company activities and performance (e.g., [46]). The questionnaire was mailed to the 2500 randomly selected companies selected from the population of 3475 companies in Slovenia. In total, 372 usable questionnaires were received, representing a response rate of 13.8%. The responding companies came from a variety of industries (manufacturing 40.8%, construction 13.2%, wholesale and retail 11.0%, real estate 10.0%, transportation 5.1%, the catering industry 4,9%, and other industries 14.7%).

4 Assessment of Construct Reliability and Validity

In the first phase, the dimensionality of the single constructs (external oriented enterprise culture, internal oriented enterprise culture, customer loyalty, market share/sales volume, and financial performance) was assessed. Confirmatory factor analyses (CFA) were performed for each of the scales in order to compare onefactor model and multi-factor model for single constructs. In the first case, the constructs were conceptualized as uni-dimensional and in the second case as multi-dimensional constructs. Statistics in Table 1 show that internal oriented enterprise culture and external oriented enterprise culture constructs were indeed multi-dimensional constructs, since in both cases multi-dimensional models outperformed the one-factor models. To assess the convergent and discriminant validity and the reliability of the customer loyalty, market share/sales volume and financial performance, which consisted of only two (three) indicators, an additional CFA was implemented combining those three constructs.

Table 1	
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Summary statistics of CFA for internal oriented enterprise culture, external oriented enterprise culture, market, and financial performance

	Internal oriented enterprise culture	External oriented enterprise culture	Market and financial performance CFA
One-factor	1 factor	1 factor	3 factors
model	$\chi^2/df = 283.83 / 20$	$\chi^2/df = 373.05 / 44$	$\chi^2/df = 23.75 / 11$
	p < .05	p <0.05	p = .013
	RMSEA = .160	RMSEA = .142	RMSEA = .055
	NFI = .828	NFI = .737	NFI = .982
	NNFI = .782	NNFI = .695	NNFI = .977
	GFI = .795	GFI = .806	GFI = .976
Multi-factor	3 factors*	3 factors**	
model	$\chi^2/df = 19.99 / 17$	$\chi^2/df = 32.76 / 24$	
	p = .274	p = .109	
	RMSEA = .002	RMSEA = .031	
	NFI = .985	NFI = .966	
	NNFI = .989	NNFI = .978	
	GFI = .981	GFI = .977	

* Internal oriented enterprise culture – employees orientation, competitors (on the employee market) orientation, and interfunctional coordination ** External oriented enterprise culture - customer orientation, competitor orientation, and

interfunctional coordination

Reliabilities for internal oriented enterprise culture (3 constructs), external oriented enterprise culture (3 constructs), customer satisfaction, market share/sales volume and financial performance were assessed with composite reliability measures. The reliability coefficient exceeded the value of .6, as suggested by Fornell and Larcker [17]. Next, in order to show the degree to which a measure represents the construct it is supposed to represent, construct validity of single scales was assessed by examining convergent and discriminant validity. Evidence of *convergent validity* was determined by inspection of the variance extracted for each factor as shown and was established, since all the variance extracted value exceeded .50 for a factor. Additionally, all items of the single measures loaded significantly on their underlying factors (all loadings were higher than .50 with significant t values) and that indeed itself is a test of the convergent validity of the scale (see Table 2).

		Loadings (λ coefficients)	CR	AVE
External oriented	Customer orientation	.716	.74	.48
enterprise culture*	Interfunctional coordination	.666		
	Competitor orientation	.699		
Internal oriented	Employee orientation	.821	.79	.56
enterprise culture*	Competitor orientation (on the employee market)	.608		
	Interfunctional coordination	.800		
Financial performance	Overall profit levels achieved compared to competitors (EBIT)	.883	.91	.77
	Return on investment compared to competitors (ROI)	.897		
	Profit margins compared to competitors	.854		
Market share/sales volume	Market share compared to competitors.	.947	.86	.76
	Sales volume achieved compared to competitors.	.786		
Customer loyalty	Levels of customer loyalty compared to competitors	.884	.88	.79
	Levels of customer satisfaction compared to competitors	.892		
$\chi^2 = 116.68$ / df = 55; RMSEA=.055; NFI = .948; NNFI = .954; GFI = .945				

Table 2 Measurement model (items, standardized loadings, CR and AVE)

* Items for measurement of external and internal oriented enterprise culture are presented in the appendix 1.

Discriminant validity was also assessed for the scales with more than 1 construct (external oriented enterprise culture and internal oriented enterprise culture). Several CFA's were run for each possible pair of constructs, first allowing for correlation between the two various constructs and then fixing the correlation between the constructs at 1. In every case, the chi square differences between the fixed and free solutions were significant at p<.05 or higher. Additionally discriminant validity was assessed by Fornell and Larcker [17] in which the pairwise squared correlations between factors were compared with the variance extracted estimates for the dimensions making up each possible pair. In every case the Fornell-Larcker criteria was met, which means that the variance extracted estimates exceeded the square of the correlation between the factors making up each pair.

In the second stage of the research, the proposed conceptual model was tested with structural equation modelling. To obtain a more favourable number of parameters to be estimated, we conducted an additional simplification of our nine-factor model to a final five-factor model. For each of the first order factor models, with more than two underlying factors (internal oriented enterprise culture and external oriented enterprise culture), second order factor models were computed. This was achieved by averaging the corresponding indicators leading to a single composite indicator. The final results of this stage are external oriented enterprise culture and internal oriented enterprise culture latent variables with three indicators. Other constructs constituting market and financial performance were unchanged. Reliability and validity were once assessed for both simplified constructs. The composite reliabilities computed for newly generated latent variable external oriented enterprise culture. All loadings had reached the value of .66 or higher. For all the constructs, a discriminant analysis was performed. Pairs of constructs involving all possible combinations were assessed in a series of two-factor CFA.

Each model was run twice, once constraining the phi (ϕ) coefficient to unity and once freeing this parameter. A chi-square difference test was then performed on the nested models to assess if the χ^2 values were significantly lower for the unconstrained models [50]. The critical value (at p<.05) was exceeded in every case.

5 Results

With respect to the overall model fit, the chi-square statistic indicates some discrepancies between the data and the proposed model (χ^2 =121.39 / df = 59; p < .05). A significant chi-square indicates a non-perfect fit of the model to the data. Although the analysis of a covariance structure has traditionally relied on a chi-square likelihood ratio test to assess how well a model fits, it is very sensitive to the sample size, number of items and number of factors in the model [10]. Another possible explanation for the discrepancy can be the use of composite indicators, which typically worsens model fit [26]. However, other global fit statistics suggest an adequate fit of the model. The RMSEA index of the model was .053, which is in fact close to the range for a good fit, but still suggests a reasonable fit. Also the majority of other incremental and stand-alone fit indices (Table 3) suggest that the global model fit is acceptable.

Table 3 provides the regression coefficients of estimated effects within the causal model, regarding the selected hypotheses. Hypotheses H1 predicted positive relationship between internal and external oriented enterprise culture. Concerning the strength of relationship (γ_1 =.731; p<.01) it can be fully confirmed. The relationships between external oriented enterprise culture and customer loyalty and external oriented enterprise culture and market share / sales volume are both positive and significant (γ_2 =.266; p<.01 and γ_3 =.298; p<.01). Therefore, we can confirm the second and third hypotheses. Also the relationships between market and financial performance are positive. According to H4 and H5, customer loyalty not only influences financial performance (β_1 =.467; p<.01) directly, but also

indirectly through market share / sales volume (γ_4 =.533; p<.01). Finally we can confirm H6 as market share/sales volume also impacts financial performance (β_2 =.349; p<.01).

Relationships	Standardized regression coefficient	t-values	Significance
H1: Internal oriented enterprise culture – External oriented enterprise culture	γ ₁ =.731	9.041	p<.01
H2: External oriented enterprise culture – Customer loyalty	γ ₂ =.266	4.347	p≤.01
H3: External oriented enterprise culture – Market share/sales volume	γ ₃ =.298	5.709	p<.01
H4: Customer loyalty - Market share/sales volume	γ ₄ =.533	7.529	p≤.01
H5: Customer loyalty – Financial performance	β ₁ =.467	6.101	p≤.01
H6: Market share/sales volume - Financial performance	β ₂ =.349	4.730	p≤.01
$\chi^2 = 121.39 / df = 59$; RMSEA=.053; NFI =	.947; NNFI = .95	58; GFI = .9	43

Tab	le 3
Estimated effects within	in the structural model

Discussion and Conclusions

In the management literature there is limited empirical evidence as to how internal and external oriented enterprise culture impacts market (customer satisfaction, customer loyalty, market share and sales volume) and financial performance. The present research gives clear empirical insight into the importance of both cultures as prerequisites of market and financial performance.

The results of the study reveal strong the positive impact of internal oriented enterprise culture on external oriented enterprise culture. This is the case despite the fact that the majority of the companies in our sample were from B2B markets, and from industries other than services. This insight shows the importance of internally oriented enterprise culture, also in contexts where employees do not have a direct contact with customers. The relationships between external oriented enterprise culture and customer loyalty and external oriented enterprise culture and market share / sales volume are also positive. This also holds true for the relationship between market and financial performance.

The research presented in this study show that for an enterprise's long term success, the owners and managers of the enterprises must consider enterprise culture (one of the important constitutional elements of business ethics) as one of the enterprise's key success factors (as thought and perceived by MER Model of Integral Management). To achieve enterprise success, the owners with their managers must assure such conditions (internally as well as externally) which

would foster the enterprise growth and development, its effectiveness and efficiency. On the other hand, the conditions fostering enterprise's effectiveness and efficiency should consider the enterprise's success based on the principles of enterprise culture.

This study is subject to several limitations, however our observations confirm the theoretical argument that an enterprise's long term success can be ensured only by practicing the external (effectiveness) as well as internal (efficiency) oriented culture of the enterprise. Therefore, further research should be done to explore indepth the impact of both orientations (external and internal) on the enterprises' performance. In addition, research should also explore the impact of the socially responsible behaviour (in relation to external and internal oriented culture) of the enterprises on their performance. Also, additional control variables such as buyer and supplier power, seller concentration, ease of entry, market growth, technological change, differentiation of companies according to type of customers (B2B, B2C), and differentiation according to type of product (physical, services) should be considered in further research. Additionally, we propose that in future studies more objective data from multiple respondent sources should be obtained.

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Appendix 1

External and internal oriented enterprise culture sub-constructs itemsand their standardized loadings, CR and AVE

Sub-construct	Items	Loading s	C R	AVE
Customer orientation	We monitor our level of commitment and orientation to serving customers' needs.	.827	.77	.53
Interfunctional coordination	We give close attention to after-sales service.	.560		
	Our business strategies are driven by our beliefs about how we can create greater value for customers.	.765		
Customer orientation Interfunctional	Our salespeople share information within our business concerning competitors' strategies.	.843	0.7 8	.55
coordination	All of our business functions are integrated in development of business strategies.	.751		
	We communicate information about customer experiences across all business functions.	.608		
Customer	We respond to competitive actions.	.742	.79	.56
prientation	The top management team regularly discusses competitors' strengths and strategies.	.778		
	We regularly monitor competitor activities.	.721		
$\chi^2/df = 40.88/23;$ RMR = .031; GFI	p = .0172; RMSEA = .039; NFI = .966; NI = .956	NFI = .973;	CFI =	= .982;
Employee orientation	We frequently monitor employee satisfaction.	.888	.90	.74
Competitor	All employees are highly respected.	.799		
orientation (on the employee market)	We give close attention to loyalty of employees.	.894		
Employee orientation	We are analyzing the working conditions of employees working in competition.	.707	.81	.59
Competitor orientation (on	We are aware of employment rates in our industry.	.820		
the employee market)	We are informed about the runaway possibilities of our employees.	.764		
Employee orientation	We appreciate collaboration between employees from different business function (e.g. marketing, R&D, etc.)	.884	.89	.80
	We communicate information about employees across all business functions.	.904		
$\sqrt{2}/df = 17.45/17$	n = 4247; RMSEA = 008; NEI = 088; NN	IEI = 0.003	CEI -	- 006.

 χ^2/df = 17.45/17; p = .4247; RMSEA = .008; NFI = .988; NNFI = 0.993; CFI = .996; RMR = .023; GFI = .986

Serbian Small and Medium-sized Enterprises in Times of Crisis

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Abstract: Over the previous decade SMEs have become an important agent in the Serbian economy. Although they have made encouraging development achievements, due to a belated transition process, SMEs in Serbia are well behind other transition economies and the EU, especially with respect to efficiency. During the global economic crisis, small and medium-sized enterprises have suffered as much as other companies have. In 2010, micro and small enterprises started to recover by moving their activities to less risky businesses while medium-sized enterprises fell in number and saw declining employment as they were less adaptive to new, tougher circumstances. This affected the intensity of the recovery of the entire SME sector. It is also important to note that in 2010 and 2011 for the first time in the transition period the number of shops closed was larger than the number of shops established. After the initial signs of economic recovery were registered in mid-2010, since the second half of 2011 there has been widespread fear of the so-called W effect, e.g. the recurrence of recession (induced by the recession in the EU). The SMEs are critically important for economic recovery. In the future, the SME support policy should be focused on: a) the enhancement of competitiveness, and b) innovation development. Only with more efficient small and medium-sized enterprises will the Serbian economy have better prospects in the global market.

Keywords: recession; support policy; innovation; competitiveness

Introduction

Over the past ten years, Serbia has undertaken a number of market reforms, owing to which small and medium-sized enterprises have become a significant economic factor. Their share in total GDP, overall employment, and import and export has increased considerably. This is a result of improved economic environment, as well as a more advanced legal and institutional framework for doing business. In addition, the government introduced measures to support the development of the SME sector.

These achievements look impressive if we cast our mind to the 1990s and the level of SME development we had back then. Still, Serbian small and medium-sized enterprises are well behind other transition economies and, particularly, the EU member states. The SMEs' share in total GDP, employment, export, and import is similar to that of other countries in the region. However, should we compare different economic ratios per employee, we will conclude that Serbian SME are less efficient and, consequently, less competitive on the global market.

In the last decade SME support measures have been mainly of the quantitative kind – the underlying objective was to achieve a rising number of newly opened companies each year and, ultimately, to have a critical mass of SMEs. An ever larger number of companies helps boost employment and absorbs a surplus of workers who have been made redundant in companies during restructuring. Since 2005 overall employment has been rising steadily.

The global economic crisis started to adversely affect the Serbian economy from the end of 2008. All the companies suffered, and small and medium-sized ones were no exception whatsoever. During the time of crisis, the number of newly opened companies decreased, while the number of closed ones rose in the meantime. In 2010, micro and small companies started to recover, while medium companies still faced problems. They are less adaptable by their nature and to a great extent impact on overall intensity of SME recovery. Shops faced the most difficult problems, and their net demographic effect was negative in 2010 and 2011. From mid-2010 onward there had been signs of humble economic recovery, but it seems that from the third quarter of 2011 recession is back.

For a steady recovery and self-sustained economic development SMEs are of critical importance. Having in mind their low competitiveness abroad, in the future the SME support policy should be focused on: a) competitive strengthening, and b) innovation development. Some early steps in this direction have been made but it requires a long-term approach and the engagement of considerable human and financial resources in order to achieve success.

The aim of the paper is threefold: a) to shed light on problems that SMEs face in times of crisis, b) to assess the competitive level of Serbian SMEs, and c) to take stock of innovative strength and potentials and deliver reasonable policy advice.

1 SMEs are Pivotal Economic Agents but They Suffer

In the period 2000-2010 Serbia underwent transition and a number of marketoriented reforms were realized. Now, one could say that the first stage of transition is over. The legal framework for doing business is mainly in line with the EU requirements as the daunting task of legal harmonization is near to its end. The institutional infrastructure has been developed on the basis of the EU's White Book. The economy is well restructured (transformed) and so is GDP formation. On the company level, the majority of social-owned companies have been privatized and restructured. However, public (state-owned) companies are only at the beginning of their restructuring process, as few of them have been privatized or, at least, have embarked on restructuring.

Rapid GDP growth in the transition period, and a more stable and favorable business environment than before made room for small and medium-sized enterprises and entrepreneurship (SMEE) to develop. Proactive policies designed to help SMEs grow at a pace faster than the average helped create favorable business conditions. Policies conducive to the development of SMEs and entrepreneurship arose from several lines of activity, namely: 1) Institutions in charge of SME and entrepreneurship support have been created on the republic, regional, and local levels; 2) the Legal environment (laws and other regulations), through harmonization with the EU legal framework, has become more businessfriendly than before; 3) the Government introduced a number of tax, customs, and investment incentives for SMEs in particular; 4) Government and nongovernmental institutions introduced financial incentives for SMEs and entrepreneurs, while considerable support came from international financial institutions. As a result, an increasing number of small and medium-sized enterprises and shops were established year in, year out. Total employment started to increase in 2005. SMEs absorbed a number of unemployed people who had to leave their companies as a consequence of restructuring. One can argue that the first phase of SME development in Serbia is over. In this period the goal was a quantitative one - to establish a sufficient number of SMEs within economy, and it was fulfilled

Shining achievements resulted from an altered and a more favorable business environment and support policy measures that stimulate rapid SME growth. SMEs have become an important economic agent. In 2008, the year before the global economic crisis broke out, SMEs accounted for 59.1% of total GDP and 67.2% of total employment. At the same time, SMEs accounted for 66.6% of total turnover, 59.1% of total value added in the non–financial sector, and 58.7% of overall profit [1].

The first signs of the global economic crisis emerged in mid-2007 as the US real estate market collapsed. The peak was in September 2008 when one of the oldest investment banks, Lehman Brothers, went bankrupt. Banks stopped lending money to each other and a formidable liquidity problem occurred. The crisis

became global as banks in every corner of the world were involved in speculations with US securities based on (dubious) mortgage credit lines. The crisis produced its first negative effect on the Serbian economy in May 2007 when international players withdrew from the Belgrade Stock Exchange, which made prices of different securities drop by 30% on average, just like in other financial markets in the region.

Furthermore, the world economic crisis has caused severe problems in the financial sector of the Serbian economy and non-financial companies as of the last quarter of 2008. Foreign direct investments shrunk and capital outflow started, foreign demand decreased considerably, household savings deposits in banks (FX deposits mainly) decreased by 1 billion euros in just a few months¹, credit conditions worsened dramatically², and liquidity problems were exacerbated as it became extremely difficult to collect claims, especially from the Government and public companies.

One has to bear in mind that the global economic crisis did not really cause economic problems in Serbia but rather aggravated the existing situation. To be more precise, over the last decade a neo-liberal concept was prevalent, producing negative effects for overall development. Rapid economic growth (a 5.4% GDP growth on average in 2001-2008)³ rested mainly on expansive public and personal consumption⁴. A high share of public consumption in GDP⁵ was a signal that public services (ranging from government to pension services) had not been restructured. Restructuring in public companies did not start at all. Macroeconomic policies were poorly coordinated: the fiscal policy was expansionary but the monetary policy had to be very restrictive so that macroeconomic stability could be safeguarded. Therefore the GDP increase was below the optimal (lower than potentially feasible). All in all, development before the crisis was in fact unsustainable in the medium-term and the external crisis only exacerbated domestic economic problems.

When the world economic crisis hit the Serbian economy, the government and the central bank were reluctant to react and, consequently, belated with their response. Measures they introduced were too weak to prevent recession. Generally speaking, Serbian banks were in a better shape than banks throughout the region when the

¹ Data released by the National Bank of Serbia (NBS)

² Because of an increase in country risk (to 2% p.a.) and an increase in the key policy rate of the National Bank of Serbia (interest rate on governmental bonds of up to 17.5% p.a.).

³ Statistical Office of the RS.

⁴ Free formation of wages resulted in their high increase of over 10% per year in real terms. *Source*: Ministry of Finance of the RS.

⁵ During the period 2001-2008 the share of public consumption in GDP was 45-50% and an increase in indirect tax duties was 9.8% p.a. *Source*: Ministry of Finance of the RS.

crisis struck⁶. At first, the National Bank of Serbia introduced measures to improve liquidity (it lowered the compulsory reserves obligation). In order to prevent the outflow of FX deposits from banks, the amount guaranteed by the state (insured)⁷ was raised from 3 thousand euros to 50 thousand euros per deposit. An agreement between the NBS and foreign banks operating on the Serbian market⁸ was brokered (the so-called Wiener agreement). By agreement, banks accepted an obligation to stabilize the level of credit to their clients, whether companies or citizens and not put it down. Unlike other central banks, which put down the interest rate to a level close to zero in order to avert recession, the NBS raised the key policy rate instead so as to prevent inflation expectations (and that to 17.5% p.a.).

The government introduced (weak) encouraging measures in an attempt to prevent recession. Tax duties on savings deposits were temporarily abolished in order to preserve domestic savings. Tax duties linked with securities transfer were also abolished with the view to sustaining the volume of transfers on the Belgrade Stock Exchange. In order to curb recession, the government extended support for different credit lines by subsidizing interest for: 1) *Companies with liquidity problems* (0.8 billion \in); 2) *Investment companies* (0.17 billion \in), and 3) *Citizens* - for consumption and mortgage credits (0.2 billion \in)⁹.

The government and NBS measures mainly pursued the right direction, but they were weak and undertaken with delay. It was clear that the impact of the global economic crisis was stronger than anticipated. The government acknowledged that recovery was impossible without the IMF's support. A stand–by arrangement with the IMF covered the period March 2009-April 2011 and it involved the financial support of 4 billion dollars; its aim was to strengthen the FX reserves of the NBS and to prevent deterioration in the FX ratio of domestic currency. USD 2.1 billion of this support was withdrawn. At the same time the arrangement underscored the need to continue market reforms and public service reforms, as well as to cut down on public spending and secure macroeconomic stability in the medium term.

The national economy suffered a lot in 2009. GDP dropped by 2.8%, industrial production by 13%, trade by 12%, and traffic volume by 15%. The export volume decreased by 26% because of a weaker foreign demand, while the import volume dropped even more, by $35\%^{10}$. SMEs and entrepreneurs were not immune and their development slowdown was immense. There were a lot of detrimental factors but the most influential seemed to be the following: 1) *Fewer opportunities* for

⁶ They were overcapitalized (capital adequacy was 28%), partially due to the higher capital adequacy ratio requirement in Serbia (12%). *Source*: NBS

⁷ According to the law Foreign Currency (FX) deposits in Serbia are secured within the Deposit Insurance Agency of the Republic of Serbia.

⁸ Approximately 75% of total bank assets in Serbia belong to foreign banks. *Source*: NBS

⁹ Source: NBS

¹⁰ Data released by the Republic Statistical Office

entrepreneurs than before on the domestic and foreign markets, as usually happens during the downturn of the economic cycle; 2) *Stronger fear* on the part of entrepreneurs who wanted to start a business or develop it because conditions were unstable and domestic and foreign demand was weak; 3) *Unfavorable financial conditions*, a lower credit volume available, and more demanding crediting requirements; 4) *Falling demand* on the domestic and external markets, both on the part of companies and citizens; 5) *Rising competition* among entrepreneurs as well as between SMEs and large companies as all economic entities strove to survive, and 6) *Lower liquidity* and more difficult debt collection.

The development of Serbian SMEE slowed down measurably after the period 2004-2008, the time when the sector became an important factor in market reforms and revitalization [1]. As a consequence of the economic crisis and worsened business environment, since 2008 the number of opened companies and shops has been in decline and the number of economic entities that terminate their operations has been on the rise.



Table 1 Business Demography

Source: Serbian Business Registers Agency, Republic Development Bureau

In the course of 2009, 10,014 new enterprises and 39,365 new shops were established (11% and 9.2%, respectively, less than the year before), while 3,597 companies and 36,441 shops were closed (17.2% and 5.4% more than the year before). In 2010 the net effect of the so-called business demography worsened further. The tendency of a decreasing number of newly established companies, on one hand, and an increasing number of closed ones, on the other, gathered momentum. As a result of further deterioration of business conditions, in 2012, 9,469 companies were established (5.4% less than the year before) and 9,340 were closed (as much as 169.7% more than in 2009). At the same time 35,036 new shops were established (11% less than the year before) and 37,168 were closed

(2% more than the year before). The net effect relating to companies (the number of established vs. the number of closed) worsened year in, year out and in 2010 it stood at 1:1 (1:2.8 in 2009). The net effect for shops was even worse - at 1:0.9, which means that for the first time there were more shops closed in Serbia than ones opened. One of the most influential reasons for closing the shops, in addition to worsening business conditions, was the development of market chains in Serbia.

In the period January-September 2011, 6,359 new SME were established (14.7% less than in the same period in 2010) and 10,738 enterprises were closed (101.9% more). At the same time 23,833 new shops were set up (13.3% less than in the first nine months of 2010) and 25,919 were closed (3.9% less). The ratio between the number of opened and the number of closed companies (net effect) equalled 0.6:1 and it was much less favorable then in the same period of 2010 (1.4:1). The net effect regarding the opening of new shops was 0.9:1, approximately similar to the level of the previous year of 1:1. Undoubtedly, data still suggest that conditions for doing business are difficult, especially for the start-ups. Such a state of affairs can partially be attributed to a slow reaction of entrepreneurs to the deterioration in business climate. New, stronger concerns about the economic recovery reveal there is not much room for optimism.

The economic crisis led to a setback in development and a drop in competitiveness of the SME sector. Major business indicators are less favorable than before – there is a drop in turnover, GDP, and profit. Qualitative business indicators suggest that the problem is serious. Recession effects limited entrepreneurial activities and chances of entrepreneurs and small economic subjects to transform economic downturn into recovery and growth. A decline in domestic and foreign demand and investments, higher risk and investments costs, as well as the fear of failure led to a decrease in the number of new entrepreneurs and, consequently, less job creation. The GEM research [2] into different aspects of entrepreneurial activities in 2009 highlighted negative effects of the crisis on the entrepreneurial climate in Serbia. The number of start-ups and new enterprises had been in decline, thus posing significant limitations to job creation opportunities. By comparing tendencies in selected countries in the period prior to the crisis with the period 2008-2009, one can conclude that more than a half of entrepreneurs within the region believe it is more difficult to start doing business now. They also believe that it is easier to achieve growth of a business in place than to start a new one. Their expectations as regards employment rise are very modest and so is their penetration of foreign markets.

There were some signs of economic recovery worldwide around mid-2009 but economic experts were afraid of the so-called W effect.¹¹ Economic recovery in Serbia started in mid-2010. Industrial output in 2010 was 3% higher than in 2009.

¹¹ The so-called W effect means that the economic situation is still fragile and that after growth the return of recession is possible.

	Comp.	Micro	Small	Medium	SMEE	Large	Total
2009							
No of companies	226,241	76,243	9,873	2,470	314,827	529	315,356
No of employees	259,383	153,074	200,954	259,129	872,540	435,751	1,308,291
Turnover (RSD m)	924,491	935,282	1,229,336	1,291,436	4,380,545	2,078,312	6,458,857
GVA (RSD m)	193,688	119,187	212,145	253,088	778,108	584,771	1,362,879
Export (RSD m)	6,037	60,090	68,647	140,603	275,378	270,437	545,814
No of exporters	1,955	6,166	3,131	1,175	12,427	333	12,760
Import (RSD m)	6,450	155,321	217,929	247,447	627,147	402,030	1,029,177
No of importers	2,556	12,040	4,252	1,452	20,300	398	20,698
Investments (RSD m)	50,231	40,374	100,095	69,096	259,796	234,170	493,966
2010							
No of companies	228,680	77,989	9,614	2,257	318,540	504	319,044
No of employees	232,176	153,264	194,450	234,695	814,585	412,966	1,227,551
Turnover (RSD m)	805,140	1,074,186	1,396,636	1,401,972	4,677,933	2,482,401	7,160,334
GVA (RSD m)	185,300	136,832	234,073	261,213	817,417	645,309	1,462,726
Export (RSD m)	6,534	83,040	95,023	155,248	339,845	393,232	733,077
No of exporters	1,822	6,366	3,116	1,102	12,406	321	12,727
Import (RSD m)	6,531	163,930	247,223	262,865	680,549	573,291	1,253,840
No of importers	2,230	11,922	4,163	1,379	19,694	396	20,090

Table 2 Rise/fall of business indicators 2009-2010

Source: Statistical Office of the RS, processed by the Republic Development Bureau

Retail trade had been increasing since July 2010. GDP rose 1% in all 2010¹³. The first projection of GDP in 2011 suggested an increase of 3%. However, from mid-2011 this projection has been corrected to a modest increase of 1%¹⁴, mainly due to an imminent new tide of recession in the EU and rising inflation in Serbia. These projections will surely send a negative signal to domestic entrepreneurs. In all likelihood one can expect only the continuation of negative tendencies in business demography.

2 The Competitiveness Level of Serbian SMEs

From mid-2010 to mid-2011 there were signs of a moderate economic recovery in Serbia in the form of GDP growth, increasing industrial production, and more voluminous trade. SMEE had an important role in setting the path to economic recovery. Over the last decade measures of support for SMEE development have

¹³ Statistical Office of the Republic of Serbia

¹⁴ The NBS projection, while the WB projection is still slightly higher (a 1.5% GDP increase)

been taken in order to create a critical mass of new small and medium-sized enterprises and shops that will form the basis for self-sustained economic growth and development in the future. This goal was successfully achieved. If we compare the scores of SMEE with the EU average, we will see their share in GDP formation, employment, and value added is at an average level. However, if we take a look at efficiency of these newly established companies and shops and compare it to the EU average, we will be able to see they lag a lot both in efficiency and with respect to different economic ratios per employee. Consequently, Serbian economy cannot be competitive on the global market, and an increasing trade deficit over the last decade proves this fact. In order to see the efficiency of SMEE improve, a set of support measures must be transformed into a qualitative one. The ultimate objective is to make companies more competitive abroad and to reduce the trade deficit as much as possible.

Via achieving dynamic transition development, the entrepreneurship sector significantly contributed to national economic growth in the previous decade. It is estimated that in 2010 the SME sector had a share of 33% in GDP formation, 43.4% in total employment, 43.9% in total investments, 44.5% in total exports, and 52.3% in total imports [3]. *The Serbian SME sector, just like other economic entities, is not competitive on foreign markets when it comes to investment activity, production expenses, and export characteristics.*

Investment activities of SMEE in Serbia diminished during the crisis. The recession caused lower values in companies' production but it did not bring down their liabilities, which resulted in rarer investment tendencies. Under changed and exacerbated business conditions (hereby we primarily refer to limited and expensive sources of financing) an underdeveloped SME sector in Serbia has not managed to lift the level of mobility, to foster development of internal potentials, and thus to prevent a fall in the level of competitiveness. The SME's share in total investment of the non-financial sector was 50.4% in 2008 while the share of investment in GVA dropped from 40% in 2007 to 27% in 2008. Investments in the non-financial sectors in 2008 with the value of 449.7 billion RSD or, on average, 1.5 million RSD per company accounted for 65.9% of total investments and they were 8.6% lower than in 2007. The SME sector accounted for 33.2% of total investments within economy and 50.4% of the non-financial sector (58.7% in 2007). Almost 43% of the value was created in medium-sized companies. By the GVA/investments ratio, the SME sector is well below the non-financial sector average (27% to 32%). The crisis hit micro businesses most and their investments in 2008 equaled only 9% of GVA (29% in 2007); only medium-sized enterprises were above the average (36%) [3].

Total investments were higher in 2009 compared to the level of investments in 2006. Investments rose by 5.5% per year on average in real terms in the period of reference. It is important to note that investments of entrepreneurs declined heavily in crisis years. Recession negatively affected medium-sized enterprises most as their investments dropped by 33% in real terms compared to the year before.

In 2009, the last year for which investment data are available, investment performance in the SME sector deteriorated further in keeping with the worsening business environment and more adverse conditions for crediting. Investments per employee and investments per company dropped to 3,400 per employee and 8,700 per company in line with overall drop. At the same time the ratio between investments and GVA was slightly higher than the year before (0.32 SME and 0.41 overall), probably in line with a steeper fall in GVA [4].

The comparative analysis of investments per employee and per company in neighboring countries and EU–27 suggests these indicators are markedly lower, both relating to Serbia's SME and the national economy [4]. These ratios for Serbia are similar to those of Bulgaria and Hungary but far worse in comparison to Romania, Slovenia, and the EU average.

		Investm empl (00	ents per oyee 0 €)	Investme company	ents per (000 €)	Investments and GVA		
		SME	Total	SME	Total	SME	Total	
EU-27	2007	7.4	8.5	31.7	54.4	0.19	0.19	
	2008	7.7	8.8	33.4	56.7	0.19	0.19	
Bulgaria	2007	4.2	4.7	23.0	35.5	0.69	0.56	
	2008	4.4	4.8	24.2	35.7	0.81	0.65	
Hungary	2007	5.6	6.6	17.5	29.2	0.39	0.34	
	2008	4.4	5.4	14.6	25.1	0.31	0.27	
Slovenia	2007	8.3	10.0	35.0	63.8	0.32	0.34	
	2008	9.4	10.8	39.3	67.1	0.36	0.36	
Romania	2007	6.5	9.3	39.2	90.9	0.62	0.70	
	2008	9.9	12.9	59.2	121.1	0.70	0.61	
Serbia	2007	4.1	4.5	12.2	20.7	0.40	0.40	
	2008	3.0	3.9	9.2	18.2	0.27	0.32	
	2009	3.4	5.1	8.7	19.8	0.32	0.41	

 Table 3

 Investments of the non-financial sector in European countries

Source: Eurostat, Republic Development Bureau

The business activities of SMEs in the period prior to the crisis (2004-2008) were marked by positive tendencies in *cost competitiveness*. High growth rates were achieved with GVA (10.9%), as well as with an average value of labor costs (10.4%) and productivity (4.9%). Growth dynamics stopped in 2009 and 2010. In 2010 the total turnover of SMEs increased by 0.3% only, while GVA was 1.4% lower in real terms than the year earlier [4].

In 2010 small and micro companies adapted to worsened business conditions as they shifted to less risky activities. As a result, they recovered moderately and improved their competitiveness. At the same time medium-sized companies faced real problems in 2010 as they could not adapt so easily.

In the entire period of 2006-2010 the average value of labor costs of SMEs increased in real terms, although during the previous two years it had risen moderately (by 0.1% and 0.4%, respectively). It is important to note that the SME's share in total employment is higher than the share in total GVA. In other words, employees in micro and small companies create lower GVA in comparison with employees in medium and large companies [4].

Although in 2010, a modest recovery took place and the average value of labor costs decreased, wages in SMEs still account for almost 2/3 of GVA and there is not much room for companies to improve and modernize their business processes, especially under crisis circumstances.

		GVA				Emp	loyment		Productivity			
	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
Non-financial sector	11.4	2.8	-11.3	0.8	0.3	1.1	-6.5	-6.2	11.1	1.7	-5.2	7.4
Large	7.8	0.7	-7.0	3.6	-6.3	-3.9	-5.0	-5.2	14.9	4.8	-2.2	9.3
SMEE	14.1	4.2	-14.3	-1.4	4.1	3.7	-7.2	-6.6	9.7	0.5	-7.7	5.7
Manufacturing industry	8.1	1.5	-16.9	-2.0	-3.4	-1.9	-11.6	-6.9	11.9	3.4	-6.0	5.3
Large	4.9	-1.8	-16.0	-2.5	-10.9	-9.2	-13.1	-9.0	17.8	8.2	-3.3	7.1
SMEE	11.0	4.3	-17.8	-1.6	2.8	3.4	-10.7	-5.6	8.0	0.9	-7.9	4.3

Table 4 Increase in GVA and productivity (%, real terms)

Source: Ministry of Finance, based on data from the Statistical Office of the RS and the Serbian Business Registers Agency

Serbian companies are not *export competitive* on average nor are so the SMEs. The crisis affects most companies that are active in international trade, and that is the reason why the number of exporters and importers fell. Lower domestic demand in 2009 had a much bigger effect on reduced imports (-35%) than on exports (-26% in 2009), which caused an increase in the coverage ratio to 52.8% overall and to 43.4% in the SME sector. In 2010, total export increased by 24% and import by 10%. The SME sector generated 45% of the total exports and 52% of total imports. In 2010 the export value of SMEs increased by 16% in real terms, and the value of imports by 2% [4].

Until 2008, the coverage of imports by exports had constantly been lower than 50%. However, in 2009 the coverage of imports was 53% for the first time. This was induced by the world economic crisis, decreasing domestic demand, and declining prices of primary products (the share of those products in the total Serbian exports was 55%). In 2010, the modest global economic recovery caused an increase in the volume of external trade. Total exports increased more than imports and the coverage of imports by exports improved (to 59%). In the SME sector, however, the import coverage was still below 50% [4].

Serbian exports are dominated by low technology intensive products which had the highest increase in the volume of external trade in 2010. Micro companies had a lower volume in medium–high tech products than the year before. Small companies at the same time saw a lower volume of external trade of high-tech products, by 7.6% in comparison to 2009. Medium-sized companies in 2010 saw an increased volume of external trade of these products. All in all, SMEs in 2010 registered an increase of 14% in the volume of external trade of high-tech products and a drop of 20% in medium-high tech, while there was an increase of 18% with medium-low tech products and a 5% increase in low tech products [4].

		2007	2008	2009	2010
	SMEE	-425,802	-477,311	-351,769	-340,704
External trade	Large	-121,380	-166,339	-131,593	-180,059
balance K5D m	Total	-547,182	-643,651	-483,363	-520,764
a	SMEE	34.8	36.5	43.9	49.9
Coverage of import	Large	70.0	66.1	67.3	68.6
by export 70	Total	48.2	48.2	53.0	58.5
~	SMEE	5.5	5.9	6.3	7.3
Share of export in turnover %	Large	14.4	13.8	13.0	15.8
	Total	8.4	8.5	8.5	10.2
	SMEE	250.1	292.0	315.6	417.2
Export per employee RSD thousand	Large	593.9	706.3	620.6	952.2
KSD thousand	Total	368.6	427.8	417.2	597.2
¥ / ¥	SMEE	719.8	799.7	718.8	835.5
Import per employee RSD thousand	Large	848.4	1,069.0	922.6	1,388.2
KSD thousand	Total	764.1	888.0	786.7	1,021.4

Table 5
Export competitiveness

Source: Ministry of Finance RS

The negative effect of the economic crisis is stronger in medium-sized and large companies with a relatively large share of exports in trade (of 10.9% and 13%, respectively) than in small and micro enterprises that are mainly oriented towards the domestic market. The value of export and import per employee in 2009 in relation to 2008 dropped at the rate of 12.5% and 20.5%, respectively. A real drop in the SME sector was significantly lower than in large enterprises (of -3.4% and - 20.2%, respectively). Higher figures of the revealed comparative advantage index in 2009 were also a result of a faster decrease in imports than in exports. Even though foreign trade of high-tech product shows the fastest growth, Serbian economy still depends on the export of low technology intensive industries [4].

Regarding the *application of ICT*, Serbian SMEs are slightly behind the EU-27 average, and in the use of internet they are significantly below the average. The category of equipment and the use of equipment in business operations shows that Serbian SMEs are close to the EU average and better off in comparison to some EU members (see the table).

	% of any	nnanias	Types of devices and communication systems								
	using computers		Extranet		Intr	anet	Wire L	based AN	Wireless LAN		
	SME	Total	SME	Total	SME	Total	SME	Total	SME	Total	
EU	96	96	20	21	33	33	78	78	36	36	
Bulgaria	89	90	15	15	48	48	59	59	27	27	
Hungary	91	91	14	14	20	20	60	60	28	28	
Romania	82	82	11	12	33	33	64	64	22	22	
Slovenia	97	98	12	13	32	32	84	84	41	41	
Croatia	97	97	16	16	30	30	74	74	42	42	
Serbia	97	98	13	14	57	57	80	80	46	47	

 Table 6

 Use of computers, devices and communication system in business, 2010

Source: Eurostat, the Republic Statistical Office of the RS

Serbia is at the same level as Slovenia and Croatia and better positioned than Romania, Bulgaria, Hungary, and the EU average. In the use of the Internet and types of connections to the Internet, they are well behind the EU average and most countries within the region. In comparison with the EU average and countries within the region, SMEs in Serbia use more WLAN, Wireless LAN and Intranet, while the use of extranet is well behind the EU average, Croatia, Bulgaria, and Hungary, but ahead of Romania and Slovenia. The lag in types of access to the Internet is especially marked in the case of mobile connections.

	% of compa received ord	nies which ers on - line	% of com sent ord	panies which ers on - line	% of companies that use Internet for banking and financial services			
	SME	Total	SME	SME Total		Total		
EU	13	13	26	27	87	87		
Bulgaria	4	4	4	4	68	69		
Hungary	7	8	17	17	88	88		
Romania	6	6	7	7	73	74		
Slovenia	10	10	16	16	96	96		
Croatia	22	22	23	23	89	89		
Serbia	20	20	23	23	80	80		

Table 7 Internet use in business

Source: EUROSTAT, the Statistical Office of the RS

Serbian SMEs most often use the Internet for banking and financial services, while E-business (online buying and selling) is more seldom. SMEs in Serbia use the Internet for financial services more than SMEs in Bulgaria and Romania but less than SMEs in Slovenia, Croatia, Hungary, and the EU average in general.

The data presented above clearly indicate that *the priority of the policy to support SMEE development should be competitiveness strengthening* [5]. Measures should be introduced to enhance companies' abilities to operate more successfully on the global market. This aim will be realized by meeting several targets, namely: 1) On the macroeconomic level - *economic structure development in line with the EU and compatible to the EU structure* – which means the rapid growth of activities with the value added being above the average; 2) on the microeconomic level improvement in the competitive abilities of companies by *closing the discrepancy with the EU average in gross value added per employee*; 3) *More balanced regional development* – taking into account deep regional discrepancies in Serbia, it is necessary to support rapid socio-economic growth of underdeveloped regions.

It is also important to foster and develop linkages between educational and research institutions on the one side, and companies on the other. Programs to improve competitiveness should be focused on: 1) Support for investment in R&D and innovation; 2) Support for companies' internationalization; 3) Drafting the strategy for productivity boost in companies, and 4) Support for cooperation and enforcement of linkages between companies and developing clusters.

3 Innovation Level of SME

The other side of the coin of Serbia's low efficiency on the international market is the low innovation level of companies, underscoring the low level of their development and the poor application of new technologies. This is partially made clear from data on the ICT implementation within Serbian SMEE that constitute the dominant segment of the economy. It is also clear from data on the structure of foreign trade regarding the technological level of products. Should one want to account for such a low technological level, one needs to take into consideration several important factors such as: 1) for decades the socio-economic environment has not been favourable for and conducive to innovation activity as Serbia, being a part of the former Yugoslavia, has developed a specific market-plan mix under which companies are not profit-driven; 2) a neo-liberal development concept prevailed during transition and, consequently, short-term goals and market forces are seen as keys for all economic problems; 3) in times of crisis, SMEE are faced with more limitations than large companies in general, especially when it comes to the process of development and application of new technology.

The European Innovation Scoreboard is an instrument of the EU Commission for monitoring and comparatively analyzing the innovation performance of member and acceding countries. On the basis of their achievements, countries are categorized into four categories: Innovation Leader, Followers, Moderate Innovators, and Catching-up countries. For the first time the Republic of Serbia was included in the 2009 research [6], which is the first important step towards the screening of innovation potential of the country and of the SMEE sector. This is rather important for the formulation of the policy and measures for stimulating innovative activities. Findings suggest companies in *Serbia belong to modest innovators while as a country in the pre-accession procedure Serbia belongs to the group of Catching-up countries.*

Data show Serbia is well behind the EU-27 average. The EU-27 innovation index is 47.8, while Serbia's index is at 22.7 only. However, it can be said that the potential of the economy is quite satisfactory for two factors examined - human resources and financial support. At the same time, Serbia is well below the EU-27 average regarding capacity of intellectual property and the share of companies – innovators in the total number of companies. In other words, there is a lot of room for improvement.



Source: European Innovation Scoreboard 2010

First dimension - enablers: Serbia's research system has modest potential compared to the EU average and neighboring countries (Slovenia and Croatia). Human resources also pose a limiting factor (with 19.2% of the highly educated and 85% of those with a secondary school degree in the total young population). Second dimension – firm activities: Serbia is investing 0.5% of GDP (public and private sources) in research (EU 2%). On the company level, 28% of all Serbian SMEs and shops can be labeled as innovative. There are 3.5% innovative SMEs with research linkages and cooperation in the total number of SMEs. *Third dimension – outputs*: the share of SMEs that regularly introduce processing/product innovations is 18.3% and 18.1% in organizational/marketing innovations in total. In comparison with the EU and matured transitory economies,

Serbia is less efficient in the application of innovations. The share of employment in knowledge-based activities is 3.9% of the total. The share of medium and high-tech product export is 27% in total and of knowledge service export is 34%. Total revenues from licenses and patents from abroad are 0.1% of Serbian GDP [6].



Source: European Innovation Scoreboard 2010

The Survey of SMEE was conducted in accordance with the Work Program of the National Agency for Regional Development for 2010 and in cooperation with the Serbian Statistical Office. The aim of the research was to analyze the real situation, problems and needs of the SME sector and the change in relation to the previous year. The Survey was carried out on a sample of 3,000 report units by means of the questionnaire comprising 65 questions¹⁵.

The Results of the Survey show that when it comes to the legal form of business SMEs most often choose the limited liability company (88% of total). The reason is that this form of company gives flexibility to managers of SMEs. Two thirds of the enterprises have been in business for more than 6 years and 43% of them for more than 11 years. There is an evident intention on the part of most entrepreneurs that their companies continue to work, on a higher (37%) or the same level of activities (50%). Only 5% of them plan to close down and 2% to transfer their business to someone else. A half of medium-sized companies have plans for further expansion while small entities shy away from expansion most (30% of sole traders and 38% of micro and small companies plan to develop their business).

¹⁵ Data from Republic Statistical Office are available internally only as the Survey results are not published yet.

Survey results confirm the dependence of the improvement of business operation on external factors (67% of the total), such as support from the state and local government. Companies graded business problems with very high marks; the largest obstacles are related to the lack of financial sources extended under favorable conditions, and to the legal environment (graded 1.9 and 2.2 on the scale of 1-7). The surveyed SMEs are mostly equipped with medium generation equipment (5-10 years old) and only a guarter own equipment less than five years old. The need to invest in technical and technological business conditions was highlighted by 60% of companies, as they have invested over the past three years, but now their intention is to postpone investment for the future. The use of PCs is not an obstacle for making progress in business, as 83% of companies use computers (there are 6.5 computers per surveyed company). The results show that every fifth company performs innovative activities, and one out of eleven maintains innovation cooperation with other business entities or institutions. Innovative activities resulted in introduction of new products or services in 1/5 of the total number of companies. The effects of implemented innovation in 54% of cases are visible in the saving of raw materials and energy, and in 46% in the reduction of labor costs. Only 16% of companies protect some of the intellectual property types, although we notice an increasing trend here (5 percentage points more than the year before).

The Serbian Statistical Office conducted a *research into innovation activities of SMEE* for the period 2006-2008 [7] with the aim of grasping the true relation between the business policy of companies and innovative activities. Out of the entire sample of SMEs, 18% are technology innovators, 18% are other innovators that introduced organizational or marketing innovation, and 6% did not finish and implement the innovation process. When looking at the share of a type of innovation introduced by the size of SME innovators, it is clear that the highest share is that of the organizational innovation (28% of total) in small (28%) and medium-sized enterprises (29%). In total, 19% report that they were a part of a group of connected companies, and 93% of SME innovators responded that their company is a base company. Regarding the market orientation, 98% responded that they sell on the Serbian market. As for a new product or service introduced, 23% opted for a product and 28% for new services. In total, 6% of SME innovators registered their trademark, and 16% listed time advantage in relation to competitors as a significant innovation protection method.

Serbia has been implementing its 'Strategy for the Development of Competitive and Innovative Small and Medium-sized Enterprises 2008-2013' [8] since 2008 when it was defined and adopted. The Strategy implementation envisages that measures and activities are concentrated in those companies that have the potential for fast growth and export expansion. Support priorities regarding dynamic companies and gazelles are: 1) The legal framework reform, with the aim of bringing laws in line with the EU's laws and minimizing administrative procedures and requirements; 2) Innovation support, with the aim of defining the system of incentives for research and development, and planning innovative activities and their implementation within companies; 3) *Functional education*, the goal being to raise the overall level of knowledge of managers and employees by improving both the formal and the informal education system; 4) *Financing improvement*, with the aim of developing the institutional framework for micro financing, investment funds, and venture capital funds; 5) *Closing the institutional infrastructure* in order to further develop the institutional network that covers the entire territory; 6) *Opening to the global market*, the goal being to improve the overall competitive strength of dynamic and innovative companies on the global market.

In line with the Strategy implementation, the National Agency for Regional Development introduced non-financial and financial support measures for the SME strengthening [9]. Non-financial measures include: 1) Entrepreneurial services (legal and financial consulting and innovation and invention), 2) Training for start-ups, 3) Monitoring, 4) European network for entrepreneurship, and 5) a European network of ambassadors representing women entrepreneurs. Financial support includes: 1) A program for strengthening the competitiveness of SMEs, 2) A program for associations support, 3) Support for rapid growth of SMEs gazelles, 4) Support for the innovation strengthening, and 5) Support for the development of innovative clusters. The Program of support for SME competitiveness is aimed at directly supporting the improvement of competitiveness by funding costs of consulting services. Several areas are picked as targets: business adjustments in line with international standards, improvement and development of new technological products, processes and services, and the education of managers and employees. Each verified project will be supported with an amount of 500-5,000€ out of the total budget of 600,000€. In the period 2008-2011 the number of supported projects reached 1,443 and the total amount of extended funds 2.98 million euros.



The programme for innovation strengthening is aimed at supporting investment of SMEs in innovation. The program is built on the cost co-financing model: development of new products, improvement of products and services, patent remuneration, new design, and the design of the marketing plan for new products. The amount envisaged as support ranges between 1,000-1.,500 \in per project. The total budget is 400.,000 \in . In the period of reference 85 projects were supported – co-financed.

The programme of innovative clusters development is aimed at helping new clusters - it envisages 2,000-20,000 euros of support per cluster, and for existing clusters 2,000-10,.000 euros per cluster. New clusters will use the financial support to cover operational costs and the costs of organization. Existing clusters will use the support they receive to cover costs of drafting feasibility studies, common project realization, prototype realization, patent registration, and training.

The programme of support for gazelles is aimed at enhancing SME competitiveness so that they can grow fast and raise their employment. The support is to be extended under several conditions: minimum 3 years of doing business, an independent entity, a minimum of 8 employees, and a 30% increase in revenues over the last three years without losses. The amount earmarked for support is fixed at 1,000-8,000 euros per company.

Conclusion

During the transition period SMEE in Serbia became an important economic factor. This was a result of introduced market reforms, an improved business climate, and, above all, the pursued supportive policy. The main aim of the policy was to establish more and more SMEE each year in order to boost employment and absorb the surplus of workforce that left companies undergoing restructuring. This important goal was achieved and the share of the sector of SMEs in total GDP and employment is considerably higher than before.

Faced with the global economic crisis SMEE are suffering like others. In 2010 the number of medium-sized companies decreased most (by 8.6%), and so did employment in these companies (by 9.6%). It is important to note that medium-sized companies are seen as drivers of development of the entire SME sector. At the same time small and micro companies have recovered and refocused their activities on less risky ones, while medium-sized companies are lagging behind because they tend to adapt to new business conditions slower; in addition, they are coping with problems that have caused a slow recovery of the entire SME sector. Shops are experiencing more difficult problems than companies and over the last two years they have had negative business demography.

Recently the economic recovery in Serbia has gathered momentum, but this recovery is fragile as the risk in the EU is increasing. The role of SMEE is important for making the recovery certain and development self-sustained. Although Serbia's achievements in terms of SMEE development are encouraging,

if we compare these companies to companies from mature transition countries and EU member states, we will see they are less efficient and less competitive. This finding leads to an inevitable shift in policy incentives for SMEE development towards greater efficiency and more innovation. Some important steps in this direction have been realized, such as data collection and measurement and, in particular, strategy definition, but other measures are in the early stage of realization.

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The Impact of FDI on the Transitional Economy in Serbia – Changes and Challenges

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Abstract: Our study analyzes the transition period of Serbia from a centrally planned to a market economy with a special view to the political, social and economic conditions during the 1990s, and the economic circumstances after the 'democratic revolution' through the inflow of FDI, GDP, GDP per capita, GDP growth rate, exports, imports, trade balance, and unemployment rate. The economic decline in the 1990s was a consequence of war, international sanctions and mismanagement of economic policy. Serbia witnessed one of the greatest hyperinflations in modern history. With the purpose of creating the conditions for an inflow of FDI, economic reforms started in 2000 in Serbia. Since the 'democratic revolution', most FDI has entered the sector of non-exchangeable goods. That has had negative effects on Serbia from the development viewpoint, since the country needs FDI to the sector of exchangeable goods, as they encourage productivity and technological progress. Foreign investors to Serbia were primarily interested in profiting from the inflow of FDI since 2000 relate to significant transfer of technology, enhancement of competition on the local market, the training of employees, etc.

Keywords: transition period; democratic revolution; economic policy; FDI; Serbia

1 Introduction

The effect of foreign direct investment (FDI) on domestic economy, trade, and unemployment is a subject of many debates. Although recent research projects have attempted to analyze the impact of FDI on a domestic country's economy, empirical results show that the consequences could be different. Some studies indicate that FDI can stimulate the economic growth, while others point out that FDI can offset the economic growth and increase in the host country. Following these hypotheses, ours is structured into four sections. We introduce a general overview of the major aims, theoretical background of the contemporary research literature in an area of FDI, methods and data. The next section provides analyses of the political, social and economic conditions in former Yugoslavia and Serbia during the 1990s and of the final transition from a centrally planned to a market economy. Then we compare the Inward FDI Performance Index of Serbia and that of other South Eastern European (SEE) countries. And finally we analyze the economic circumstances in Serbia after the 'democratic revolution' through the inflow of FDI, GDP, GDP per capita, GDP growth rate, exports, imports, trade balance, and unemployment rate, in the period 2000-2010.

The aims of this study are to discuss the political and economic conditions in the former Yugoslavia and Serbia during the 1990s. The economic situation in Serbia after the 'democratic revolution' and FDI dynamics, as well as its role in the country's recovery, are explained. The main objective of this paper is to answer the following questions: (1) What is the relationship between FDI and GDP? (2) Will FDI have a positive impact on exports? (3) Can FDI lead to a decrease in unemployment in Serbia?

2 Theoretical Background

Many scientists have analyzed the impact of FDI on economic growth of the host country [12, 29], the choice of location for foreign enterprises (region, country, and city) as well as the importance of FDI to social, economic, and political arena. FDI influences economic growth through several segments. First, it is expected to enhance it through capital accumulation: more inputs are incorporated into production [19]. Second, FDI is a source of technological enhancement and diffusion, as well as human capital strengthening [9, 40]. Furthermore, FDI promotes the diffusion of innovation: new technologies, know-how, marketing, and managerial skills through direct linkages (or spillovers) to domestic firms. Kokkinou and Psycharis [37] argue that the internationalization of production leads to better utilization of enterprises and stimulates technology transfer. The theory of multinational companies proposes that they have a technological advantage over domestic enterprises that outweighs the cost of doing business in

external markets [13, 42]. The impact of new knowledge and technology may be of benefit to domestic enterprises [8, 20], in addition to increased competition in local markets, facilitation of human capital mobility [21, 23], and vertical linkages [41, 50]. According to Altomonte and Guagliano [1], FDI may contribute to the improvement of exports with respect to domestic firms. Using the so-called Heckscher–Ohlin standard, Mundell [47] showed that capital transfer could be an excellent substitute for trade. Vernon's product cycle model also suggested a substitutional relationship between FDI and trade [57].

As the theorists indicate [1, 2, 4, 6, 43], many countries, especially transition economies such as Serbia, have stimulated foreign investors to expand their economic development and, consequently, to provide political stability. According to Griffiths and Sapsford [27], FDI from countries that are closer to the world technology frontier have a greater positive influence than FDI from technologically less advanced countries. Physical distance from investors' countries may also make a difference. Firms from countries that are closer to investor's home will have lower costs sourcing from their home countries than firms from more distant shores [50].

There are several studies providing evidence of the positive effects of the openness of a country on its economic growth and exports. Arslan and Wijnbergen [3] and Joshi and Little [34] discussed that trade liberalization in developing countries caused improvements in their economic performance. The logic behind this outcome is that trade liberalization reduces anti-export bias and makes exports more competitive in international markets. However, some studies have showed some scepticism regarding the link between openness and export performance [26, 33].

Attracting FDI is one of the most important activities across the world. Especially Crozet et al. [14] argue that the factors in choosing a location of foreign enterprises depend on the expected demand in a certain region, the factors of cost, the number of domestic and foreign enterprises in a certain area, and the public policies of attracting investment capital. Disdier and Mayer [16] indicate that the location choice of foreign enterprises is also determined by market access and production costs. Many other theorists have also evaluated the factors the location of foreign enterprises and FDI concentration [17, 22, 48]. According to the United Nations Conference on Trade and Development [56], the main traditional factors driving foreign enterprises' location have been diminishing in importance, such as the large markets, natural resources and access to low-cost labor. Other contemporary factors involved in attracting FDI are policy liberalization, favourable regulatory changes, technical progress, local conditions, managerial and organizational factors, and management practices. Many empirical studies on attracting FDI propose that foreign investors choose the region, country or city which has the probability of higher rate of profit. Scientists Helpman and Krugman [31], as well as Markusen and Venables [43], provide the theoretical background for the further clarification of FDI. Dunning [18] describes the incentives which lead to FDI undertaking and to the cross-border investment activity. Basile [4] argues that the rate of profit is considered as a result of the following factors: the cost of productivity, the cost of transport, the size and the characteristics of local market, and the level of infrastructure. Lucas [40] and Jun and Singh [35] find that the key factors in attracting FDI are the general economic and social environment stability of the host country, which is the case with Serbia after 2000. Bevan and Estrin [6] focus on the importance of encouragement, as the cost of labor, the size of market, and the investment risks. Furthermore, Globerman and Shapiro [24] argue that the economic success of a host country depends on its institutional infrastructure. The institutional infrastructure is the main factor influencing investment decisions on FDI. According to the above-mentioned authors, the natural environment and the human capital are of great importance.

Furthermore, in Serbia, many scientists are actively involved in the studies of FDI [5, 10, 11, 15, 44, 45, 46, 49]. Due to the great importance to the economy of Serbia as a transition country, it is necessary not only to inject capital but also to provide access to new technologies, new markets, and organizational and marketing expertise. Begović et al. [5] emphasize the significance of greenfield investments in Serbia that will help the country's economic recovery after the political changes in 2000 and provide a critical review of the situation of the Serbian economy. The Serbian authorities have in the past years achieved remarkable results in terms of creating a favourable environment for attracting foreign FDI. Bošković [10] explains the correlation between FDI and increasing Serbian exports, while Cvetkovski et al. [15] deal with the human resource planning associated with FDI and make reference to the situation after the political changes. Milosavljević et al. [44] study the effects of FDI on the economy of Serbia through the diffusion of innovation. Mitić [45, 46] defines a causal relationship between FDI and employment in Serbia, as well as the problem of growing unemployment.

3 Methods and Data

Alongside the theoretical research literature, we used the methodology of contemporary economic geography based on the methods of scientific achievement. The complexity of the study required the application of research methods suitable for setting up hypotheses, proving attitudes, verifying, and forming conclusions. In the methodological apparatus, as general methodological procedures, the mathematical–statistical method was used, and as a particular – analysis, synthesis, comparison, and cartographic method. The tabular and graphic classification of the data and presentation of statistical data, as well as changes of variables (growth, stagnation, and decline) are presented.

With the aim of comparison of FDI in Serbia with other SEE countries, we used the Inward FDI Performance Index (I_1). According to the World Investment Report [55] methodology, the Inward FDI Performance Index ranks countries by the volume of attracted FDI according to the country's GDP. This index is usually calculated by the formula:

$$I_1 = \frac{(FDI_A / FDI_W)}{(GDP_A / GDP_W)} \tag{1}$$

where FDI_A is the FDI inflow to country A, FDI_W is world FDI, GDP_A is GDP of country A, and GDP_W is world GDP. If the value of $I_1 \ge 1$, then the country receives more FDI than it could count on based on its contribution to the production of the world GDP. If $I_1 \le 1$, it receives less. A negative index means that foreign investors withdraw their capital from the country.

Pearson's Correlation (r) was used to evaluate the degree of linear relationship between the variables: (1) FDI (x) with GDP (y), (2) FDI (x) with export (y) and (3) FDI (x) with unemployment (y) in Serbia during period 2000–2010, according to the commonly used formula:

$$r = \frac{n \cdot \sum xy - \sum x \cdot \sum y}{\sqrt{n \cdot \sum x^2 - (\sum x)^2} \cdot \sqrt{n \cdot \sum y^2} - (\sum y)^2}$$
(2)

Coefficient of determination (R^2) represents the proportion of variation in the dependent variable that has been explained or accounted for by the regression line. The aim of coefficient of determination is to offer the proportion of FDI (*x*) in GDP growth (*y*), in export (*y*) and in unemployment (*y*) in the analyzed period, according to the following formula:

$$R^{2} = b_{1}^{2} \cdot \frac{\sum x^{2} - \overline{nx}^{2}}{\sum y^{2} - \overline{ny}^{2}} \qquad \qquad b_{1} = \frac{n \cdot \sum xy - \sum x \cdot \sum y}{n \cdot \sum x^{2} - (\sum x)^{2}} \qquad (3)$$

The statistical data bases of the Serbia Investment and Export Promotion Agency [51], the Statistical Office of Serbia [54], UNCTAD [55, 56] and the International Monetary Fund [32] were used for the period 2000-2010.

The theoretical background, the representative nature of statistical variables, and the time frame of research (the transitional period after 2000) are the indicators of the performance of methodologically and scientifically based results presented in this study.

4 Results

4.1 Social and Economic Situations during the 1990s

In the Western world, state institutions gradually evolved in order to become the modern forms which work effectively today. The first attempts to build modern institutions in the former Yugoslavia began in 1990. Deep reforms were introduced to the centrally planned economy, but without much success, because the former Yugoslavia was in debt. A boost to reforms was given by the fall of the Berlin wall and the collapse of socialism in other Central and SEE countries. After the collapse of socialism, Western multilateral institutions suggested that a successful 'transition' from the centrally planned economy to a market-based system could only be achieved with large inflows of FDI [25].

Reforms in the Communist Party had caused its disintegration and political power was transferred to the former Yugoslav republics. The political elites understood that the cosmetic changes could not go too far. Furthermore, to some politicians, it was clear that the goal must be a capitalist economy, while others naively believed that the third option was possible – a path that combined the best features of a centrally planned and a market-based economy. The beginning of reforms in the former Yugoslavia in 1990s, a stable exchange rate and the 'opening' of the country made the population feel confident about the country's welfare and progress.

According to Begović et al. [5], the reality was different, and in the former Yugoslavia the year 1990 was remembered as the last year of 'brotherly' coexistence of peoples from all six republics and two provinces. Unfortunately, the following year witnessed the collapse of the former Yugoslavia. The process of democratization of the society in the former Yugoslavia was unable to compete with national programs of constituent republics. Stančić and Grubišić [53] pointed out that many political and economic decisions were put under the carpet for decades. The rising nationalism in the Yugoslav republics led to the disintegration of the joint country. According to Popov [49], since 1991 some very unfavourable political and economic developments resulted in the catastrophic decrease of FDI inflow, the collapse of GDP per capita, and the diminishing of the real value of salaries and other personal income in Serbia. Consequently, the reduced employment, the flourishing of grey economy, technological regress, criminalization of society, and the influx of about 800,000 to 1 million refugees from the former Yugoslavia followed. The disintegration of the Yugoslav market in 1991, the beginning of civil wars and the UN sanctions imposed on Federal Republic of Yugoslavia in 1992 led to hyperinflation in 1993. The inflation in December 1993 and January 1994 broke the world record for the period since World War II. Salaries and pensions were reduced to 5-10 DEM per month, while production stalled in the autumn/winter 1993-1994. In January 1994 the hyperinflation was liquidated and the economic activity revived. The main objective of that economic policy was the provision of sufficient quantities of basic foodstuffs for the population (bread, oil, milk, sugar, salt), regardless of whether the cost was effective or not. The abolition of trade sanctions at the end of 1995, after signing the Dayton Agreement, unfortunately did not change the political situation. The conflict in Kosovo and Metohia was followed by the NATO bombing campaign of Serbia in the period between March and June 1999. According to Begović et al. [5], as a result of the interruption of economic activity in 1999, GDP was reduced by one fifth compared to 1998. In the second half of 1999, a certain recovery of production was detected. The changed production structure decreased the participation of industry (especially metal, electric, and chemical) and increased the participation of agriculture, public services and energy. The decline of the formal sector was partly compensated by the grey economy. In October 2000, Serbia was ready for new economic strategies while a new political path was being set.

4.2 Stabilization and Economic Recovery Beyond 2000

At the end of 2000, with the acquired knowledge and transfer of technology from the West, Serbia started building new democratic institutions and a market-based system. An important role in encouraging the reforms belonged to the World Bank and IMF, which, due to previous failures in other transition countries, perceived Serbia as an opportunity to do their best. They offered Serbia the financial resources that Serbia greatly lacked and strong incentives to continue with the economic reforms.

Starting after political changes in October 2000, improvements were made especially regarding the institutional and legal framework [28]. In the development of Serbia two phases of transition can be distinguished. The first phase represented a moment of enthusiasm when Serbia opened to the world. Legislative reforms were easily adopted at this stage, and there were no opponents to the changes. Therefore, the year 2001 is considered the stellar moment of transition in Serbia. However, in the second phase after 2002, political elites lost enthusiasm and political life went back to normal. The first phase was facing legislative changes, while the second phase was based on increased legislation. Although other transition countries were late to reform the system protecting the rights of private property, in Serbia there was a weakness in applying legislation. Many reform laws passed, but legislation was still the weakest link eleven years after 'democratic revolution'.

Transitions in the other Central and SEE countries differ in many ways, despite certain similarities, such as reduced industrial production in the first years of transition and a sudden increase in poverty. Decreases in production were mainly caused by the destruction of the centrally planned economy before the new market-oriented system was built. The growth of poverty was the consequence of falling GDP, increasing inequality and slow construction of efficient mechanisms of social protection. However, the situation in Serbia was different. Industrial production was growing and poverty was reduced, which can be evaluated as the peculiarities of Serbian transition. There are several reasons for the lack of decline in industrial production. First, Serbia was different in many ways from most of Central and SEE countries. In 2000, Serbia moved from a centrally planned economy to a market economy, but was greatly distorted by the former socialist government. Furthermore, the Serbian institutions in 2000 were better prepared for the transition than the other Central and SEE countries ten years earlier. Liberalization of foreign trade and business in late 2000 only abolished the unnecessary regulation, which had positive effects on production. The economic growth in Serbia contributed to the inflow of external financial support which stimulated domestic production.

In Serbia, after 2000 the private sector grew, but did not represent a major driving force as in some other Central and SEE countries, where it had quickly become the main bearer of economic progress. This was caused by the fact that the private sector had been relatively developed even before 2000, while in most Central and SEE countries it had started from scratch and grew very quickly in the early stages. The transition of Serbia after 2000 was fast-paced at first, but it slowed down over time when the country was halfway through reforms.

A strong impetus to reforms was Serbia's candidacy for EU membership in December 2009. The process of joining the EU is considered as a sustainable instrument for economic reforms, stabilization and strengthening of institutions.

4.3 Inflow of FDI, GDP, Trade and Unemployment Rate

The general benefits of post-socialist economic change in transitional countries have been widely discussed [17, 36, 38, 39]. They include greater independence from political control and enhanced well-being of consumers through better quality and easier access to FDI. On the other hand, social welfare in some ways declined, in the sense of economic security, the end of full employment, and increased social inequalities.

FDI had an important role in the economic development of SEE countries through industrial restructuring, which led to national prosperity of each country. In the first years of the 21^{st} century, most SEE countries had relatively low inflow of FDI, especially Serbia, Bosnia and Herzegovina and Albania. Their Inward FDI Performance Index (I₁) was below 1 in 2000.

Country/region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Albania	0.78	1.84	1.36	1.78	2.51	1.21	1.12	1.64	2.63	4.16	4.43
UNMIK–Kosovo	-	-	-	-	0.79	1.34	2.93	3.44	3.28	3.77	3.52
Bosnia and Herzegovina	0.52	0.74	1.78	2.59	3.78	2.10	1.93	3.61	1.99	1.53	0.66
Bulgaria	1.55	2.12	2.53	5.83	5.67	5.62	7.26	7.85	6.37	5.03	2.15
Montenegro	-	-	1	-	-	-	-	6.32	7.14	16.39	8.96
Serbia	0.12	0.56	1.68	4.14	2.34	3.06	5.26	2.33	2.12	2.30	1.67
Croatia	1.03	2.48	1.85	3.44	1.41	1.50	2.16	2.25	2.18	2.23	0.26
Macedonia	1.19	4.71	1.25	1.42	3.15	0.61	4.89	2.27	2.10	1.39	1.52
						Source	e: IMF	[32] a	nd Wo	rld Bar	ık [58]

Table 1 Inward FDI Performance Index (I_i) in SEE countries

With time, inflow of FDI grew in most SEE countries as well as I_1 , but the fall was recorded for 2004 and between 2008 and 2009. However, instability occurred in some SEE countries in 2004 due to the political changes, which led to decrease in inflow of FDI.



Figure 1 Inward FDI Performance Index (I_i) in SEE countries in 2000

The global economic crisis affected economies of SEE countries in 2008-2009. In 2010, most SEE countries had a relatively good I_1 ($I_1 \ge 1$), bearing in mind the size of their economies (except Croatia and Bosnia and Herzegovina). This is mainly due the fact that most SEE countries received more FDI than they could count on based on their contribution to the production of the world GDP. Montenegro had

the best I_1 in 2010 with the index value of 8.96. A relatively good performance index compared with the other SEE countries was also observed in Albania, where the value of the index was 4.43, followed by UNMIK–Kosovo (3.52), Bulgaria (2.15), and Serbia (1.67).



Figure 2 Inward FDI Performance Index (I_i) in SEE countries in 2010

Most FDI in the first decade of the 21st century entered the SEE countries through greenfield investments because the privatizations of the 1990s had ended. The other reason was the effectiveness-oriented investors who estimated that this region had prosperity. According to Begović et al. [5], Western countries, mostly EU members, remained the main source of FDI for the SEE region, especially through greenfield projects. If SEE region is compared to Central European countries, the inflow of FDI is not high. For example, in 2004, FDI amounted only to USD 620 million per capita in the SEE region, while in the Central European countries it was USD 2,227 million per capita. Lucas [40] and Jun and Singh [35] explained that this ratio is due to the unfavourable political and economic circumstances in the SEE region.

Due to political and economic changes, Serbia has seen a growth in FDI since the year 2000, especially after 2002, when the Law on Foreign Investments was adopted. This Law equalizes the rights and obligations of both foreign and domestic investors in Serbia. The combination of legal framework and customs regime ensure that foreign capital enjoys security and prosperity in Serbia. Serbia's tax system is highly conducive to FDI. Apart from featuring the lowest

tax rates in Europe, investments can benefit from possible tax incentives which create excellent start up. Primarily, there is a possibility of a 10-year corporate profit tax holiday for investments in the manufacturing sector.

In the analyzed period, the highest inflow of FDI in Serbia originated from the EU country members, as well as from the USA and Russia, especially in the sectors of finances, telecommunications, energy, cement, oil, and tobacco industries. The highest inflow of FDI in 2006 (USD 5.474 billion) is not likely to reappear in the near future, since it coincided with the maximum FDI in the SEE region. The high inflow of FDI to Serbia in 2006 was the consequence of privatizing the mobile telecommunications operator 'Mobtel', purchased by Norwegian 'Telenor', followed by 'Philip Morris', a mobile operator 'Austria group' and others. Due to the political instability and the elections, the inflow of FDI to Serbia decreased to USD 3.569 billion in 2007, compared to USD 3.363 billion in 2008.

Table 2 Inflow of FDI to Serbia (in USD mil.)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cash investment	52	178	503	1,389	987	1,616	5,474	3,569	3,363	2,498	1,518
Total investment	55	160	550	1,410	1,030	2,090	5,120	3,980	2,990	1,920	n/a
Source: Serbia Investment and Export Promotion Agency [51]											

ורכן irce: Serbia Investment and Export Promotion Agency

Significant decrease in FDI occurred in 2009 with the appearance of the world economic crisis. Specifically, at the moment when a large import-oriented production project was announced in Serbia ('Fiat') and when it seemed to lead to economic growth, the world economic crisis made additional inflows uncertain. The negative effects of the crisis also influenced the decrease of global investment trends in the whole region. That especially becomes evident in the case of Serbia, when compared to the first half of 2008. In the first six months of 2008, the inflow of FDI to Serbia was 75% higher than in 2009. The difference would have been even more significant but in February 2009 Russian 'Gazprom' bought Petroleum Industry of Serbia, with a 50% share in total FDI in 2009. The inflow of FDI to Serbia decreased to USD 2,498 million in 2009. From 2000 to 2008, most FDI inflows in Serbia went to the financial sector and telecommunications. In 2009 the highest FDI was recorded in the energy sector.

As an effect of the global economic crisis, the inflow of FDI in 2010 was only USD 1,518 million. The most important foreign investor countries in 2010 were the Netherlands with USD 264 million, Austria with USD 193 million, Slovenia with USD 108 million, and the USA with USD 77 million. Civil engineering and agriculture are still deficient in foreign capital inflow. Despite the convenient natural conditions for the development of agriculture, and experience for the intensive growth of this sector, it is still without FDI.

The average growth rate of the total investment (inflow of FDI to Serbia between 2000 and 2010) is 48%. A fall of 27% in the total investment was recorded in 2004, for the period between 2007 and 2010 (Table 2). The most important inflow of FDI to Serbia in the period 2000-2010 according to investment type relate to privatization and capital market.

Apart from the sale of domestic companies in the process of privatization, greenfield investments are becoming more present. It is generally difficult to attract greenfield investments to the country until entrepreneurial environment has been created, an environment that involves fewer investment risks and more business transparency. Even though no FDI are inferior to the others, greenfield investments have an advantage which is less noticeable in the other forms: these investments have the greatest influence on the increase of employment. However, most greenfield jobs in Serbia have been created in the services sector, industries and mining. On the other hand, owing to the arrival of foreign investors, imports held back domestic suppliers. According to Hardy [30], Smith and Ferenčíková [52] and Pavlinek [48], after the entry of foreign enterprises, local economies may benefit from continued and often expanded production that saves jobs (especially where the privatization agreement obliged foreign investors to maintain current employment for a particular period), or new jobs are created in greenfield investments. That is expected for the automotive industry Fiat in Kragujevac, which can jointly with its network of suppliers have important positive effects on increase in employment by about 10,000 jobs. It is assumed that local producers of car components will employ over 15,000 people. An important part of the agreement between the Serbian Government and the local authorities with Fiat is the establishment of a 67-hectare supplier park in Grošnica, which will provide components to the plant and potentially contribute to increased production for export. From the infrastructural point, the Government and the local authorities are contributing to this greenfield investment by improving railway and road conditions and building a connection with Corridor 10.

Another positive example is the Municipality of Indjija, which is among the most popular destinations for FDI inflow in SEE, primarily due to good infrastructure and the latest information technologies. Indjija was considered the most attractive municipality and ranked 18th in Europe. The tender was carried out in the second half of 2007, when FDI magazine, issued by renowned Financial Times, sent questionnaires to more than 1,000 cities and regions across Europe. The basic criteria was economic potential, the most significant investments in the last two years, the levels of investment, the number of new jobs created, GDP growth rate, economic reforms, and development priorities. The largest investments in Indjija were USD 600 million worth construction of technological park by Indian company Embassy Group, a USD 76 million business-housing complex financed by multinational construction company Trade Unique, and USD 11.4 million Battery Factory funded by Bulgarian Monbat. These three investments will provide about 2,700 new jobs in Indjija.

Belgrade as the capital and the primary centre of development has seen the greatest increase of FDI in Serbia. The contributing factors are the existence of
infrastructure, human resources and business operating conditions. The level of investment to Belgrade in 2007 was 105.9 times higher compared to the level in 1996, which can be accounted for by a number of factors, such as economic sanctions imposed by international community in the 1990s, political isolation, and the war in the former Yugoslavia. The highest inflow of FDI in 2010 was invested to the central Belgrade municipalities: Savski Venac, Novi Beograd, Vračar, Palilula and Stari grad. The Municipality of Novi Beograd was converted from a former huge 'dormitory' into 'Serbian Manhattan', because almost all leading business and financial subjects, as well as leading foreign enterprises in the country, have their representative offices there. As Pavlinek [48] asserts, the inflow of FDI to other Central and SEE countries as well as Serbia, was considerably higher in the capital cities in comparison to the other urban agglomerations. According to Blažek [7], Prague attracted 49% of total FDI invested to the Czech Republic, while the involvement of Bratislava amounted to 67.8% of total FDI in Slovakia (in 2002), and Budapest held 56.5% in 2000 (Hungary).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
GDP per capita (USD)	1,152	1,524	2,012	2,613	3,169	3,391	3,958	5,277	6,467	5,438	5,139
GDP (PPP) per capita*	5,655	6,100	6,468	6,786	7,598	8,315	8,928	9,722	10,900	10,708	10,897
GDP (USD bn)	8.7	11.4	15.1	19.5	23.7	25.2	29.3	39.0	47.7	40.1	38.0
GDP growth rate	5.3%	5.6%	3.9%	2.5%	9.3%	5.4%	5.2%	6.9%	5.5%	-3.0%	1.8%
Exports (USD mil.)	1,558	1,721	2,075	2,477	3,523	4,553	6,428	8,825	10,973	8,344	9,794
Imports (USD mil.)	3,330	4,261	5,614	7,333	10,753	10,575	13,172	18,554	22,875	16,056	16,734
Trade Balance (USD mil.)	-1,772	-2,540	-3,539	-4,856	-7,230	-6,022	-6,744	-9,729	-11,902	-7,712	-6,939
Exports/ Imports	46.8%	40.4%	37.0%	33.8%	32.8%	41.1%	48.8%	47.6%	48.0%	52.0%	58.5%

Table 3
GDP and external trade of Serbia

Source: IMF [32] and Statistical Office of Serbia [54] * Geary–Khamis USD

The average growth rate of GDP (USD bn) is 4.8% (Table 3). Following the political changes in Serbia in 2000, GDP per capita rose until 2008, when maximum GDP per capita 6,465 USD was recorded. Between 2004 and 2008, average economic growth was 6.3%, while GDP per capita almost doubled. Strong GDP performance was largely driven by the services sectors such as telecommunications, retail, and banking. In 2009, the global economic crisis led to the first negative GDP growth in Serbia during the analyzed period. GDP growth rate was negative -3.0%, while in 2010 it was 1.8%. The Serbia's external liquidity was secured through a \notin 3 billion stand-by agreement with the IMF. The Serbian Government and IMF estimate real GDP growth at an average rate of

3.8% for the next three years. These projections are based on expected growth in activity in the majority of sectors, as well as on the recovery in the construction sector after a big drop in 2009. Economic policy of the Serbian government includes strengthening of industrial production and stimulation of capital investments in industry, especially in export-oriented sectors.

The average growth rate of export is 19% (Table 3). After 2000 Serbia had constant export and import until 2008. A big drop in export was recorded in 2009 and 2010 (8,344 USD million in 2009 and 9,794 USD million in 2010), as well as import (16,056 USD million in 2009 and 16,734 USD million in 2010). The main export products of Serbia in 2009 and 2010 were: iron and steel, clothes, cereals, vegetables, and non-ferrous metals. In 2009 and 2010, the EU countries were both the largest Serbia's export partners and the largest import partners. Serbia signed the CEFTA agreement which enabled exports of all products originating from Serbia without customs duty and other fees to the following countries: Albania, Bosnia and Herzegovina, Croatia, Macedonia, Moldova, Montenegro, and UNMIK-Kosovo. The CEFTA countries were the second largest export destinations (33% in 2009) and the third largest import destinations (7.8% in 2009). Serbia signed a free trade agreement with CIS (Russia is a participating country of CIS). CIS countries were the third largest export partners (7.3%) and the second largest import partners (18.5%) of Serbia in 2009. Serbia signed a free trade agreement with EFTA countries, Norway, Switzerland, Iceland, Liechtenstein, as well as with Turkey (April/May 2010). Trade with the United States is pursued under the Generalized System of Preferences (GSP). The USA trade benefits provide for a preferential duty-free entry for approx. 4,650 products from Serbia.

During the analyzed period, the Serbian economy suffered from a constant trade deficit, which is the reason the Serbian Government is strongly supporting the further industrial development of the country, especially in export-oriented sectors. Furthermore, the three sectors declared as the sectors of special importance for development of Serbia are automotive, electronics and ICT industry. The highest trade deficit was recorded in 2008 – 11,902 USD million.



Figure 3 Unemployment rate in Serbia, Source: IMF [32]

The average growth of unemployment rate is 17.27% (Figure 3). In 2000 the unemployment rate was 12.1%. It reached its maximum in 2005 (21.8%). With the increase in the unemployment rate, employees are faced with decreased salaries and great uncertainty. Unfortunately, a lot of domestic enterprises have to make decision about forced redundancies.

Our study shows that positive linear coefficient of correlation for FDI *versus* GDP – USD bn r= 0.71; linear correlation FDI *versus* export – USD millions is 0.74; and coefficient of correlation FDI *versus* unemployment shows very weak linear correlation (r=0.023). As for coefficient of determination (R^2) for GDP (USD bn) is 50% while coefficient of determination (R^2) for export – USD millions is 54%.

Conclusion

Serbia, unlike other Central and SEE countries, went through transition after 2000. The economic decline in Serbia in the nineties was a consequence of war, international sanctions and mismanagement of economic policy. In addition, Serbia witnessed one of the greatest hyperinflations in modern European history. For the purpose of creating the conditions for sustainable development, economic reforms took place between 2000 and 2010.

To sum up, our analysis showed the following. Firstly, the inflows of FDI in Serbia have had a positive impact on economic growth, but not on exports. The main reason is that, since the 'democratic revolution' most FDI have entered the sector of non-exchangeable goods (banking, insurance, telecommunications, real estate and retail trade). This has had negative effects on Serbia from the development viewpoint, since the country needs FDI to the sector of exchangeable goods because they encourage productivity and technological progress. Large inflows of investments to the sector of non-exchangeable goods, particularly to the real estate sector, have been intensified by migrations of population to Belgrade and other cities, which results in a deeper demographic and economic polarization of Serbia. Foreign investors were primarily interested in profiting from the privatization of the former state-owned companies. Therefore, the privatization policy which was directed to higher and faster profit, and not toward modernizing production capacities or maintaining employment rate, was particularly convenient.

Secondly, the priority problems of Serbia are still the external trade deficit and a relatively small number of export-oriented projects by foreign investors. The economy of Serbia requires larger FDI that would encourage productivity and technological progress, i.e. FDI more directed towards trade and processing industry (metal processing, textiles and automotive industry). By enhancing competiveness and economic efficiency, including and owing to FDI, the balance

of trade deficit will not pose a problem. Furthermore, the economic growth can significantly promote export expansion and vice versa.

Thirdly, likewise, we have also found that FDI inflows have no obvious effect on unemployment. The relationship between FDI inflows and unemployment shows very low correlation (r=0.023). During the analyzed period, the transfer of formally employed workers to real sector of economy occurred. The process of transition in Serbia led to a decrease in the number of employees in state-owned companies and consequently to a decline of formal employment.

Fourthly, we have found that a feedback relationship exists between exports, growth of GDP and inflow of FDI. Thus, an appropriate development strategy of Serbia such as providing incentives for economic growth and FDI can lead to export growth. The essential problem of Serbia is a lack of export products and services and non-competitiveness. Therefore, the biggest economic problems of Serbia are the significant trade deficit, the low employment rate and, above all, the lack of investment and technological innovations and an unfavourable image of the country abroad. Increasing export requires new projects, programs and products, and they are most easily achieved with the help of foreign capital and world transnational companies. Economic growth and exports expansion can significantly decrease unemployment. This result means that rapid economic growth and expansion of exports, accompanied by higher per capita income, usually increase output growth. Thus, foreign corporations and domestic firms will demand more labor force with skills to create products. The final finding is that exports not only attract inward FDI but also stimulate economic development in the long-run. The process of joining the EU is of significance for foreign investors. If they are already interested in investing in Serbia, and if Serbia is about to obtain the EU candidate status, they will be convinced that Serbia is getting ahead with reforms, so they will invest here in order to be the first in the market.

Fifthly, the large benefits Serbia has had from the inflow of FDI since 2000 refer to the significant transfer of technology and the domino effect on the domestic economy, the enhancement of competition on the local market, and improving the business environment in Serbia, connecting and involving domestic companies into the international technological, production and distributive networks, training of employees etc. The flexibility and ability of the labor market to attain new knowledge and skills are compatible with new business principles. Finally, inflows of FDI to Serbia are still moderate (2011, FDI amounted to 5% GDP) which can be explained by the impact of the world economic crisis on reducing FDI, the exhausted possibilites of privatization and the structural weaknesses of the economy.

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The Role of Business Incubators in Supporting the SME Start-up

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Abstract: A range of factors determining the extent and success of entrepreneurship have a local dimension: they are either strongly affected by local phenomena and/or they are best supported by initiatives conceived and implemented locally. Entrepreneurship can be locally fostered through business incubators. The role of business incubators is to accelerate the successful development of entrepreneurial companies through an array of business support resources and services, developed and managed by incubator management and offered both in the incubator and through its network of contacts. The main aim of the article is to present the role of incubators as a means of supporting the small and medium enterprises. The article is divided into three parts. In the first part is presented the core of incubators, incubator types and goals. In the second part is explained the role of business incubators in fostering local dimension of entrepreneurship. In third part of the article we describe the building of business incubators in Slovakia and their role as a means of helping to start entrepreneurship as well as of helping to support technologically oriented SMEs in Slovakia. The paper was elaborated as a part of VEGA project 1/0654/11, "Innovative small and medium enterprises as a part of knowledge based economy in Slovakia".

Keywords: incubator; small and medium enterprises; start-up; types of incubators; business incubator; technological incubator; virtual incubator; role of business incubator

1 Introduction

Business incubators began in the 1960s and really took off in the late 1990s as support for start-up companies who need advice and venture capital to get their ideas off the ground. Business incubators are programmes designed to accelerate the successful development of entrepreneurial companies through an array of business support resources and services, developed and managed by incubator management and offered both in the incubator and through its network of contacts [15].

The main goal of a business incubator is to encourage the development of new business within the local community. By assisting a local entrepreneur to start a company in the area, the community is likely to benefit from an increase in the number of available jobs in the area and the additional revenue that is brought to the city or town as a result of the new business activities. Both elements can help to revitalize a local economy and thus enhance the quality of life for everyone who lives and works in the area. The main aim of the article is to present the role of incubators as a mean supporting the start-up small and medium-sized enterprises. The article is divided into three parts. In the first part is presented the core of incubators, incubator types and goals. In the second part is explained the role of business incubators in fostering local dimension of entrepreneurship. In third part of the article we describe the building of business incubators in Slovakia and their role as a means to help to start the entrepreneurship as well as to help to support technologically oriented SME in Slovakia. The paper was elaborated as a part of VEGA project 1/0654/11, "Innovative small and medium enterprises as a part of knowledge based economy in Slovakia".

2 The Role of Business Incubators

Business incubators aim to assist new entrepreneurs with business start-up. The business incubator helps to fill a void which is found in many areas. Not everyone is able to spend the time or money necessary to attend college and obtain a business administration degree. Further, not everyone has access to resources that can fund a new business effort until it becomes profitable. Incubator programs help to fill the gap by providing rudimentary training to entrepreneurs, a space to launch the business, and in some cases contacts between the new business owner with others who are in a position to invest in the future of the company [2].

The incubator cannot replace business initiative, personal effort and resourcefulness. There is a term used called "incubator syndrome" in which the entrepreneur allows their initiative and judgement to be replaced by those of the consultants in the centre. While the consultants may give superb advice, it is the entrepreneur's responsibility to make the business succeed.

Incubators vary in the way they deliver their services, in their organizational structure, and in the types of clients they serve. Classical incubators are business incubators oriented towards giving support in starting the business through advice, lease of space, and the offer of the administrative infrastructure and other services. They may also have good connections to sources of funding, but they are seldom themselves business investors. Technological incubators support technologically oriented firms mostly as start-up and spin-off firms. They cooperate close with universities, research institutions and science and technological parks [14]. Many of incubation programs serve affiliate or virtual clients. These companies do not

reside in the incubator facility. Affiliate clients may be home-based businesses or early-stage companies that have their own premises but can benefit from incubator services. Virtual clients may be too remote from an incubation facility to participate on site, and so receive counselling and other assistance electronically. This virtual model suits those entrepreneurs who need the advice offered by an incubator but who still want to maintain their own offices, warehouses, etc. [1].

Incubators differ from science and technology parks in their dedication to start-up and early-stage companies. Science and technology parks, on the other hand, tend to be large-scale projects that house everything from corporate, government or university labs to very small companies (both of them – science as well as technology parks – tend to be for established companies paying commercial rates). Most science and technology parks do not offer business assistance services, which is the core of a business incubation program. However, many science and technology parks house incubation programs [3].

Most common incubator services are: help with business basics, networking activities, marketing assistance, help with accounting and financial management, access to bank loans, loan funds and guarantee programs, access to angel investors or venture capital, help with presentation skills, links to higher education resources, links to strategic partners, help with comprehensive business training programs, advisory boards and mentors and technology commercialization assistance. Although most incubators offer their clients office space and shared administrative services, the heart of a true business incubation program are the services it provides to start-up companies.

Unlike many business assistance programs, business incubators do not serve any and all companies. Entrepreneurs who wish to enter a business incubation program must apply for admission. Each community sets criteria that applicants must meet in order to participate in the business incubator. Acceptance criteria vary from program to program, but in general only those with feasible business ideas and a workable business plan are admitted [10].

The amount of time a company spends in an incubation program can vary widely depending on a number of factors, including the type of business and the entrepreneur's level of business expertise. Firms with long research and development cycles require more time in an incubation program than manufacturing or service companies that can immediately produce and bring to market a product or service. Most businesses that use an incubator will stay there for up to a year, but by then should have grown sufficiently to move into their own facilities. Many incubation programs set graduation requirements by development benchmarks, such as company revenue or staffing levels, rather than time in the program.

Incubators do charge for the facilities and resources that they supply, but since nearly all are supported in some manner by government or regional grants, the charges are subsidised and lower than in the market place. Because many of incubators are regionally funded, or because a young company would require such a facility to be local to them, they are mostly identified by region [5].

The types of companies that find business incubators most helpful tend to be hightech, or knowledge-based businesses. The main industry sectors intentionally supported by incubation programmes in Europe are given in the Table 1.

Industry sectors/Business activities	%
Biotechnology, pharmaceutical sector	14,2
Hi-tech sector	18,6
IT sector	18,2
Combination of more activities	9,5
Business and financial services	0,6
Retail, marketing and distribution	0,4
Services/Professional	8,8
Knowledge oriented services	11,5
Creative industries	6,1
Research and development	12,2

Table 1	
Main industry sectors supported by incubation programmes in Europ	е

About one-third of business incubation programs in Europe are sponsored by economic development organizations. Government entities (such as cities or counties) account for 21% of program sponsors. Another 20% are sponsored by academic institutions, universities and colleges. In many countries, incubation programs are funded by regional or national governments as part of an overall economic development strategy [16].

3 Business Incubators – Programmes Fostering Local Dimension of Entrepreneurship

A range of factors determining the extent and success of entrepreneurship in a country have a local dimension: they are either strongly affected by local phenomena and/or they are best supported by initiatives conceived and implemented locally.

A trend devolving resources and decision-making power to regional and local levels has occurred since the late 1960s [13]. As a result, local and regional governments in OECD countries have developed an array of enterprise development programmes with a variety of objectives and target groups. They include efforts to improve enterprise dynamics, particularly start-ups, by tapping

Source: State of the Business Incubation Industry, 2006

into latent entrepreneurial ability, improving the regional business climate and facilitating collaborative behaviour.

Indeed, there are particular advantages in supporting entrepreneurship through local programmes: actions can be better tailored to the specific needs of an area and its businesses, and the involvement of a wider range of actors can bring a mix of competencies to this issue.

The fact that the extent and likely success of entrepreneurship is frequently tied to the local milieu demands creative policy thinking from both local and central governments [4]. Indeed, a policy which fails to account for regional and local differences will likely be suboptimal.

David J. Storey (1994) identifies six significant influences on new firm formation which can vary from region to region. These six factors are:

- a) demographics regions with young populations tend to produce more firms, and rates of start-up are generally higher in urban than in rural environments,
- b) unemployment through different routes this can both encourage or diminish business start-up rates,
- c) wealth it is expected to produce in wealthier areas more business startup owing to higher levels of demand and greater availability of capital,
- d) the educational and occupational profile of the workforce may have contradictory effects on business start-up, as persons with superior qualifications will more likely find employment but may also have superior means with which to create their own enterprise,
- e) the prevalence of small firms it is argued that employees in small firms will aspire to own other small firms,
- f) the extent of owner-occupied housing property is viewed as a frequent source of start-up capital for entrepreneurship.

The economic characteristics of the location in which the business incubator is established greatly affect its operation and its usefulness. Business incubators should maximise synergies with the local business environment. The areas chosen as incubator sites should ideally provide access to markets for products or services (as small firms within an incubator stand to benefit from trade and networking with large companies outside), a degree of business expertise in the community, diverse financial resources, and local commitment to the incubator programme. In many countries the operation of many incubators is overseen by an advisory board comprising representatives of the local business community. Many cases confirm that prior to establishing a business incubator, it may be necessary to improve the local climate for entrepreneurship with the aim of encouraging demand for the services an incubator would provide. In this vein, a 1994 evaluation of science parks in the United Kingdom found that a critical issue was to increase the supply of high-tech firms.

An important issue in the functioning of business incubators in a region is the nature of their interaction with institutions of higher education. The support of start-up firms – particularly high-technology firms – around university centres are cases in this point. Many institutional permutations are possible; some involving a greater degree of involvement of the academic community in business development than others. In such cases, suitable divisions of labour between academic activity and enterprise development must be found – for instance as between applied and general research [7]. A related tension stems from the fact that industry often operates with short-term time-frames, while universities may pursue longer-term research objectives.

The popularity of incubators has become widespread. Local authorities consider business incubators a useful instrument for nurturing a more entrepreneurial climate while reducing the failure rate of small enterprises.

4 Supporting SME Start-up by Means of Incubators in Slovakia

The building of an incubator network in Slovakia started in 2002. By 2009, 16 incubators were established in various regions of Slovakia with state budget support, pre-accession Phare Programmes, and structural funds. Apart from the above, 1 training (virtual) incubator was established in Rimavska Sobota [11].

In 2009, the Programme "Support of SME via the network of incubators and implementation of the research-based spin-off method" supported 5 incubators in with a total amount of 53 598 Euros from the state budget [10]. The incubators covered with these funds provided a part of operational costs and loss incurred due to the provision of leases for prices lower than commercial market prices and due to provision of additional services for lessees.

Incubator	City	Contribution in EURO		
Business incubator	Handlová	13 355,27		
Incubator	Moldava nd Bodvou	9 604,43		
Technological incubator (TI)	Prievidza	6 523,21		
TI INOVATECH	Sládkovičovo	16 293,30		
TI in Science and	Žilina	7 821,83		
Technological Park				
Total sum from state budget		53 598,04		

 Table 2

 Overview of funds expended for support of operation of incubators in 2009 from the state budget

Source: http://www.nadsme.sk

The business incubator in Handlová reached an occupancy of 76% as of 31 December 2009, of which the occupancy rate of incubated companies was 87%. In comparison with the previous period, the number of incubated companies was reduced from 13 to 12 (a combination of various activities) employing 42 employees. Activities/services of the incubator are oriented towards IT courses, counselling for starting entrepreneurs, e.g. related to income tax returns or annual financial statements, consultations related to requests for micro-loans and creation of business plans. At the same time, the incubator leased the premises and technology to incubated companies, provided clerical service and promoted the services offered by the incubator.

The incubator in Moldava nad Bodvou reached an occupancy rate of 55% as of 31 December 2009, of which the occupancy rate by incubated companies was 100%. The number of incubated companies was 11 (retail, distribution, services). Activities/services of the incubator are: lease of premises, promotion of the incubator activities, working on projects.

The technological incubator in Prievidza reached an occupancy rate of 72% as of 31 December, 2009, of which the occupancy rate by incubated companies was 85%. Within the monitored period, the number of incubated companies was reduced to 22 (mostly small technological firms) and the number of jobs was reduced to 98. The activities/services of the incubator are oriented towards trainings, counselling for starting companies and the companies in long-term care, counselling related to the provision of micro-loans, various project activities, and lease of premises and technology.

The technological incubator INOVATECH Sládkovičovo reached an occupancy rate of 57% as of 31 December 2009 (of which the occupancy rate by incubated companies was 58%), and placed 10 incubated companies with 66 jobs. The activities/services of the incubator are the lease of premises, lecture halls with equipment, a conference room, providing the access to PC rooms, counselling and cooperation in the creation of business plans and in the process of acquisition of funds, administration services for incubated companies, and the promotion of the services provided by the incubator. The incubator became a network partner of the Microsoft's "BizPark" Programme, which is designed for "start-up firms" [9]. Several meetings, seminars and presentations related to entrepreneurship took place in this incubator. The incubator started cooperation with the Academy of Education in Galanta, a potential partner for education and counselling.

The technological incubator in Science and Technological Park in Žilina reached an occupancy rate of 89% in the monitored period, of which the occupancy rate of incubated companies was 84%. In comparison with the previous period, the number of incubated companies dropped to 34 and the number of jobs in incubated companies is 149. The activities/services of the incubator are the lease of premises and providing administration services, counselling, consultation in the field of SME, the creation of the project for construction of a new incubator building, a member of the first IT cluster in the Slovak Republic - Z@ICT, a member of cluster in automobile industry TPI-TEC, the presentation of companies in the incubator, the creation of the design of the technological transfer model at Technical University in Žilina to prepare the conditions for effective commercialisation of research and development results, and the organisation of events for students (for example the campaign, "Do you have an idea?", with the aim to address new clients).

The number of incubated enterprises is a significant factor of fulfilment of goals of the incubators as well as of the national programme [9]. As of 31 December 2009 the 5 mentioned incubators placed in the operational premises together 89 starting enterprises, which created 449 jobs. The average total occupancy rate in five incubators, to which a contribution was provided in 2009, was 69%, of which average occupancy rate by incubated companies was 81%.

As to the total, by 31 December 2009, 214 incubated companies, which created together1 3288 jobs, were placed in 16 business and technological incubators in Slovakia. Another 64 jobs were created in the management and administration of the incubators. The average total occupancy rate in incubators was 79%, providing the interest of starting entrepreneurs in incubator services and importance of investments for their establishment and operation [6].

Incubator	Total area for lease in m ²	Occupancy Rate in m ²	Occupancy rate in %	Number of incubated companies	Number of jobs	Number of jobs in management and administration
Business Incubator and Technological Centre B.Bystrica	1 066	866	81 %	14	83	4
Incubator Bratislava	197	114	58 %	8	92	5
University Technological Incubator STU Bratislava	780	623	80 %	12	45	3
General Business Incubator Gelnica	2 600	2 487	96 %	6	126	4
Business Incubator Handlová	951	724	76 %	12	42	3
Scientific-Technological Incubator Košice*	х	х	х	11	124	5
Incubator Malacky	2 412	2 002	83 %	24	65	8
Martin-Flemish Business and Incubator Centre Martin	1 075	541	50 %	18	79	3
City Incubator Martin*	х	х	х	х	х	х
Business Incubator Spišská Nová Ves, Part 1	740	665	90	5	48	2

 Table 3

 Business and technological incubators in Slovakia (as of 31 December 2009)

Business Incubator Spišská Nová Ves, Part 2	1 233	1 037	84 %	3	10	1
Incubator House, Moldava nad Bodvou	735	403	55 %	11	94	3
Technological Incubator Centre Prešov	898	893	99 %	12	131	6
BIC, Technological Incubator Prievidza	1 084	780	72 %	22	98	4
Business Incubator Rožňava	1 877	1 376	73 %	12	76	3
Technological Incubator Inovatech Sládkovičovo	1 159	656	57 %	10	66	6
Science and Technology Park, Žilina	770	685	89 %	34	149	4
Total	17 577	13 852	79 %	214	1 328	64

* statistical data for these incubators are not available

Source: http://www.nadsme.sk

Over the last several years there is evident development of business incubators in Slovakia. They help many entrepreneurs and to create conditions to start the entrepreneurship, but also help to support technologically oriented SMEs. There is no one perfect model for a business incubator. Some designs are very similar to the development centres. Others are more focused on the demands of the local culture and business community and follow a format that is more in line with specific local needs. Often, the exact structure of the business incubator program depends on who is backing the effort, as well as what organizations contribute to the continued operation of the program [8].

Conclusions

Business incubators form an important part of the support infrastructure for small and medium enterprise start-ups in Slovakia. Their mission is to provide the starting companies (usually for a period of 3 years from the commencement of business) with complex support on one spot and create favourable starting conditions to enable the operation of their enterprise. The main services provided are the lease of office space, production and storage premises at prices lower than the usual commercial market prices and administration support for the companies (e.g. providing of conferences and showroom premises, certain clerical services, technical infrastructure and others). Apart from business premises, the incubators provide their clients with educational services and counselling (e.g., the creation of business plans, counselling related to the acquisition of funds for entrepreneurship, the elaboration of the marketing strategy, mediation with contacts, and the like). The extent and form of support in individual incubators varies depending on type, specialisation and capacity. It can be summarized that business incubation helps to meet a variety of economic and socio-economic policy needs in a country, which may include business creation and retention, technology commercialization, creating jobs and wealth as well as fostering a community's entrepreneurial climate.

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Comparing Start-up Propensities and Entrepreneurship Characteristics of Students in Russia and Germany

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Abstract: This paper comes along with the international research project "Foundation and Entrepreneurship of Students" (GESt-study) which aims to analyze target group differentiated start-up propensities and entrepreneurship characteristics of students in diverse countries to derive demand-oriented recommended actions for an appropriate conceptualization of entrepreneurship education and support. The results of this country comparison illustrate that the students in Russia show higher start-up propensities and usually deal stronger with entrepreneurship than the students surveyed in Germany. However, this stronger motivation in Russia to create start-ups is based on economic necessity, which often does not depend on innovative business ideas. In contrast, the students questioned in Germany recognize coaching and consulting as more important start-up support than their fellows from Russia – leading one to assume that they stand in later phases of the start-up process and intend more complex and challenging business ideas. Furthermore, the students in Germany regard their own financial risk and fear of failure as higher start-up barriers, whereas their Russian fellows lack stronger entrepreneurial qualifications. Altogether, both student groups should be imparted particularly start-up specific basic knowledge as well as entrepreneurial skills during the whole their studies and on the basis of an interdisciplinary approach.

Keywords: entrepreneurship; business start-up propensity; students; Russia; Germany

1 Introduction

Entrepreneurs are since the beginning of the 1980s an increased focal point of economists and governmental politics [5]. The emergence of entrepreneurship depends on the one hand on values and on the other hand on corresponding incentives as well as entrepreneurial assistance [27, 5]. The implementation of an appropriate entrepreneurship support infrastructure is tied to knowledge about technology, globalization, societal developments as well as the nuances of entrepreneurship. In order to develop a theory of entrepreneurship, it is required to analyze individuals, organizations and the context [3]. The individual on her own can hardly change her personality and cultural background. However, she can be integrated into a context that facilitates the recognition of entrepreneurial opportunities as well as the ambition to realize them [38].

This paper aims to compare start-up propensities and further entrepreneurship characteristics in Russia and Germany regarding the student target group. Russia has emerged since the early 1990s as a market economy. In Russia, a huge proportion of young persons are fascinated with the idea of the free market economy and with some Russian entrepreneurs - the oligarchs, several of whom, especially during the transformation phase, achieved enormous wealth [19, 5]. Certainly, the reality of entrepreneurship in Russia is clearly more complex [11]. Although in Germany the public entrepreneurship support infrastructure is developed better in an international comparison, cultural barriers exist that result in relatively little start-up activity [6]. Both Germany and Russia show, according to the Global Entrepreneurship Monitor (GEM), a comparative low Early-Stage Entrepreneurial Activity (TEA) rate of about four percent. In the group of efficiency-driven economies, Russia even ranks in the last place [4]. Due to the high fluctuation range of the TEA between groups as well as inside the country groups, in addition to the economic wealth level, there must be also further causalities that are decisive for the emergence of start-up propensities and start-up activities. International comparisons enable the exploration of other entrepreneurial determinants. Though the GEM presents some evidence of entrepreneurship criteria, this is neither the case concerning the fundamental scope of detectable influencing factors, nor regarding the target group of students [29]. This article aims to consider which circumstances exist in the student domain. An adequate design of entrepreneurship education and entrepreneurship promotion can be realized based on insights through the analysis of student entrepreneurship characteristics in the pre-start-up process [32].

2 Selected Politico-Economic and Sociocultural Frame Conditions of Entrepreneurship in Russia and Germany

Entrepreneurs utilize innovative opportunities on regional, national and international level and thereby create a basic condition for the attainment of economic stability. Product, process and service innovations of start-ups created particularly by graduates create new markets as well as steady employment for the highly skilled, and they sustain economic competitiveness [14, 15]. In this connection, investments of increasing efficiency form the basis for the growth of the Russian economy as well as the German [29].

As determinants for entrepreneurship, social scientists emphasize on the one hand the institutional perspective that focuses the role of economic, political, and judicial bodies in entrepreneurship promotion; on the other hand, they emphasize the entrepreneurship shaping sociological variables, such as social norms, values, and social networks, including relatives, friends, and social groups, as well as the individual character traits of entrepreneurs, for instance the need for achievement, self-confidence, self-reliance, and risk ambition [12, 10]. The aspects of the institutional perspective include the surrounding politico-economic conditions. The sociological variables and the individual traits can be united into a sociocultural perspective [29]. Consequently, this section is subdivided into politico-economic and sociocultural framework requirements for entrepreneurship.

2.1 Politico-Economic Framework Requirements for Entrepreneurship

Although in Russia two thirds of the enterprises survive the difficult phase of market entry, 90 percent of all firms fail during the first three years. Despite their remarkable economic and social importance in Russia, smaller enterprises demonstrate an exceeding low competitiveness and survivability [36]. This problem can solely be counteracted by a long-term-oriented and smaller businesses-focused public policy. Hence, previous laws and regulations concerning the realization of the right to self-employed work have already been supplemented. Moreover, a system of institutions for the promotion and development of smaller enterprises exists, comprised of the public committee of the Russian Federation in "Support and Development of Smaller Enterprises", further bodies of executive power, smaller enterprises supporting funds, the Russian Chamber of Commerce and Industry as well as public entrepreneurs' associations. In addition, in more than 70 parts of Russia, structures within the institutions of the executive power have been established that focus via regional programs on the support of smaller enterprises. Furthermore, a network has emerged of infrastructure entities such as business centers, business incubators, centers for innovation and technology, or techno-parks, founded by, amongst

others, the Russian Agency for the Support of the Development of Small and Medium-sized Enterprises [36].

The problems of small and medium-sized enterprises (SME) often result from a lack of higher managerial knowledge, which is on the result of unavailable qualification chances and which leads to lower economic competency on the market [21]. This managerial incompetence is counteracted for example by several offered further education and distance learning concepts for enterprisers, for some years now at Saint Petersburg State University [36].

In May 2010, the head of the Agency for Support and Development of Small and Medium-sized Enterprises in Moscow declared that in 2010 approximately 2.3 billion rubles to subsidize small enterprises would be available, and a further two billion rubles was available to promote innovation [22]. Thus the governmental business start-up promotion is effected through targeted subsidies, singular benefits as well as regional guarantee funds. Russian experts act on the assumption that start-up and SME support programs pools the responsible ministries and agencies – having long-ranging positive effects on economic climate and SMEs [23]. In addition, the regions in Russia offer their own start-up support programs. However, in Russia experts criticize the governmental support programs as rather negative because they were not sufficiently developed and coordinated and, thus, did advance adequately the start-up culture in Russia [13, 40].

In contrast, according to international experts, Germany actually possesses worldwide the best public start-up and SME support infrastructure [7]. Thus, the relatively low rate of start-ups in Germany is all the more surprising, and therefore could be attributed more strongly to the surrounding sociocultural conditions for entrepreneurship [29]. Since 2003, the Bank for Small and Medium-sized Businesses of the Development Loan Corporation is responsible for subsidized loans at the federal level. The Federation, the Special Assets of the German Federal Government (ERP), the federal states as well as the European Union promote business start-ups through support programs, mostly via low-interest loans but also via free grants. In the initial stage, the loans are free interest and require no repayment; generally, they have low interest rates and require little security [28, 40] and thus lay good foundations for the financing of business start-ups.

2.2 Sociocultural Framework Requirements for Entrepreneurship

Despite the economic relevancy of entrepreneurship, studies about Russian entrepreneurs and comparisons with their western ideals barely exist, especially regarding psychological aspects. Scientists have elaborated entrepreneurshippromoting psychological factors such as the drive for success, the need for achievement, risk ambition, and innovativeness. Their occurrences are also influenced by cultural values and, thus, are usually differently pronounced in diverse cultures. Therefore, one may assume distinctions between Russian and German entrepreneurs as regards these entrepreneurship-promoting psychological aspects [39].

Contrary to individualistic Germany, in Russia, with its restrictions as regards economic autonomy, the drive for success and the need for achievement are culturally not deep-seated values. In addition, both Russia's and Germany's culture can be regarded as high in uncertainty avoidance, high in risk aversion, and low in innovation preferences [17, 39]. Moreover, the collectivist attitude in Russia, combined with the high uncertainty avoidance, reduces more strongly the innovation activity than in Germany [16, 39].

As a result, the Russian culture does not intensify the decisive psychological aspects, and assumingly lower than in the German culture, which can linked to the lack of a strong entrepreneurship tradition. Certainly, in the context of evaluating the illustrated assumptions, in addition to the cultural surrounding conditions, the politico-economic progress also must be considered. In a comparison between Russia and the USA – like Germany, an individualistic culture and, furthermore, with a remarkable TEA of eight percent [4] – the expected lower drive for success and need for achievement in Russia could not be confirmed empirically [39].

The anticipated lower risk propensity in Russia could be affirmed, at least concerning growth-oriented entrepreneurs, but not regarding enterprisers focusing on income generation. This could be reasoned by the influence of Russia's economic conditions, considering the higher risk to work in growth-oriented private enterprises subject to a dramatic reorganization. The assumed lower innovativeness in Russia could not be approved empirically [39].

In Germany, graduates traditionally prefer positions in big-sized companies or the public sector. In Germany, security, risk avoidance and social stability are fundamental values, and the society is affected by a certain anxiety. Entrepreneurship, however, is based on achievement and the willingness to take manageable risks. It seems that the need for achievement and risk tolerance are higher than in years before [20]. Due to higher financial dimensions, especially in high-tech sectors, the risk of failure is accompanied by serious consequences. In view of Basel II and the economic crisis, the financial institutions demand higher securities on credit initiations. Accordingly, the Founder Report 2010 shows that only six percent of the consulted potential founders focus on the high-tech sectors - a loss of 21 percent since 2006. However, the quality and the innovativeness of the business concepts would lag behind. Nevertheless, in Germany, for the first time in four years, noticeably more persons intend to create an enterprise, the chief motive of which is a way out of unemployment, whereas realizing their own ideas appears less important [9, 25]. Regarding the student target group, a similar influence of the economic crisis could be found, with similar results as regards looking for a way out of unemployment and realizing own ideas as start-up motives, but there were contrary results regarding the start-up propensity [33].

This is not a positive signal for future innovations and the creation of high-skilled employment. In Germany necessity entrepreneurship traditionally can frequently be seen, and opportunity-driven entrepreneurship only at a low level [7]. But it is precisely opportunity entrepreneurship that has positive effects on economic development [2, 1].

3 Research Design

Based on a literature review a theoretical reference framework of student start-up propensities [34] has been derived to identify and test potential influencing factors within the student start-up process. In order to analyze the student start-up propensities in the narrower sense, moreover, the *foundation ambition types-model* [30] has been applied. The foundation ambition types are categorized as follows [35]: The *foundation-layman* has not dealt with foundation at all; the *foundation-sensitized* has not yet considered foundation; the *foundation-interested* has already considered foundation but has not started to prepare foundation; the *foundation-preparer* is already engaged in the preliminary foundation ambition types model illustrates the potentially emerging start-up intention in the course of time, whereby it allows for the postulated target group differentiation [35]. Only such a process-oriented approach enables an adequate analysis of structural and situational influencing factors within the pre-start-up process on the potential arising start-up propensity [31].

On the basis of the literature review, the theoretical framework and the foundation ambition types model, a standardized questionnaire has been developed to survey students during their courses. This procedure counters the weaknesses of Internetbased questioning, because it leads to a considerable higher return rate on the one hand [37] and avoids biases due to self-selection effects on the other hand [8]. Hence, more realistic results are generated that permit researches to both question and support the findings of online surveys conducted in this subject area. In addition to students from undergraduate studies [41], postgraduate students with several years of work, leadership and start-up experiences were also questioned.

The results of this article rest upon a large-scale survey that has been conducted since 2007 in Germany and in 2010 in Russia. In this connection, nearly 3,500 students at four German universities and approximately 400 students at 10 Russian universities in six cities have been questioned; the students are especially in the study fields Engineering, Informatics and Business Administration, for the reason that students from these areas represent the highest start-up intentions and activities [18, 15].

4 Results

1

While the German sample were 38 percent from Engineering, 30 percent from Business Administration, one fourth from Informatics and the remainder from other study fields, 47 percent of the Russian sample came from Business Administration, 10 percent from Engineering and 43 percent from other subject areas. 45 percent of the respondents questioned in the Germany study had studied up to three semesters, about one fourth between four and six semesters, 14 percent more than six semesters and approximately 18 percent were in postgraduate studies. In the Russian sample, 30 percent had studied up to three semesters, 53 percent between four and six semesters, 15 percent more than six semesters and only two percent were in postgraduate studies. From the students questioned in Russia, 58 percent are females, while 31 percent were female in Germany. In the Russian sample, the 43 percent of respondents were under 20 years old, while a further 40 percent were between 20 and 25 years old. In contrast, in the German group 63 percent of the students were between 20 and 25 years old and only five percent were under 20. Taken as a whole, the students questioned in Germany were older than those in Russia, a fact due to the differences in the education structure and the higher number of postgraduates in the German sample.

As regards the foundation ambition types, the Russian sample included 40 percent mostly *foundation-interested*, followed by 38 percent *foundation-laymen*, 13 percent *foundation-sensitized*, six percent *foundation-preparers* and nearly four percent *foundation-laymen*, at 52 percent, followed by 28 percent *foundation-interested*, 11 percent *foundation-sensitized* and with almost five percent each *foundation-preparers* and *founders* (Figure 1). In summary, the students surveyed in Russia demonstrate clearly a stronger start-up propensity than their counterparts from Germany.¹ However, compared to the Russian students, the German sample represents more students having already founded an enterprise, which results also from the bigger fraction of postgraduates.

In this connection, the existent differences are statistically most significant ($p \le 0.001$).



Figure 1 Student Foundation Ambition Types in Germany and Russia

In Russia the national start-up climate is evaluated by 84 percent of the students as rather start-up friendly, whereas this portion in Germany is clearly lower with 60 percent, leading to the assumption that the students in Germany perceive the start-up barriers stronger than their Russian comparison group. 73 percent of the Russian sample can be described as willing to take risks, compared to 59 percent of the respondents in Germany, which, as has been pointed out, can be interpreted as a cause for the higher start-up propensity of the students in Russia. Correspondingly, it can be presumed that the Russian students' stronger start-up intentions emerge on the one hand from the conspicuously stronger existent business idea (with 40 percent, vis-à-vis 28 percent in the Germany comparison group); on the other hand, they are reflected in the considerably higher anticipated start-up probability of 52 percent, compared to 38 percent of the German sample.

As regards the planned start-up time, the students from Germany specify on average 4.8 years, while their Russian fellow students, despite their younger age, only 3.1 years. The latter seem better prepared for potential business creation. Accordingly, almost 45 percent of the Russian sample has dealt at least one year with entrepreneurship, which is case for about one third of the German comparison group. Further, 47 percent of the students questioned in Germany have not yet utilized information sources regarding business creation and entrepreneurship – a circumstance which describes only 17 percent of their Russian counterparts. In Russia, this can be ascribed particularly to usually more

often used information sources such as the internet, friends, relatives, literature, college/university, organizations, and enterpriser networks. In contrast, the students from Germany especially access more frequently information sources like chambers of commerce and industry, tax advisers, and banks.

While every second student questioned in Germany indicates not being surrounded by entrepreneurs in his/her private environment, this applies to 37 percent of the Russian sample. Thus, the students in Russia clearly have more points of contact to entrepreneurship within their private environment than do their German comparison group. This could, one the one hand, be the reason why with 60 percent the students in Germany, compared to 55 percent of their Russian fellows, tend stronger toward team start-ups. On the other hand, also the slightly lower existent leadership experiences of the German students underpin the higher tendency to found in a team. Moreover, with 73 percent, vis-à-vis 67 percent of the German sample, a bigger fraction of the students in Russia intends to operate the potential business start-up on a full time basis. In order to become established on the market with their potential new enterprise, the students surveyed in Russia predict a time span of 4.9 years, compared to 5.0 years in the German sample. The former expect needing seed capital of on average 66,000 euros, compared to 181,000 euros indicated by the students questioned in Germany. Almost two thirds of the Russian sample are willing to pay for a business start-up consultation, which applies to about 60 percent of the students in Germany.

On the whole, the students in Russia show usually stronger pronounced start-up motives. Only *autonomy* and *flexible hours of work* are more important to the German group. *Realizing income* is regarded by both student groups as most relevant, followed by *self-actualization*. While within the Russian sample a *way out of unemployment* ranks highly, to the German students *realizing own ideas* is more important. In both samples *realizing a high income* ranks on the fifth place. The most distinct differences in magnitude between both groups as regards start-up motives can be found with *prestige*, *realizing income*, *self-actualization*, and *way out of unemployment*; these are continuously rated as more relevant by the Russian sample (Figure 2). Obviously, to the students from Germany *prestige* has not such an intense relevancy in connection with business creation than to their Russian comparison group, indicating that in Russia the entrepreneur – at least within the comparatively younger student generation – in the meantime has reached a relatively positive social status.



0: very nonrelevant; 1: nonrelevant; 2: relevant; 3: very relevant



As assumed, the start-up barriers altogether are noticed as considerably higher by the students surveyed in Germany, exclusive of *missing entrepreneurial qualifications, low profit, politico-economic environment* as well as *missing available time*. By the students of both countries *missing equity* is evaluated as strongest start-up difficulty, followed by *own financial risk*. In the German sample highly-rated barriers are *missing outside capital, missing customer contacts,* and *extensive official channels,* whereas in the Russian sample these are *missing entrepreneurial qualification, low profit,* and *missing outside capital.* The clearest divergences between the countries exist as regards start-up barriers are *missing customer contacts, missing courage, missing business idea, fear of failure, cyclical state, missing business creation partners, missing entrepreneurial qualification,* and *extensive official channels.* From these mentioned start-up difficulties, the students questioned in Russia evaluate only *missing entrepreneurial qualifications* as more a hindrance than their fellows in Germany (Figure 3).



0: none; 1: smallest; 2: small; 3: fewer; 4: balanced; 5: more; 6: big; 7: biggest



Almost whole the range of the analyzed start-up support measures is more important to the students questioned in Russia. Solely coaching and consulting and to a little extent also courses are considered as more relevant by the German group in which they represent also the most desired support measures, followed by contact bourses with enterprisers, impulsion financing, and specific contact points. To the students in Russia impulsion financing as well as specific contact points are the most relevant start-up support, followed by contact bourses with enterprisers, business plan workshops, and both courses and meetings and discussions with professors (Figure 4). The German sample seems to prefer, at least to a small degree, stronger assistance offered usually in later phases of the pre-start-up process, namely *coaching and consulting*, which is not performed until the business idea can be concretized and realized. In contrast the students in Russia ask, amongst others, more for business plan workshops as well as meetings and discussions with professors - start-up support which can be offered adequately in earlier stages of the pre-start-up process. However, when looking at the five most important start-up assistance measures, both groups show quite a few similarities.



0: very nonrelevant; 1: nonrelevant; 2: relevant; 3: very relevant



Conclusions

Considered generally, the chief reasons for the relatively low portion of entrepreneurs in Russia can be attributed to an insufficient financing situation, high risk avoidance and a strong deficit in entrepreneurial qualifications [12]. This is also shown by the results specifically regarding the surveyed target group of students. How far the principal directions of the Russian economic policy² as well as their reform stages³ [24] have a positive impact on the in this country relatively reserved entrepreneurship depends further on the readiness of the – by a lack of entrepreneurial tradition affected – Russian community members for a mental reorientation [21]. As regards the surveyed students, the tendencies therefor, in comparison with Germany, can be classified as relatively positive.

Compared to Russia, in Germany, with its well-shaped start-up support infrastructure, the socio-cultural framework requirements seem to have stronger barriers for the relatively restrained start-up activity. According to the GEM the – to the labor force referring – TEA almost equals in both countries, whereas regarding the surveyed student target group clear divergences exist in favor of a

² Property rights; fair competition; abolishment of administrative barriers; reduction of tax burden; improvement of the financial infrastructure as well as the social policy.

³ Reformation of the legislature; nationwide development of infrastructure acticities; change to the new, market-economical monetary policy.

considerably stronger pronounced start-up interest in Russia. However, in this country, this beneficial starting basis for a start-up realization is constrained strongly by an anticipated lack of entrepreneurial qualifications. In contrast, the country comparison highlights that the students in Germany show more critical start-up barriers, particularly in the field of networking, taking calculable risks, and having a business idea in mind. Due to the noticeably stronger existent start-up motivation from economic necessity within the Russian sample, it can be assumed that several business ideas lack innovativeness. Another factor underpinning this assumption can be recognized when considering the stronger demand for coaching and consulting in the German sample – a support more relevant in later stages of the start-up process and in more complex and challenging business ideas; this oftentimes is case in the context of innovation.

Altogether, to both the students in Germany (of whom approximately every second has not yet dealt with the topic business creation) and the students in Russia (who are prevented starting an enterprise by a lack of entrepreneurial qualifications) has to be imparted especially start-up specific basic knowledge and entrepreneurial skills, which should be conducted in an interdisciplinary manner and during the whole studies. Moreover, start-up specific contact points should be established and offered to students and graduates, so that the special information demand of prospective founders can be covered by the university as training post for future (self-) employment. Only by dint of an appropriate start-up infrastructure can a positive start-up climate emerge at the universities, which should not push the students to their own business creation but present them self-employment as attractive earning alternative. If foundation-interested students are also supported with consultation during the start-up process by their universities, they will certainly be more open-minded to search actively during studies for potential business ideas – leading finally to more innovative start-ups.

In the framework of the GESt-study a further step could be realized toward the intensification of the cross-national and intercultural collaboration within entrepreneurship research. However, further in-depth analyses and comparisons also with more countries – in terms of learning with and from other nations and cultures – could result in additional knowledge, for example, how the start-up support of students, amongst others in Russia and Germany, could be developed appropriately based on student requirements. In this connection, the paper offers a first overview of similarities and differences within start-up propensities and entrepreneurship characteristics of students in Russia and Germany.

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Financial Market Co-Movement between Transition Economies: A Case Study of Serbia, Hungary, Croatia and Slovenia

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Abstract: This paper tests and analyses the interdependence of financial markets in the transition economies of Serbia, Hungary, Croatia and Slovenia, as well as the similarity of these markets with the US financial market. The source of information is the data obtained from the financial markets of these countries in the form of stock-market indices for the period 05.10.2005-30.09.2011. The main hypothesis to be tested in the work is the assumption that there is a significant level of similarity between these financial markets. The methodology used in the study includes statistical methods of sampling and factor analysis. The research results confirm the hypothesis, which was tested in the work, that there are significant levels of similarity between the financial markets of transition economies, both among each other and with the US market.

Keywords: financial markets; transition economies; stock exchange; stock-market indices

1 Introduction

Transition economies are characterized by an array of specific features and characteristics, given that in these economies the degree of changes – both on micro and macro spheres – are manifested more intensively, market fluctuations are more significant and their effects are more obvious. Also, it is evident that the global business environment is changing very rapidly. [7] The financial markets of transition economies represent the typical conditions and circumstances of these economies in terms of their relative "shallowness", insufficient liquidity and extreme volatility. A significant issue in the modern business reality is the level of

similarities and differences between individual financial markets, especially in the terms of transition economies vs. developed markets. The turbulence of changes, both on the micro and macro levels, raises the question of a linkage between individual financial markets, in terms of an "overflow" of the state and conditions from one financial market to another. These issues have gained in importance particularly in recent years given the present financial crisis and its effects, and also the effects of the crisis transfer from one to other financial markets. Pericoli and Sbracia [9] have very analytically dealt with issues concerning financial contagion in their research. They have pointed to some key questions with which all financial analysts should start their analysis, before trying to get answers on the issues of connection between financial markets. The first question they addressed in their study refers to which channels international shocks should be transferred? The second question relates to the analysis of certain discontinuities in international transmission mechanisms and the third question poses a dilemma in terms of whether international investors and financial policy makers should be concerned about the rising levels of similarity in the forming of stock market prices on various financial markets during periods of market instability. Accordingly, the subject of the study is to test the level of similarities between the financial markets of some transition economies, with special emphasis on the study of similarity of these markets to the US market. The research especially focuses on the crisis period (especially to 2008), as well as on the effects produced by the crisis on these markets and reaching certain conclusions about the similarities and differences of the reactions made by these markets to these effects.

When researching the specific features of financial markets of transition economies, a range of factors that influence the state of affairs on these markets must be taken into account. By this, it is primarily referred to the availability and transparency of information on these markets, the level of efficiency of these markets, the institutional regulation of these markets and the like. Beine and Candelon [8] in their research confirmed the existence of a significant correlation between the volume of trading and the extent of the reforms carried out on these markets in the form of their financial liberalization. Namely, there is a significant similarity between the markets of transition economies in the domain of their institutional framework, approaches in defining trading technologies and the diversity of financial instruments. Consequently, it is interesting to test the level of similarities between these markets, expressed through the stock-market indices, which reflect the actually gained stock market prices on financial markets of transition economies.

Daly [5] in his work, which is engaged in researching and testing the connection between the markets of South-East Asia in the period before and after October 1997, came to the conclusion that no matter that there is evidence of a link between financial markets of South-East Asia, the overall results suggest that there is no significant increase in the level of correlation between the financial markets during the post-crisis period. These results are very interesting, since they suggest the need to further analyse the factors that significantly affect the level of correlation between the financial markets. It is particularly important to test the level of correlation between the financial markets of transition economies, given the fact that these are relatively "young" markets which are extremely vulnerable to the impacts of the environment, are little or not efficient at all, and are highly volatile.

It is especially important to try to provide a precise answer to the question of the relationship between stock returns potentially generated on these markets, based on quantitative grounds. One of the main objectives of this research is to provide high quality, reliable information tested in practice for potential investors on investment opportunities on these markets and thus to reduce the risks of investing activities. Accordingly, it is essential to explore and test the existence of similarities between the financial markets and to try to test the changes in returns that may be made on these markets as well as the links between the markets in question, all in order to offer potential investors quality information on the possibilities of investment diversification.

Ciarlone, Piselli and Trebeschi [1] analysed in their article how much of the reduction in emerging markets spreads can be ascribed to specific factors - linked to the improvement in a given country's fundamentals; rather than to common factors, which are linked to global liquidity conditions and agents risk aversion. They found that a single common factor is able to explain a large part of the co-variation in emerging market economies spreads observed in the last 4 years, and they concluded that emerging market economies do remain vulnerable to sudden shifts in financial market conditions.

Berger, Pukthuanthong and Yang [3] in their research analysed international diversification in the sense of frontier markets. That is extremely interesting for our research having in mind that we are still at the beginning of international diversification in the sense of emerging markets and the possibilities of gaining larger stock returns with smaller investment risk. They proved that frontier markets have low integration with the world market and thereby offer significant diversification benefits.

Albuquerque and Vega [11] analysed the effects that real-time domestic and foreign news about fundamentals have on the co-movement between stock returns of a small, open economy, Portugal, and a large economy, the United States. They concluded that US macroeconomic news and Portuguese earnings news do not affect stock-market co-movement. For our research, this could be interesting, keeping in mind that we analysed co-movements between transition economies and the US market.

Kodres and Pritsker [6] developed a multiple asset rational expectations model of asset prices in order to explain financial contagion with a focus on contagion through cross-market rebalancing. Inci, Li and McCarthy [2] used local correlation to examine financial contagion. They found out that there is reverse contagion from any of the German, British, Japanese and Hong Kong spot or index futures markets to those of the U.S. Corsetti, Pericoli and Sbracia [4] showed that the results of no contagion is due to arbitrary and unrealistic restrictions on the variance of country-specific shocks.

Considering all the above mentioned facts and analysing the research made in the field, it can be concluded that the issue of correlative links between financial markets in developed economies, the links between market returns, the stock returns and the volatility of the developed markets are relatively well explored, but the same cannot be said for the financial markets of transition economies. This is one of the main reasons for the implementation of the present research work, aimed at potential investors and the interested public, offering high quality, tested-in-practice information on the relationship levels between transition market economies, all with the aim of finding specific information on the possibilities of investment diversification.

In that sense, the following hypotheses were tested in the work:

H0: There is a high level of similarity between the financial markets of transition economies, both among themselves and in relation to the US financial market. This is the basic hypothesis of the research, in terms of an ambition to study and test the level of integration between financial markets of transition economies, and the level of similarity of these markets with the US financial market. The starting point of the research is the existence of a significant level of similarity between these markets, which can best be tested on the example of stock-market indices that represent the actual transactions carried out on them.

H1: The returns on these financial markets show a statistically significant correlation. This hypothesis is rooted in the previous research hypotheses, since by analysing stock-market indices, among other things, we analyse the potential returns generated. In other words, by testing this hypothesis the aim is to prove or to deny the thesis that if financial markets are substantially similar, then it is reasonable to expect that the returns on these markets are significantly correlated as well, and vice versa.

H2: Changes in stock-market indices on these financial markets are inter-linked. The aim is to test the variability level of stock-market indices, in the sense whether certain market laws are possible to be set on the movements of the stock-market indices of these markets.

The obtained research results will be significant not only to the field experts and professionals but also to a wider academic audience because it will confirm or deny the existence of links between the financial markets of transition economies and a correlation of these markets with the US financial market, which will provide important information both to potential investors and portfolio analysts. Also, through research, the direction of these relationships will be tested, as well as the links between the returns which can be achieved on these markets, in terms

of testing correlative relationships between the stock-market indices of these economies. Bearing in mind that relatively few studies have been published on this topic so far, it is assumed that this research will represent a significant contribution to the research's subject area, especially keeping in mind the recessionary conditions on the financial markets in general.

The study is organized as follows: in the first part, the introductory remarks are presented with a comparative overview of the representative research made in the field. In the second part, the used methodology is presented. In the third section, the data and the results are shown, while in the fourth section the conclusions are presented.

2 Methodology Review

The methodology used in the research is aimed towards gaining concrete, practically tested knowledge about the level of similarities between the observed financial markets. In order to obtain reliable analysis results, the analysed sample covers the period between 05.10.2005-30.09.2011, i.e. a total number of 1508 days were observed. During the observed period, the values of stock-market indices and their changes over time were analysed, as the stock-market indices represent the closed - realized market prices on the observed financial markets. Given that the stock exchanges are considered to be the typical institutions of the financial markets generally, it made sense to take stock-market indices into the analysis. The sample was taken from the following stock-market indices: Belex15, BelexLine, Crobex, SBItop, Bux, DJIA, S&P500. The stock-market indices of Belex15 and BelexLine were deliberately taken into account as a way and aspect of internal control of the given results, because it was expected that the two stockmarket indices would have behaved very similarly as time passed. Bearing in mind all mentioned, it can be concluded that the sample chosen for the research is representative, and that the given results will be the result of original scientific research based on representative samples and the application of appropriate scientific methodology.

In the first part of the research, the analysis of the sample was carried out, both in terms of a single year, and the overall sample. The data is first calculated by the arithmetic mean and standard deviation. The obtained values of the mean and standard deviation values indicate movement of the sample over time and the amplitude-change values.

Standard deviation shows how the sample elements deviate in average from their arithmetic mean, and are calculated by using the formula [12]:

$$\sigma = \sqrt{\frac{1}{n}} \sum_{i=1}^{n} \left(x_i - \overline{x}\right)^2 \tag{1}$$

where:

n - the number of elements in the sample

- x (x-bar) the arithmetic mean of the sample
- $x_i (\underline{i} = 1, 2, ..., \underline{n})$ the `i`-th member of the sample

In the further studies we used factor analysis [10]. With factor analysis the variables are grouped into factors, which provide variables that are related, i.e. which behave similarly. In this way, the initial set is reduced to a number of extracted factors which contain the information about the mutual relationship of all variables. The formula used for this purpose is [10]:

$$y_i = \mu_i + \sum_{j=1}^k \lambda_{ij} f_j + \varepsilon_i$$
⁽²⁾

where $\varepsilon_i \sim N(0, \psi_i)$ and $\varepsilon_{1,...,\varepsilon_p}$ are independent. Note that (2) appears to be a multiple linear regression problem except that the values of $f_1,...,f_k$ are unknown. The parameter λ_{ij} , relating the *i*th variable with the *j*th factor, is called a factor loading.

In order to present the results more concise, the model presented in the formula (2) can be written in a matrix form. Let $y' = (y_1, ..., y_n), f' = (f_1, ..., f_k),$ $\varepsilon' = (\varepsilon_1, ..., \varepsilon_p), \ \psi' = (\psi_1, ..., \psi_p) \text{ and } \Lambda = (\lambda_{ij}).$ In this way we get the following formula [10]:

$$y = \mu + \Lambda f + \varepsilon \tag{3}$$

where $\mu = (\mu_1, ..., \mu_p)$ and $\varepsilon \sim N_p(0, \psi)$, with $\psi = diag(\psi_1, ..., \psi_p)$. By taking the mean of variance y, we obtain:

$$E(y) = \mu, \tag{4}$$

$$\operatorname{cov}(y) = \Lambda \Lambda' + \psi \equiv \sum.$$
(5)

In the research we derived the estimators as solutions of the equations:

$$diagS = diag(\Lambda\Lambda' + \psi)$$
 and $\Lambda = S(\Lambda\Lambda' + \psi)^{-1}\Lambda.$ (6)

When the initial choice of the factor loadings Λ was made in the research, the next step is to "rotate" the factors to obtain ones that are easily interpreted. The model

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that is considered in (3) assumed the factors $f_1,...,f_k$ to be independently distributed as N(0,1). [10] That is,

$$f \sim N_p(0, I). \tag{7}$$

If we premultiply out factors by a p x p orthogonal matrix Γ , we have:

$$f^* = \Gamma f \sim N_p(0, I). \tag{8}$$

This model can be also written:

$$y = \Lambda f + \varepsilon = \Lambda \Gamma' \Gamma f + \varepsilon = \Lambda \Gamma' f^* + \varepsilon.$$
(9)

If we wish to relax our condition of independent factors, we can premultiply our factors f by an arbitrary matrix A, obtaining

$$f^{**} = Af \tag{10}$$

Hence (8) becomes

$$y = \Lambda f + \varepsilon = \Lambda A^{-1} A f + \varepsilon = \Lambda A^{-1} f^{**} + \varepsilon.$$
(11)
where $f^{**} \sim N_p(0, A A')$

3 Data and Results

For the purpose of the study a representative sample was formed, which includes the daily values of stock-market indices of Serbia, Hungary, Croatia and Slovenia, as transition economies from the region of South-East Europe; and also the daily values of the S&P500 and DJIA stock-market indices were analysed, as representatives of the typical conditions and circumstances on the US financial market. The time period covered by the survey is the period from 05.10.2005 to 30.09.2011. The data are collected from the official stock exchange web sites. Statistically, this is a representative sample which covers a large amount of information that could be characterised as reliable, because they represent official information about the movements of stock-market indices on the observed stock exchanges. In 2005, the sample has 63 days; in 2006 a total of 248 days; in 2007 it has 251 days; in 2008 the sample consists of 254 days; in 2009 it covers 254 days; in 2010 the sample is represented with 251 days, and in 2011 the sample has 187 days. Totally, the observed period covers 1508 days. In the first part of the research, the statistical analysis of the observed sample was carried out in order to gain qualitative knowledge on the behaviour and characteristics of the observed sample year by year, as well as through the passing of time, i.e. years. This was carried out on the basis of observing the movements and the dynamics of the changes that occurred on the stock-markets. The arithmetic mean, the standard deviation, the maximum and minimum values were calculated. These indicators describe the form of the sample, and also the movements of the stock-market indices values are shown during the observation period. When observing the values of the stock-market indices annually, a similar behaviour can be seen, in terms of the standard deviation of the sample, as well as in terms of minimum and maximum values. To get a complete insight into the characteristics of the entire sample, statistical analysis was conducted for the entire sample and the data obtained are presented in Table 1 below.

Stock index	Mean	N	Std. Deviation	Minimum	Maximum	Range
Belex15	1225.318	1508	752.32	354.39	3304.64	2950.25
BelexLine	2144.457	1508	1105.24	841.99	5007.34	4165.35
Bux	21400.68	1508	4039.46	9461.29	30118.12	20656.83
Crobex	2771.613	1508	1072.25	1262.58	5392.94	4130.36
SBItop	1276.882	1508	547.53	592.07	2674.69	2082.62
DJIA	11174.75	1508	1557.06	6547.05	14164.53	7617.48
S&P500	1227.228	1508	190.86	676.53	1565.15	888.62

Table 1 The descriptive statistical analysis of the sample

Source: Author's calculations

On the basis of the value of the standard deviation, it is seen that the slightest deviation from the mean is in the case of the stock-market indices of S&P500 and SBItop, while the maximum deviation was that of Bux. Based on minimal and maximum values, the ranges of stock-market indices values are represented. Moderate deviations are observed at Crobex and BelexLine, while the DJIA stock-market index shows a slightly larger deviation. This all suggests that the least volatile financial markets were Croatia and Serbia, and the most volatile was the Hungarian financial market. It is interesting to note that in the case of the DJIA stock-market index, a significant level of volatility is also present, as compared to both the transitional financial markets and in relation to the financial markets represented in the values of S&P500.

The application of the descriptive analysis methods on the value changes of stock indices over time (returns), leads to interesting results about the behaviour of the sample, or returns. When the entire sample is analysed, the following results are obtained (Table 2).

Based on the standard deviation, it is noted that the slightest deviation from the mean values were in the case of BelexLine and SBItop, while the maximum deviation was for Bux. Based on minimum and maximum values, the ranges of stock-market indices value changes (returns) are seen. Moderate deviations are observed for the DJIA, S&P500 and Crobex, while Belex15 has a slightly larger deviation. The highest range is noted for Bux and CROBEX, as seen according to the values.

Table	2
raute	4

The descriptive analysis of the value changes of the stock-market indices

Stock index	Mean	N	Std. Deviation	Minimum	Maximum	Range
Belex15	-0.0174	1507	0.71694	-4.72	5.28	10
BelexLine	-0.0169	1507	0.48493	-3.03	4.29	7.31
Bux	-0.011	1507	0.83574	-5.49	5.72	11.22
Crobex	-0.0014	1507	0.67343	-4.68	6.42	11.09
SBItop	-0.0101	1507	0.555	-3.66	3.63	7.29
DЛА	0.0017	1507	0.60354	-3.56	4.56	8.13
S&P500	-0.0015	1507	0.66255	-4.11	4.76	8.87

Source: Author's calculations

The mean value of the stock-market indices by years are presented in the following table (Table 3).

Stock index	2005	2006	2007	2008	2009	2010	2011
Belex15	1028.304	1241.705	2617.193	1439.761	599.1034	659.4091	720.6143
BelexLine	1942.79	2198.118	4121.986	2568.696	1202.729	1280.005	1350.109
Bux	21197.63	22446.97	26087.15	19690.18	16279.62	22487.13	21612.07
Crobex	2040.55	2640.626	4482.458	3508.53	1857.744	1992.694	2181.096
SBItop	904.8417	1167.838	2135.025	1692.112	977.8764	886.7618	760.7701
DJIA	10636.67	11416.31	13178.26	11235.41	8905.041	10677.76	12014.07
S&P500	1233.297	1310.928	1477.184	1218,907	950.325	1141.063	1281.748

Table 3 Mean values of stock-market indices by years

Source: Author's calculations

The value of the stock-market indices per year increased in 2005, 2006 and 2007, while a decrease was noted in 2008 and 2009, a slight stabilization in 2010, and decline again in 2011. Bux shows this trend the most obviously, and other stock-market indices show a similar trend, but since they show a more moderate growth, the fall is consequently also more moderate.

By data analysis, we can see changes in the value of stock-market indices (returns) per year, which is presented in Table 4.

Stock index	2005	2006	2007	2008	2009	2010	2011
Belex15	0.0346	0.0801	0.0562	-0.2413	0.0275	-0.0032	-0.0383
BelexLine	0.0002	0.0562	0.0604	-0.1995	0.0198	-0.0068	-0.0387
Bux	-0.0722	0.0268	0.0109	-0.1177	0.0949	-0.0016	-0.0819
Crobex	0.0145	0.0837	0.0766	-0.178	0.0238	0.0106	-0.0345
SBItop	0.0545	0.0761	0.0957	-0.1869	0.0297	-0.033	-0.071
DJIA	0.0394	0.0238	0.0108	-0.0657	0.0269	0.0174	-0.016
S&P500	0.0466	0.0189	0.006	-0.0778	0.0341	0.0192	-0.0269

Table 4 The mean change in value of stock-market indices (returns) per year

Source: Author's calculations

The results show that the value of the stock-market indices changes (returns) is positive in 2006 and 2007, while in 2008 an expressed negative value of the stock-market indices changes (returns) is seen. In 2009, as well as in the following year, the returns are mostly positive and then again fall to negative values in 2011. In the previous phase, the observed sample was analysed for changes in the value of the stock-market indices, and also according to changes of returns values, which result from the changes in the values of stock-market indices in the given period. In the following, the research emphasis is placed on the analysis of the sample structures, all in order to test the level of similarities or differences between the observed financial markets and as such to gain specific, empirically tested knowledge about the relationships between the observed markets. This analysis included the following stock-market indices: Belex15, BelexLine, Bux, Crobex SBItop, DJIA, S&P500. For easier representation, the results shown in Tables 5, 7, 8, 10, 12, 13 were multiplied by 1000.

The study will first test whether there is a difference in the correlation of stockmarket indices related to years, i.e. which values of stock-market indices show higher and which show lower correlation with the years. A structure analysis is carried out of two separate factors with the observed stock-market indices and years (the way stock-market indices behave over time is tested). Through the method of main components, the structure of the two separate factors are analysed on the basis of eight factors: year, Belex15, BelexLine, Bux, Crobex, SBItop, DJIA, S&P500, with a sample of 1445 days. The analysis covers the years 2006, 2007, 2008, 2009, 2010 and 2011.

	Year	Belex15	BelexLine	Bux	Crobex	SBItop	DJIA	S&P500
Year	1000	_			•			
Belex15	-593	1000		20		- 65		
BelexLine	-610	997	1000			10		
Bux	-237	651	644	1000				
Crobex	-516	941	953	624	1000			
SBItop	-553	902	918	529	960	1000		
DЛA	-261	759	755	878	761	632	1000	
S&P500	-402	794	791	878	770	644	983	1000

Table 5 Correlation matrix of the values of stock-market indices and years

Source: Author's calculations

Table 5 shows that the highest correlation (997) is seen between the values for BelexLine and Belex15, which has been expected, since they represent the same financial market, and the two stock-market indices were taken into consideration as parts of the analysed sample functioning as corrective factors, i.e. to test the correctness of the selected methods of analysis. The highest correlation with a negative sign (-610) is seen between BelexLine and year (years).

Table 6

The characteristic root and the participation percentage of stock-market indices and years

n	Root	%	Sum
1	6.094	76.176	76.176
2	1.128	14.103	90.279
3	0.507	6.336	96.615
4	0.148	1.852	98.467
5	0.098	1.219	99.686
6	0.019	0.243	99.930
7	0.003	0.044	99.973
8	0.002	0.027	100 000

Source: Author's calculations

According to the results of Table 6, it is visible that the two selected factors cover ca. 90% of sample information.

					1 -factor	; ;		2 -factor		
	J1	qlt	wrig	inr	krd	cor	ctr	krd	cor	ctr
1	Year	712	1	125	574	329	54	618	383	339
2	Belex15	953	1	125	-962	925	152	-167	28	25
3	BelexLine	967	1	125	-965	932	153	-188	35	31
4	Bux	879	1	125	-788	621	102	508	258	229
5	Crobex	923	1	125	-949	901	148	-150	22	20
6	SBItop	881	1	125	-891	793	130	-296	88	78
7	DJIA	966	1	125	-879	772	127	440	194	172
8	S&P500	942	1	125	-906	821	135	347	120	107
	1	5	8.0	1000			1000			

 Table 7

 The structure of the two extracted factors of the stock-market indices and the years

Source: Author's calculations

In Table 7, the columns mean the following: qlt - communality, wrig - weight coefficient, inr - inertia; krd - coordinate points; cor - the contribution of the factors to the variable, ctr - the contribution of the variable to the factors.

The results show that the values of stock-market indices are mutually compatible, while the values of the stock-market indices do not agree with the time lapsing (years). The first factor includes all the stock-market indices, and they reversely agree with the time passing. The reason for this is the decline in the values of the stock-market indices, which was detected in the analysed period. The whole of the eight characteristics is reduced to two separate factors. A significant contribution of the extracted factors (qlt) individually was observed in all eight features (year and the seven observed values of the stock-market indices). The results show that all values of the stock-market indices belong to one factor.

All analysed stock-market indices, including changes according to the years, were divided into two factors, and since all the stock-market indices belong to the first factor, they tend to show a similarity in the changes by years.

The structure of the first extracted factor consists of seven stock-market indices, namely: BelexLine with factor contribution (cor) 932, Belex15 with factor

contribution (cor) 925, Crobex with factor contribution (cor) 901, S&P500 with factor contribution (cor) 822, SBItop with factor contribution (cor) 794, the DJIA with factor contribution (cor) 773, Bux with factor contribution (cor) 621. The latent contribution to the structure consist of years with contribution factor (cor) 329. The structure of the second extracted factor consists of the year with factor contribution (cor) 383.

By the analysis of the correlation at the two extracted factors for the value of the stock-market indices (the time factor is not taken into analysis, analysis were carried out within the stock-market indices values), the structure of the two extracted factors were analysed (with principal component method) based on the seven values of stock-market indices, namely: Belex15, BelexLine, Bux, Crobex, SBItop, DJIA, S&P500, with a sample of 1445 days.

	Belex15	BelexLine	Bux	Crobex	SBItop	DJIA	S&P500
Belex15	1000			2011-1-1-1-0-			
BelexLine	997	1000	8	2			2
Bux	651	644	1000	25 35		0.5 5	8
Crobex	941	953	624	1000			
SBItop	902	918	529	960	1000		8.4 17.
DJIA	759	755	878	761	632	1000	Ĩ
S&P500	794	791	878	770	644	983	1000

Table 8 Correlation matrix of the values of the stock-market indices

Source: Author's calculations

According to Table 8 the highest correlation (997) is seen between BelexLine and Belex15, while the lowest was between SBItop and Bux (529).

Table 9

The characteristic root and the percentage of contribution of the stock-market indices values

n	Root	%	Sum
1	5.804	82.921	82.921
2	0.899	12.843	95.764
3	0.149	2.126	97.890
4	0.112	1.604	99.494
5	0.021	0.299	99.793
6	0.012	0.174	99.968
7	0.002	0.032	100.000

Source: Author's calculations

The percentage of characteristic roots ranges from 0.032% to 82.921% (Table 9). The newly acquired structure consists of the two extracted factors, which contain 95.764% of the entire information of the tested section.

In Table 10, the columns mean the following: qlt - communality, inr - inertia; krd - coordinate points; cor – the contribution of the factors to the variable, ctr - the contribution of the variable to the factor.

				1 -factor			2 -factor		
_	J1	qlt	inr	krd	cor	ctr	krd	cor	ctr
1	Belex15	962	143	953	908	156	232	54	60
2	BelexLine	975	143	955	912	157	249	62	69
3	Bux	913	143	810	655	113	-508	258	287
4	Crobex	971	143	947	897	155	272	74	82
5	SBItop	952	143	881	777	134	419	175	195
6	DЛА	962	143	902	814	140	-385	148	165
7	S&P500	969	143	917	841	145	-357	128	142
			1000			1000			

Table 10 The structure of the two extracted factors of the stock-market indices

Source: Author's calculations

Based on the results in Table 10, it can be seen that there is a high correlation and agreement between the values of the stock-market indices, which means that when a stock-market index rises, others rise as well; or when one of the stock-market indices fall, other values fall, too. Higher values for communality are seen at: BelexLine 975, Crobex 971, S&P500 969, Belex15 962, DJIA 962, SBItop 952, Bux 913.

The structure of the first extracted factor consists of seven separate stock-market indices, namely: BelexLine with contributing factor (cor) 913, Belex15 with contribution factor (cor) 909, Crobex with the contribution factor (cor) 898, S&P500 with contribution factor (cor) 841, DJIA with contribution factor (cor) 814, SBItop with contribution factor (cor) 777, and Bux with contribution factor (cor) 656. The structure of the second extracted factor cannot be defined.

According to the analysis of the stock-market indices values by years, the research provides the following information (Tables 11 and 12, Figure 1).

Level	Proximity
Belex15, BelexLine	0.00
Belex15, Crobex	0.01
S&P500, Bux	0.02
DЛА, S&P500	0.04
Bux, DJIA	0.14
Belex15, Bux	0.25

Table 11 The grouping of the stock-market indices values

Source: Author's calculations

Based on the displayed dendrogram (Figure 1), a grouping by similarity of the stock-market indices are observed, and it clearly can be concluded that one group consists of Belex15, BelexLine and Crobex, while the second group includes SBItop, DJIA and S&P500. It can be concluded that Bux tends to lean towards the second group, which is confirmed by other research results, as well.





Legend: Belex15 (1); BelexLine (2); Bux (3); Crobex (4); SBItop (5); DJIA (6); S&P500 (7) Source: Author's calculations

The mutual contribution of the factor structure of the years in relation to the values of the stock-market indices also provides interesting results (Table 12).

 Table 12

 The mutual contributions between groups (6) division and extracted structure factor analysis

				1-factor		2	-factor		
	Mass	inr	kvl	krd	cor	ctr	krd	cor	ctr
2006	172	7	1000	178	120	1	-483	880	45
2007	174	383	1000	3909	989	457	417	11	34
2008	176	30	1000	625	326	12	897	674	157
2009	176	204	1000	-2713	908	223	863	92	146
2010	174	61	1000	-1369	761	56	-766	239	113
2011	129	42	1000	-808	285	15	-1282	715	236

Source: Author's calculations

In Table 12, the columns mean the following: inr - inertia, kvl – the quality of the elements in the structure; krd – coordinate points, cor – the contribution of the factor to the variable, ctr - the contribution of the variable to the factor.

The results presented in Table 12 show that in 2007, 2009, 2010, and to a lesser extent, 2008 and 2011 belong to the first factor, while the years 2006, 2008 and 2011 belong to the second group. The relations between the years can be seen based on the results, i.e. which years are inter-related.

Table 12 shows that the highest weighting coefficient 176 is seen in 2008, which means that most part of the sample belongs to one class – and exactly to the class corresponding to the above specified weighting, and the next is with the classes: 2009 (176), 2007 (174), 2010 (174), 2006 (172), 2011 (129). The inertia (inr) for the class of 2007 is 383, which means that it is distinguished the most from other classes, and the results follow as listed: 2009 (204), 2010 (61), 2011 (42), 2008 (30), 2006 (7). On the basis of mutual distance per year, the following results were calculated (Tables 13, 14 and 15, Figure 2):

			1	-factor		2	-factor	50	
gro	oup	inr	kvl	krd	cor	ctr	krd	cor	cti
2007	2006	1272	1000	3731	945	207	901	55	78
2008	2006	183	1000	446	95	3	1381	905	18-
2008	2007	962	1000	-3284	979	162	480	21	22
2009	2006	883	1000	-2891	822	125	1346	178	175
2009	2007	3849	1000	-6622	995	660	446	5	19
2009	2008	979	1000	-3338	1000	169	-34	0	(
2010	2006	213	1000	-1547	968	36	-283	32	8
2010	2007	2541	1000	-5278	952	417	-1184	48	135
2010	2008	589	1000	-1993	589	60	-1664	411	269
2010	2009	390	1000	1345	405	27	-1629	595	258
2011	2006	119	1000	-986	604	12	-798	396	52
2011	2007	1864	1000	-4717	885	284	-1699	115	238
2011	2008	507	1000	-1433	302	26	-2179	698	394
2011	2009	613	1000	1905	441	47	-2145	559	381
2011	2010	43	1000	560	542	4	-515	458	22

 Table 13

 Mutual contributions of the extracted factor structures and the differences in the two centres of the groups (dipoles)

Source: Author's calculations

In table 13, the columns mean the following: inr - inertia, kvl – the quality of the elements in the structure; krd - coordinate points; cor – the contribution of the factors to the variable, ctr - the contribution of the variable to the factor.

Table 14

Distance (Mahalanobis) between the years in relation to the movement of stock-market indices values

	2006	2007	2008	2009	2010	2011
2006	0.00	3.40	2.83	6.82	5.03	3.34
2007	4.93	0.00	5.98	3.26	6.82	3.34
2008	3.40	2.83	6.82	5.03	3.34	0.00
2009	0.00	5.98	3.26	6.82	3.34	1.05
2010	2.83	6.82	5.03	3.34	0.00	1.05
2011	5.98	3.26	6.82	3.34	1.05	0.00

Source: Author's calculations

By the Mahalanobis distance calculation, yet another indicator of the similarities or differences between the stock-market indices or the financial markets that they represent is obtained (Table 14). This way the distances between different spaces can be compared. Table 14 results indicate that the distance is the least between the years 2009 and 2006 (0.00), and the maximum distance is observed between the years 2010 and 2007 (6.82).

Based on the displayed dendrogram (Figure 2), it can be seen that the closest to each other are 2008 and 2011 with a 0.00 distance, and the distance is the biggest between 2006 and 2007, with a result of 6.35. The results show which years are the most similar to each other, and when the difference is the least.

Level	Proximity
2008, 2011	0.00
2008, 2010	3.03
2007, 2009	3.26
2006, 2008	4.44
2006, 2007	6.35

Table 15 Year groupings according to the stock-market indices values

Source: Author's calculations

The years 2008 and 2011 are the closest to each other; the distance between them is 0.00. The closest to them is 2010 with a result of 3.03 in distance, while 2006 is at a distance of 4.44. The second group consists of 2007 and 2009, with a distance of 3.26; and this represents a group for itself, while the proximity of this group compared to the first group is 6.35.



Figure 2

Analysis of the mutual distance between the values of stock-market indices per year

Legend: 2006 (1); 2007 (2); 2008 (3); 2009 (4); 2010 (5); 2011 (6) Source: Author's calculations

Conclusions

In this paper, the level of similarities have been analysed between the financial markets of transition economies of some South-East European countries (i.e. Serbia, Hungary, Croatia and Slovenia) and the similarities of these markets to the US financial market. By the analysis of the behaviour of the sample – i.e. the stock-market indices by years, and with the aim to reach certain conclusions about the similarities between the markets analysed by years; it can be concluded that the stock-market indices have behaved similarly according to the years, both in terms of standard deviation changes and according to the maximum and minimum values. In 2005, a significant value dispersion is present in the case of the Bux stock-market index, that is for Hungary, which is also evident by the results for the standard deviation and the value ranges of the stock-market indices (minimum-maximum). Other markets were stable and behaved similarly in this year; only the DJIA stock-market index differed in behaviour according to the

standard deviation values. So, it can be concluded that in 2005, the markets were relatively stable, with significant fluctuations on the Hungarian market and on the market share in the US, which is represented by the DJIA stock-market index. In 2006, significant fluctuations-dispersions were present for the value of the Bux stock-market index, while other markets represented through the values of the realized stock-market indices behaved relatively stable. In 2007, significant fluctuations-dispersions are again seen in the value of the Bux stock-market index, which now becomes symptomatic for the Hungarian financial market, since for three years in a row the behaviour of this market has been extremely volatile and fluctuating, when compared to other markets which are the subject of the analysis. In 2008, the trend continues, confirming empirically the thesis that the Hungarian financial market is highly volatile. The situation is similar in 2009, 2010 and in 2011, also. These facts indicate that we can talk about a similar behaviour of the markets in terms of volatility level, noting that Hungary's financial market behaves somewhat differently than the other markets analysed; in the sense, that the level of volatility of this market is very high as compared to other monitored markets.

The thesis about the level of the Hungarian financial market's volatility in the observed period (as compared to the other observed markets), was confirmed by statistical analysis on the level of the whole sample (Table 1); because the standard deviation value in the case of the Hungarian financial market, as well as the fluctuations on it, are significantly higher when compared to the other markets.

By the analysis of the stock-market indices values, it can be seen that these values have formed similarly through the years (there is a similar trend of changes), with the conclusion that the deviations in the values of certain stock-market indices in some cases were higher, and in other cases lower. The largest differences in behaviour are present in the case of the Bux stock-market index, that is the Hungarian market, followed by the DJIA stock-market index, while the other markets have behaved very similarly according to this criteria. Based on these empirical results, it can be stated that the hypothesis H0 set in the research is confirmed, or that the assumption that there is a high level of similarity between the transition economies and their financial markets is true, both among themselves and in relation to the US financial market. As such, it is interesting to note that the stock-market indices values have behaved very similarly.

By analysing the behaviour of the sample – stock-market indices values changes (returns) annually – and with the aim of reaching certain conclusions about the similarities between the markets analysed through the observed years, it can be concluded that the returns have behaved similarly according to the years, both in terms of standard deviation level, and in terms of minimum and maximum values. In 2005, the highest level of volatility is present in the case of the Bux stock-market index, while the lowest level of volatility is present in the cases of Belex15 and BelexLine stock-market indices. This trend of the returns` behaviour changes and varies from year to year, in the sense that in 2006, the biggest change was

observed in the case of the Bux stock-market index; in 2007, for Belex15, and again for the Bux in 2008, 2009, 2010 and 2011. The conclusion is that the Hungarian financial market behaved the most volatile-fluctuating, in terms of changes in returns. Looking at the overall sample during the observed period of time, it can be concluded that the level of returns have behaved similarly over time on these markets, thus confirming hypothesis H1 set in the survey.

The analysis of the sample structure resulted in significant findings. By testing whether there is a difference in the correlation of stock-market indices according to the years (i.e. which stock-market indices show a higher, and which of them show a lower level of correlation), it was obtained that all stock-market indices correlated negatively according to the years, and the most negatively correlated stock-market index was the stock-market index of BelexLine. Describing the structure of the sample, it was obtained that the analysed sample can successfully be reduced to two factors which contain approximately 90% of the information from the entire tested data. On the basis of further research on the structure of the sample, it can be concluded that all stock-market indices reversely agree with the lapsing of time, which can be explained by the fact that in the analysed period there was an overall fall in the stock-market indices. The values of the stock-market indices are mutually compatible.

By applying factor analysis of the extracted two factors based on the seven values of the stock-market indices, a result was obtained that there is a significant level of correlation between the Serbian, Croatian and Slovenian financial markets, while the US and Hungarian financial markets have clearly separated according to their own correlation.

Observing the structure of the analysed sample and connections between the individual markets, the obtained information show that values of the stock-market indices could be conditionally grouped into two groups. The first group consists of the Serbian and Croatian stock-market indices, and the other consisting of stock-market indices of Hungary, Slovenia and the US market. Based on the results, it can be concluded that there is a significant level of similarity between the stock-market indices that consist the first group, and also between the stock-market indices that make up the second group, which creates real prerequisites assuming that there is a significant market correlation within groups, and between the groups with each another.

By analysing the contribution of the factor structure of the years in relation to the value of the stock-market indices, it has been obtained that in terms of belonging to the first or second factor, the years have differentiated. As such, the years 2007, 2009, 2010 and – to a lesser extent – the years 2008 and 2011 belong to the first factor, while the years 2006, 2008 and 2011 belong to the second factor. By this, the level of integration between years, and the similarities between the behaviour of the markets according to the years becomes clearly evident. It is interesting to note that the years 2006, 2008 and 2011 behave similarly, though 2008 was

characterized by a significant decline of activities in general, and of heavy destabilization. 2008 and 2011 are closest to one another, while the largest distance can be seen between the years 2006 and 2007. Maybe it is exactly the fact of this similarity between 2008 and 2011 that indicates a new wave of the crisis and disturbances in the economic trends, because the research has clearly come to the conclusion of a very similar behaviour of these two years.

The results are very interesting, because they clearly show the present trends over the years and give a clear signal to future trends. 2008 and 2011 form a group for itself, the closest to them being 2010 (which was expected, keeping in mind the above described facts), while they were most distanced from 2006 (again as expected, bearing in mind these results). 2007 and 2009 form a group for themselves, and they can be understood as transitional years, in terms of transition from prosperity to recession conditions and vice versa. Based on the research results, the hypothesis H2 set in the research also can be adopted, namely that there is a high correlation and agreement between the values of stock-market indices.

The results of the study clearly indicate the existence of significant correlations and similarities between the analysed markets, which has a definite significance in assessing the state of affairs to be expected on these markets. It is interesting to realise that there is not only a significant level of similarities between the markets and economies of the observed transition economies of South-East Europe, but also between these markets and the US market, both in terms of the values of the stock-market indices, and in terms of the returns. Another significant result indicates the high level of similarity between the Hungarian and the US financial markets, because it was found, that of all financial markets in the region, the Hungarian market correlates the most and is the most similar to the US market. Observing the structure of these markets it has been realised that these markets are structurally similar also, which in turn provides important information to all potential investors and analysts in the process of anticipation of the state of affairs on these markets. The directions of further research will be aimed at testing the characteristics of financial contagion on these markets, in the terms of defining the effects of "overflow" of crisis from one to the other market, given that this study has confirmed the hypothesis of similarity between these markets.

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Compliance Management – a New Response to Legal and Business Challenges

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Abstract: Accounting failures at Enron and others have raised the question of adequate internal controls. The current global economic crisis has increased the public and legislative focus on accountability, transparency, risk management and compliance with laws and regulations. Organizations seek efficient and effective mechanisms to ensure keeping up with challenging legal requirements. This paper will facilitate the understanding of how corporations can improve their compliance by the setup of a compliance program (including design, implementation and evaluation). Basic compliance initiatives prevent legal misbehavior, complex programs extend to areas like customer satisfaction, public reputation, transparency, ethical behavior, organizational structure and risk management. Compliance in practice is a complex issue that requires interdisciplinary research since it lies on the borderline of law, finance, risk management and operations management. This paper proposes a variety of compliance related research hypothesis.

Keywords: compliance management; compliance function; compliance and ethics; risk management

1 Introduction

Dramatic incidents of excessive greed, accounting failures or conflicts of interest, including those of Enron, Parmalat, WorldCom, Citigroup, Arthur Andersen and more have raised the question of adequate internal controls. In the last 20 years accountability, transparency, risk management and compliance with laws and regulations have become highlighted issues.

Basic compliance initiatives prevent legal misbehavior, but complex programs extend to areas like employee morale, customer satisfaction and public reputation. Compliance management is embedded into the present trends of ethical awareness, corporate environmental and social responsibility and public commitment. The current global economic crisis has increased the public and legislative focus on risk management and risk prevention. Today, in Hungary we face an everchanging regulatory environment. As a reaction to this, organizations seek efficient and effective mechanisms to ensure they can keep up with challenging legal requirements. Compliance efforts range from ad hoc projects to mature and complex programs. Along the way, we have witnessed the birth of a profession and the growth of its supporting industry, including consultants and suppliers [1].

This article is composed of four parts. First, an overview of compliance management is given, including the overview of SoX requirements, the COSO framework and the FSGO standards. In the second part, compliance is discussed as an organizational function. Strategies, actions and resources for managing compliance in organizations are detailed. Later, working hypothesis are listed for possible future research to find out the state of compliance function in highly regulated industries in Hungary. Finally, conclusions and challenges are outlined.

2 What is Compliance Management

The aim of compliance management is to detect and prevent corporate crimes and mistakes, minimize the damage of arising issues, prevent recurrence, improve business and control processes. Ideally, compliance management helps people on all levels to operate an organization without discovered or undiscovered non-compliance incidents.

The scope of compliance management varies from one corporation to the other. Under the umbrella of compliance management it may include compliance to business related laws and inner regulations, environmental issues, labor and wage regulations, data security, health and safety issues, equal employment opportunity, antitrust considerations and competition, fund raising, etc. There is a risk that compliance initiatives address too many areas but bring fewer results than a strictly defined scope. Financial compliance is usually managed by auditors. Operational compliance used to be managed by several professionals, for example lawyers, internal control specialists and strategy consultants. These days, compliance officers are in charge.

Though the state is the main source of regulations, compliance management deals with other forms of regulations as well, such as internal corporate policies, professional groups (e.g. the Basel Committee), industry associations, etc. Compliance management can be seen as part of a shift from regulatory law enforcement to self-regulation. "Self-regulation can be often more prompt, flexible, and effective than government regulation. It can permit application of the accumulated judgment and experience of an industry to issues that are sometimes difficult for the government to define with bright line rules" [2], ISO certification is a classic example of self-regulation. We must note that government incentives

to certified economic actors are a driving force. Proponents of self-regulation point out the lower costs to produce the same protection.

The disadvantages of self-regulation can be weaker enforcement (see Box 1) and the phenomenon also described as the regulatory paradox, namely violators avoiding registration into self-regulating organizations. Furthermore, voluntary codes could be developed in accordance with or rather against government initiatives.

Executive compensation used to be regarded as the company's very private, internal affair. However, the outrageous remuneration incidents of listed companies in the US and the EU (e.g. Bank of America) have attracted public attention to the problem. In the EU, the 2004/913/EC [3] recommendation created a general regulatory framework. The overall influence of the non-binding recommendation was not powerful enough. Following the financial crises of 2007-2008, a risk-based review of the bonus structure was vital [4]. The general requirement of the Financial Services Authority Code is, "A firm must establish, implement and maintain remuneration policies, procedures and practices that are consistent with and promote effective risk management." [5] In 2010, the third Capital Requirements Directive (CRD3) amendments were approved, including the regulation of the structure, amount and timing of bonus payment in financial institutions (i.e.: immediate bonus payment cannot exceed 60%; at least half of the bonuses should be paid in shares, etc.). Member states were required to implement CRD3 by the end of 2011. This is a current example of a recommendation turning to hard law.

For many corporations, a risk-based redesign of the overall corporate remuneration system is a future challenge. For instance, one main task of banks is to carefully control risks taken. But agent-principal situations imply some moral hazard: renumeration can encourage risky lending and a focus on short-term results. Incentive systems should be adapted to the nature of the product; a long-term product should be connected with long-term interests (mixing immediate and deferred bonus payments). Clear rules on the remuneration of intermediaries could promote higher credibility, transparency and stability.

Box 1

Example of regulatory shift from the concept of self-regulation to hard law

As for self-regulation in the matter of compliance management, the seven elements of the Federal Sentencing Guidelines for Organizations (FSGO) form the basis of understanding and managing compliance risks for businesses in the USA. These guidelines help organizations to plan and implement programs that help facilitate compliance, identify and sanction noncompliance, and are viewed as effective by the courts. "A company may, under some circumstances, receive a more lenient sentence if it has in place an effective compliance and ethics program." [6] According to Silverman, the FSGO components are the following:

- 1 "Organizations must establish compliance standards and procedures to be followed by employees and agents of the organization.
- 2 The program must be administered and overseen by 'high-level' personnel within the organization.

- 3 Organizations must ensure that substantial discretionary authority is not delegated to employees with a propensity toward criminal conduct.
- 4 Organizations must provide training programs and effective communications about their compliance standards and procedures.
- 5 Monitoring and auditing systems must be implemented, and a reporting system must be established through which employees can report wrongdoing without fear of retribution (e.g. whistle-blowing programs).
- 6 Organizations must provide incentives for employees and others to come forward to report issues and must establish disciplinary policies for those involved in wrongdoing.
- 7 After an offense has been reported, organizations must take reasonable measures to respond and prevent future incidents from occurring." [7]

The original FSGO was revised in 2004. The amendments focused on the proactive role of leadership and included ethics, as standards for an "effective compliance and ethics program".

In 2002, the Sarbanes-Oxley Act (SoX) was passed. This law has set new standards of financial reporting, auditing and internal governance for publicly traded companies. "The legislation required the organization's chief executive officer (CEO) and chief financial officer (CFO) to certify not only the completeness and accuracy of the information contained in quarterly and annual finance reports, but also the effectiveness of the underlying internal controls that generated the information" [8]. The most far-reaching part of the act is Section 404, which requires companies to include an internal control report into the annual financial reports. Section 406 requires a disclosure on the code of ethics for financial and accounting officers. Since SoX, organizations must set, monitor and assess their internal controls to inform the public investors, the CEO and CFO have enhanced responsibilities for the behavior of the corporation. The underlying principle of the act is that communication of achievements and defects can support public trust in the corporate sector.

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) is a voluntary organization formed by several professional groups. The 1992 COSO Internal Control – Integrated Framework is qualified as a suitable assessment framework for SoX control assessment. COSO has been stated to have met the Securities and Exchange Committee's four criteria:

- 1 "Be free from bias.
- 2 Permit reasonably consistent qualitative and quantitative measurements of a company's internal control.
- 3 Be sufficiently complete so that those relevant factors that would alter a conclusion about the effectiveness of a company's internal controls are not omitted.
- 4 Be relevant to an evaluation of internal control over financial reporting." [9]

The COSO framework report gives a definition of internal control: "a process, effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories:

- 1 Effectiveness and efficiency of operations.
- 2 Reliability of financial reporting.
- 3 Compliance with applicable laws and regulations." [10]

It also describes five interrelated components of internal control (see Figure 1), all relevant to each above mentioned objectives category:

- 1 The **control environment** is the foundation for all other components of internal control. "An effective control environment is an environment where competent people understand their responsibilities, the limits to their authority, and ... are committed to following an organization's policies and procedures and its ethical and behavioral standards." [11] Factors of control environment are: the management's operating style, direction provided by the board, ethical values maintained and demonstrated, etc.
- 2 **Risk assessment** is the identification and analysis of relevant risks to the achievement of the objectives (provided that there are identified operational, financial, and compliance objectives). Mechanisms are needed to identify and deal with the special risks associated with economic, industry, regulatory change.
- 3 Based on the analysis, the risks are managed through policies, procedures, techniques and mechanisms. **Control activities** include approvals, authorizations, verifications, reconciliations, performance reviews, separation of duties, password procedures, inventories, etc.
- 4 **Information and communication** processes are essential to business and internal control. The challenge is to get and give information on time, in a relevant, reliable and appropriate form all across the organization.
- 5 **Monitoring** and evaluation assesses the quality of the IC system's design, administration and performance over time. Revealed deficiencies should be reported to management.

COSO aims to provide standards against which business executives can assess their internal control systems and establish goals to improve. According to COSO, compliance is an objective of internal control activities. Since the initial COSO framework was created, the world has become more interested in the reliability of non-financial reporting, e.g. the above-mentioned internal control report according to SoX Section 404. Meanwhile, concerns about the adequacy of the framework have been voiced by many. [12]

Non-financial reporting (NFR) has received increased attention since the 1990s. Publishing structured non-financial performance information (e.g. on sustainability or on corporate social responsibility) delivers a well-controlled message.



Figure 1

Five components of Internal Control according to the COSO Internal Control – Integrated Framework

Reporting according to formalized frameworks allows stakeholders (including government regulators, potential employees, analysts, investors, media, competitors, etc.) to compare non-financial performance in time or in relation to other organizations. Reputation and pressure from stakeholders are the main driving forces in NFR [13]. In general, organizations are much more likely to manage risks of potential issues if they measure and analyze regularly. However, the reputational value might be considered more important than the added value of the environmental or social performance itself.

It is not only the COSO framework that reveals the strong link between risk management and compliance management. In April 2005, the Basel Committee, a global standard-setting organization, published a high-level paper for setting the requirements for a compliance function in banks. "The expression '*compliance risk*' is defined in this paper as the risk of legal or regulatory sanctions, material financial loss, or loss to reputation a bank may suffer as a result of its failure to comply with laws, regulations, rules, related self-regulatory organisation standards, and codes of conduct applicable to its banking activities (together, '*compliance laws, rules and standards*')." [14]

Finally, a distinction between risk management and compliance management shall be made. Risk management aims to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. Operational risk is "the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems, or from external events." [15] Operational risk includes legal risk, but excludes credit risk, market risk, reputational risk and strategic risks. Operational risks can have compliance implications. Compliance management defines compliance risks with laws and regulations in focus. There is a segment of risks that are operational and compliance risks too.

Governance, Risk Management, and Compliance, or GRC, is a new umbrella term with numerous definitions given. These three functions are strongly related and could be integrated in order to avoid overlaps and gaps. GRC is rather an overall management approach to corporate governance, control mechanisms, risk and compliance.

3 Strategies, Actions and Resources for Managing Compliance in Organizations

How do organizations manage their responsibilities? In theory, compliance and ethics are two different approaches [16]. Compliance is focused on the rules (laws and standards) and is a principal management activity in the US where you can find a rules-based regulatory structure with top-down instructions. Ethics are strongly connected with compliance, but go beyond avoiding illegal practice. Corporate culture, values, attitudes, beliefs and practices add up to organizational behavior. The programs to introduce ethical codes, also called integrity based programs, focus on the elements of exemplary conduct, accountability, and transparency in organizational behavior. As opposed to the rules-based approach, it is called the principle-based compliance strategy (also described as 'comply or explain'), which is more present in the EU regulatory environment, where rigid, centralized regulation would hardly be possible.

In reality, ethical mistakes can have legal sanctions (e.g. the case of Computer Associates detailed in Box 2) and firmly affect the image of the corporation. Ethical failures can lead to reputational loss and/or legal penalties. Reputation is a valuable asset, and also one main motivating factor for compliance. (Also, a motivation for compliance could be fear of negative publicity and customer dissatisfaction, individual and corporate responsibility, and cooperation with the regulator. Motivation for non-compliance could be the high cost of compliance, unavailable expertise to meet compliance requirements, lack of knowledge or understanding of the letter and/or the spirit of the law, ignorance, and the great complexity of the organization. [17]) Therefore, most compliance programs combine the two theoretical approaches. The practice of developing a written code of conduct is widely used. In general, codes state an ethical framework, include procedures to report any violations and prospective consequences. The importance of the code can be measured in the implementation, enforcement.

The commitment of leadership is a key factor in compliance since it is the management that sets the standards of behavior, partly by example and partly by the tone of oversight, expectation and compensation. The organization and the executives are expected to devote time, attention, budget, staff and other resources to meet all obligations and prevent possible misconduct. Generally, the overall compliance program is the ultimate responsibility of one single compliance officer.

Revealed non-compliance also requires a lot of effort, time and money to come over. CA Technologies, former CA, is a large IT management software and solutions company, founded in 1976, which serves customers in more than 140 countries. In 2004, Computer Associates (CA) was charged with improper accounting practices, misstatements of revenue, materially false and misleading public statements, obstruction of the government's investigations and more. CA entered into a deferred prosecution agreement (DPA) [18], which included the following corporate reforms:

(1) creation of a compliance committee of the board of directors,

(2) the committee's report had to be published on the company's website,

(3) establishing a comprehensive ethics and compliance training program for all CA employees and appointing a chief compliance officer to oversee it;

(4) new comprehensive records management policies and procedures, as well as testing programs to ensure compliance,

(5) implementation of an improved financial and ERP system to strengthen controls, eliminate errors and enhance the internal audit function.

In 2007, after significant changes in the above mentioned areas, the company fulfilled the terms of the DPA and all pending charges were dismissed. "We will continue to demand a high level of transparency, ethical behavior and integrity from our entire organization. In meeting the terms of the DPA, CA has made great strides in putting in place the business systems, processes and procedures that will ensure its ability to grow and generate value for shareholders, customers and employees." [19] said John Swainson, CA's president and chief executive officer.

Box 2

Case study of Computer Associates International Inc.

The scope of compliance operations should be tailored to the specific company. First, the organization needs to identify the external and internal compliance risks faced by the company. This requires the thorough understanding of the legal and business environment, the industry and relevant expertise in corporate strategy and internal processes. The compliance program should be designed to address the compliance risk profile. In general, relevant compliance risks could be: fraud, corruption, product safety, health and safety, environmental compliance, IT, intellectual property, antitrust compliance, employment practices, social responsibility, human rights and more [20]. Please note that organizations face the risk of setting up an extended compliance scope but end up with less valuable outputs.

Companies should accurately calculate the reward of compliance versus the risk of noncompliance. It is useful to define the limits of compliance and its relation to audit, internal control, legal department and risk management.

The identified compliance issues require response strategies in the form of developing policies and procedures to address compliance risks effectively (see Box 3). Infrastructure and resources (including material, human, IT, financial, technical) have to be provided and assigned to enforce the program. To illustrate the high-complexity of compliance management, consider that to manage for example product liability compliance, the following business functions could be related: engineering, procurement, manufacturing, quality control, sales and distribution, and more. To ensure product compliance the organization needs a certain level of control across the entire supply chain.

Following an internal audit, a Global 100 company discovered evidence of contractual noncompliance due to a lack of adherence to policies and a failure to record documents in their system. First, the full extent of the non-compliance problem needed to be revealed. In fact, the contract generation process had inadequate controls and many agreements had been drafted outside of approved standards. As steps to better compliance, the contract database was rebuilt and integrated into the company's master database system, and effective controls were created around contract administration [21].

Box 3

Example of a specific compliance issue

In terms of reporting compliance issues we should differentiate between external and internal reports. On one hand, the changing regulatory environment for companies requires flexibility and on-going change in statutory reporting (e.g. Basel II, SoX). On the other hand, suspected law violations should be reported internally and escalated to the chief legal officer, CEO or the board through appropriate communication channels (e.g. whistle-blowing programs, compliance hotline). Most compliance issues are reported internally first and reported to authorities in case it's inevitable. Therefore, an effective reporting system must be established. There is a need for responding mechanism (investigation, follow-up, etc.) from the leadership to employees.

Ultimately, organizational compliance is the responsibility of all employees. The importance of awareness, education and training cannot be overestimated, and any conduct due to lack of knowledge is potentially costly. By training, employees can develop the perception that compliance management is an unnecessary obstruction to day-to-day business operations. Publications and web-based interactive training are widely used methods.

Periodic reviews of risk assessment, compliance policies are the way to improve the compliance program. Measuring, monitoring, audits, and assessing effectiveness help the management to see clearly the strengths and weaknesses of the overall compliance function. Reviews can help the organization to capture future compliance risks.

Furthermore, compliance should not end at the development of an isolated compliance function. Well integrated, proactive and comprehensive compliance

means that compliance consideration can be found throughout the business processes, and compliance helps to achieve business objectives and adds business value. For example, in cooperation with the human resources department the compensation system should be developed to encourage excellence, transparency and responsibility. Performance evaluation can incorporate motivating factors for ethical behavior.

4 Research Hypothesis and Methods

Compliance is a relatively new organizational function. Many organizations have compliance programs because of the regulatory requirement to have one. Today, in Hungary companies faces the challenges to comply with international regulation; for instance some multinational corporations quarterly work for SoX compliance. Consequently, there are compliance professionals, officers, managers, suppliers. Still, we do not hear or read much about compliance, and we cannot talk about a common knowledge or understanding. It is considered a rather private thing.

As a matter of fact, only large companies have the resources to manage compliance through a formal program. Small and medium-sized companies rather have some limited compliance function integrated as a way to manage business activities, supported by external partners.

Therefore, our future research will focus on the compliance function in highly regulated industries with large companies, such as banking, energy, pharmaceuticals, etc. in Hungary. We propose the test of the following research hypothesis:

	Hypothesis	Research method proposed
1	Effective internal control systems add value and have a positive impact on the long-term profitability of companies.	Case study research
2	Improved compliance leads to higher stock premium.	Statistical analysis of listed pharmaceutical companies to investigate correlation of stock premium and compliance costs.
3	More compliant companies have access to capital at lower costs.	Statistical analyses, case study research
4	Better compliance improves business operational efficiency.	The efficiency of some limited business operations in banks can be compared with Data Envelopment Analysis. This method will allow for the anonymity of

Table 1 Proposed research hypothesis and research methods

		banks if surveys are run through the Hungarian Banking Association. DEA is a nonparametric method used to measure efficiency of business services operating with multiple inputs and multiple outputs.
5	The risk management and compliance management is part of corporate culture and cannot function without the commitment of the management.	Interviews to be run with key compliance officers in several industries.
6	Better compliance comes with fewer conflicts and lower stress levels for employees.	Sampling and multivariate analysis are proposed to explore the relationship among compliance, conflicts and stress.
7	The degree of risk and compliance integration is a measure of maturity.	Research model based on Capability Maturity Model
8	Fully integrated controls reduce audit costs, improve business efficiencies and achieve higher ROI on compliance expenditure.	Document analysis. Compliance costs to be compared: headcount, administrative, program expenses, etc.
9	Improved compliance will attract and retain higher-talented workforce.	Longitudinal studies

The aim of the research is to reveal the added value of the compliance function to business efficiency or business productivity. The challenge is to identify the mechanisms and elements how compliance activities can promote business performance. A more profound understanding could support business decision makers and help outline areas for improvement.

Conclusions

In 2000, Enron published its Code of Ethics. By December 2001, the company had fallen and caused the most complex bankruptcy scandal in US history (later surpassed). Enron is a classic example of the insufficiency of self-regulation. This and the following corporate scandals accompanied by public indignation were accelerators to major reforms in the regulatory environment.

Keeping up with laws and regulations is a constant challenge for today's organizations; therefore compliance to laws and regulations is a risk in itself. As a reaction, compliance as a new corporate function has emerged. Traditional compliance issues are associated with law and regulation, including industry standards and practices. In a broader view, compliance is connected with transparency, accountability, ethical behavior, organizational structure and risk management. Corporations will take a cautious position in defining the scope of compliance in order to avoid beginning with many things but finishing with just a few.

Laws, standards, and voluntary codes set the framework of acceptable and desired business behavior. Corporations can improve their compliance by the setup of a

compliance program (including design, implementation and evaluation). However, no box-ticking will result in substantive change. Ethics, organizational behavior, and corporate culture are critical in good quality compliance management. Any improvement of compliance achieved can be demonstrated to investors, competitors and other stakeholders. In fact, an underlying motivation for compliance management is to build reputation and public trust.

As compliance awareness grows, a new profession has emerged. In Hungary, we estimate that thousands of employees regularly work to ensure compliance of a wide-range of corporations. Compliance in practice is a complex issue that requires interdisciplinary research since it lies on the borderline of law, finance, risk management and operations management. The last five years' financial crises have provoked numerous new discussions and much research. Compliance-related research delivering shared experience and best practices could be useful and convertible to the business sector. Future research should map the business value of compliance in large, regulated companies in Hungary.

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Knowledge Transfer in Multinational Companies – Evidence from Hungary

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Abstract: The article has the aim to contribute to the understanding of knowledge transfer features of multinational organizations. The framework for the research is provided by the Central and Eastern European International Research Team (CEEIRT), which consists of researchers from universities in Central and Eastern Europe and which is studying the changing human resource management practices in this region. The paper first analyses some of the critical issues of knowledge transfer at multinational companies, based on international human resource management research. After the review of literature, knowledge sharing is studied with the help of a research project conducted with the participation of the authors of this paper. Using data on 74 Hungarian subsidiaries of multinational enterprises, this paper analyses knowledge transfer aspects in the HR practice and compares them with international research results. It finds that Hungarian subsidiaries are important places of HR-related learning, the success of which is highly dependent on the ability and on the motivation of people to knowledge transfer.

Keywords: knowledge transfer; subsidiaries of multinational companies; reverse knowledge transfer; Hungary

1 Introduction

The number of multinational companies (MNCs) and the number of people employed by them is increasing worldwide. Along with it, the pace and size of foreign direct investments to countries outside the developed world are expanding [3]. The same also applies to Hungary, where multinational enterprises play an important role in the economy. The contribution of these companies to the Hungarian export is considerable, and they employ approximately 20% of people working in the private sector. Their human resource solutions have an impact on the practices of other actors of the economy [12]. It should also be mentioned that in 2009, the value of FDI in Hungary exceeded 40% of the GDP [19].

Multinational companies are an important playground for learning [21, 29] and for cross-border knowledge transfer [25]. They also play critical roles in knowledge sharing, since mergers and acquisitions provide excellent opportunities for both parent and subsidiary to renew their knowledge base and to add knew knowledge to it [17, 21, 27, 34]. Subsidiaries can play a strategic role both in the creation and diffusion of strategically important knowledge [30].

The present article also focuses on diverse aspects of knowledge transfer which were addressed above. The aim is to analyze the specific features of knowledge transfer in international companies, precisely in the field of human resources. This objective is justified by numerous research results [2, 8, 13, 16, 21, 25, 31, etc.] which emphasize the importance of the aspects of knowledge management and learning in the case of multinational organizations. Research on knowledge transfer in MNCs has shown enormous development over the last one and a half decades. Michailova and Mustaffa [22] identify four fields of research: the outcomes of knowledge flows, knowledge characteristics, actors involved in the knowledge flows, and the relationship between these actors. They also identify key accomplishments, existing gaps and future research directions. In spite of the remarkable improvement in this field, knowledge transfer issues in MNCs don't get the attention they deserve, even though companies often fail due to lack of it.

This paper joins the research described above, and also presents findings of research which was conducted within the framework of a long-term cooperation between researchers of Central and Eastern European universities (Central and Eastern European International Research Team: CEEIRT). The team examines the changing HR practices and functions which can be observed in the CEE region and in Hungary, and which take place in subsidiaries of multinational companies as result of social and economic changes [12]. Empirical data for this paper were gained from research carried out by the authors of the paper in Hungary.

2 Research Methodology

The research included several topics of HR (key strategic issues, key HR issues, HR roles of headquarter and subsidiary, future and general HR issues). We also wanted to learn how the aspects of knowledge management are present in the field of HR, especially those of knowledge transfer. The findings are analyzed in this paper, which on one hand builds upon the results of international research and upon our own previous research in the field of HR [7, 14, 18]; and on the other hand, upon the research conducted internationally [21, 25, 31] and by our faculty in the area of knowledge management [10, 11, 15].

Within the framework of the project, HR functions and practical solutions were analyzed with the help of the tools of benchmarking. This study uses information
that was received from 74 Hungarian subsidiaries of multinational companies (personal interviews at 62 companies, an online questionnaire at 12 companies). About 80% of the interviewees were top managers or top HR managers, and the majority of them (60%) had spent at least 3 years in their current positions. Our statements are based on descriptive statistical data (frequency, distribution, average).

3 Knowledge Management in the Multinational Context

The changing business environment has made organizational knowledge a critical factor of sustainable competitive advantage. Knowledge transfer plays a critical role in the long-term existence of the organization: it has strategic importance.

When studying the knowledge management features of multinational companies we can turn to the model which was developed by Marquardt and Reynolds [21] about global learning organizations, and which shows very well how large is the variety of factors that have to be considered. They identify three levels of knowledge transfer, such as

- o individual and group level,
- organization level and
- o global level,

and each level expands the dimensions of the knowledge related characteristics of multinational enterprises.

In the learning processes of organizations operating internationally, critical factors are location [31, 34], the distance [2] between the involved units, political issues, the organizational culture of the company [6, 34], characteristics of the strategy, structures and communication processes, language skills [33] or intercultural skills of the leaders. In the following section of the paper, the international dimensions of knowledge management will be analyzed.

3.1 Knowledge Transfer between Parent and Subsidiary

Research usually shows a leading role of corporate headquarters in knowledge transfer of multinational companies, which means that a vertical knowledge transfer is characteristic of the companies: knowledge is transferred from the corporate centre to the subsidiaries. It is assumed that it is basically the subsidiary that learns from the parent; and there is no important knowledge flow in the other direction [34]. However, more and more research [1, 34] underpins a

strengthening role of subsidiaries in organizational knowledge transfer. They contribute not only to the vertical but also to the horizontal knowledge transfer, if they own knowledge that is useful for both parent and other subsidiaries.

3.1.1 Organizational Strategy and Knowledge Transfer

If we want to analyze the directions of knowledge transfer, we have to consider the strategies of multinational companies. Bartlett et al. [4] identify four kinds of strategic mentality. International strategic mentality is the earliest stage of internationalization, when technology and other kinds of knowledge, generally are transferred from the parent company to the subsidiary. Multinational strategic mentality shows that strategy is based "on the foundation of multiple, nationally responsive strategies of the company's worldwide subsidiaries". In companies with global strategic mentality, manufacturing, research and development are mainly managed from the headquarters; and also most strategic decisions are taken at the centre. Companies with transnational strategic mentality acknowledge the importance of flexible and responsive country-level operations. The methods of knowledge transfer which are identified by DeSouza and Evaristo [9] may be connected to the above-described strategies. According to them, there are three kinds of vertical knowledge transfer that embody three strategies of knowledge transfer in global enterprises: strategy commissioned in the headquarters of the company and which is carried out at the local subsidiaries; strategy developed in the headquarters and carried out regionally; strategy developed regionally and carried out locally. We can conclude that many researchers recognize the importance of the growing complexity of knowledge motion among company units.

3.1.2 Direction of Knowledge Transfer

Yang et al. [34] emphasize that mergers and acquisitions provide good opportunities for the organizations to add to or renew their existing knowledge. Knowledge flows within multinational companies include, along with the traditional vertical knowledge transfer from the headquarters to the subsidiaries, also knowledge transfer in the opposite direction: knowledge flows from subsidiary to headquarters, the so-called reverse knowledge transfer. They show that the determinants of conventional and reverse knowledge transfer are based on different transfer logics. Conventional knowledge transfer is likely to be "transplantation" or "supplementation", where the subsidiary generally adapts the knowledge coming from the parent company. Reverse transfer is more complicated than conventional knowledge transfer, so knowledge characteristics play a more important role than in conventional transfer. Subsidiaries may be motivated by the opportunity though, that they can strengthen their position through the transfer of knowledge within the whole organization, and that the parent company is interested in the knowledge transfer if it is beneficial for it from

some point of view. For this, the parent company may recognize and acknowledge new knowledge of the subsidiaries and its possible advantages. The distance of the knowledge flows also influences the methods chosen for knowledge transfer: namely the choice whether personal coordination mechanism or technology-based coordination mechanism is preferably applicable in knowledge transfer of a certain organization [2].

3.2 Critical Players of Knowledge Transfer

In the MNC context, cultural and functional similarity or diversity can have a very powerful impact on knowledge processes and knowledge sharing [20], and, since international business life is connected to people's mobility and their interaction, with crossing national borders, factors such as understanding, tolerance, value system [6], impacts of multinational environment, languages, accent, behavioural diversity [5] have become more important than ever. Expatriates are seen as an important means of identifying new knowledge and transferring tacit knowledge in multinational corporations [30]. MNEs often assign expatriates to foreign subsidiaries with the aim of transferring knowledge; however, research is lacking in connection with their strategic role in facilitating knowledge transfer and in enhancing foreign direct investment performance [32].

We usually distinguish two kinds of assignments in multinational organizations: assignees sent from the parent company or from a third country to a subsidiary (expatriates) and the assignees from a subsidiary appointed for a long-term stay abroad at the parent company (inpatriates). Expatriates from the parent company play a significant role in interpreting and disseminating the parent company's knowledge at the subsidiaries [30]. They usually transfer knowledge and skills which don't exist at the subsidiary: organizational culture, technical knowledge, process knowledge, and financial and market knowledge. In addition to this, they take home new knowledge with them, because they work in a multicultural workforce, and they deal with different cultures, with different people and different attitudes. The expatriates benefit from the assignments, since their reputation and international competence improve as a result of their work abroad. As another outcome of their assignment abroad, a two-way knowledge transfer becomes reality. Organizations are interested in using the knowledge and experiences of the expatriates the best possible way, for the sake both of the organization and the individual. Thus, through their assignment, expatriates contribute to the reverse knowledge transfer of multinational organizations. However, in order to have a chance to do this, organizations have to develop knowledge-oriented views and also to develop and sustain a supportive collaborative organizational culture [5, 26]. The repatriation process affects the retention of these people, how their international experience and expertise is retained for the organization.

When analyzing the role of expatriates, we must also talk about the fact that a critical though neglected factor in the knowledge transfer of multinational companies is the knowledge sharing ability of the sharing person. This is why we must in this process pay attention to the abilities and willingness of expatriates to transfer knowledge [23, 24, 28]. The disseminative capacity of the expatriate or knowledge sender depends on both the ability and willingness to share knowledge. Successful knowledge transfer is based on the individual's intrinsic motivation [10, 28]. Multinational companies have different ways to develop the desired skills and competences of expatriates to transfer knowledge: long-term assignments abroad can strengthen the willingness of expatriates to transfer knowledge and, at the same time, their knowledge transfer skills can also improve through their involvement in diverse short-term projects or other unique solutions. However, not only characteristics of the knowledge sender but also characteristics of knowledge, and also of the receiver of knowledge, and the relationship between sender and receiver influence the degree of knowledge transfer from headquarters and subsidiaries [24]. Along with knowledge management initiatives coming from the centre, we should also mention the importance of expatriates from regional centres. This mobility gives the opportunity to adapt faster and more flexibly, instead of adapting centrally developed solutions.

International project groups, committees, assignments [30] and informal networks can be viewed as efficient learning structures and framework in MNCs. The extent of the opportunity for members of the subsidiaries to participate in cross-border activities makes the possible contribution of them to international knowledge transfer transparent. The following section of the article analyzes the characteristics of this international knowledge transfer in Hungarian subsidiaries of MNCs, with focus on human resource management.

4 Knowledge Management and Human Resources

Our statements regarding knowledge management features of practices in the field of HR are based on answers that we gained by using two different methods. First, there were questions explicitly addressing knowledge transfer features of the organizations under survey; second, there was information regarding other HR issues but which we also were able to explain from the perspective of knowledge management, since they may have implications for knowledge management. In focus was competence development and the factors that have an impact on it. We sought answers to questions such as:

- Who plays a more important role in the organizational learning and in knowledge transfer: is it the headquarters, or is it the subsidiary?
- In what direction does knowledge flow and what are its enablers?

• How does knowledge transfer take place within the international organization?

First, we sum up our statements regarding the competences which are viewed as important.

4.1 Managing Competences

4.1.1 Important HR Functions and Desired Competences

In the period examined, employee communication was first in the ranking of HR areas considered to be the most critical, most important HR functions. Respondents indicated that HR planning and talent management were similarly critical. This is reflected in the answers to the question regarding critical skills and competences. From a variety of the managerial competence fields of HR managers – such as personal credibility; change management; business knowledge; teamwork; strategic contribution; traditional HR services; knowledge of foreign languages; the use of information technology in HR and knowledge sharing competence – respondents found

- the ability to ensure personal credibility (achieving results, effective relationships, communication skills) (84%);
- change management capability and skills (68%), and also
- appropriate business knowledge (66%)

to be the three most important ones.

4.1.2 Competence Development

We studied the most important personal competence development possibilities in the field of HR from three perspectives. We sought information

- a) regarding formal/informal learning,
- b) regarding the place where formal learning takes place (local vs. headquarter administered training and development), and
- c) the possibilities to learn as result of work-related mobility.

We added to these dimensions also the dimension of intercultural trainings.

What respondents held for the most powerful method of HR competence development and consequently, for the best learning opportunity, was local training end development, and informal learning on the job. They also found formal learning important. What we saw regarding informal learning corresponds to the well-known fact according to which people learn most and best during work, from their closest co-workers, by experience, or by doing activities. However, the priority of local learning as opposed to learning in the company centre may have different causes and requires further investigation. Learning in the centre received much lower scores, and so did mobility; these latter ones did not contribute to the competence development comparably to the methods described above. This regards the mobility between parent and subsidiary, and between subsidiaries. In the surveyed period of time, respondents held intercultural trainings for the least influential means of personal HR competence development.

4.2 Knowledge Flows

4.2.1 Knowledge Sharing between Parent and Hungarian Subsidiary

From the factors that facilitate knowledge transfer between parent and subsidiary (Table 1), the research project examined the motivation towards knowledge sharing, knowledge transfer abilities, and also the way of knowledge transfer and the kind of transferred knowledge. From these factors, respondents found the ability to transfer knowledge and motivation to transfer knowledge as most important factors and as the most important enablers of knowledge processes.

Table 1 The enablers of knowledge transfer (on a 1 to 5 scale, average) (Source: empirical research of the authors)

Knowledge flow enablers	The average of the answers
Ability to transfer knowledge	2.56
Motivation to transfer knowledge	2.63
Method of knowledge transfer	2.71
Type of knowledge	3.08

Respondents also meant that the knowledge transfer processes which are practiced in their own organization are the most important knowledge flow (Table 2). Knowledge flow from the parent to the subsidiary is the second most important flow of knowledge. It corresponds to the opinion of the respondents regarding the most important forum of knowledge transfer: the most important forum of knowledge acquisition is training and development at the local subsidiaries.

The respondents found the importance of knowledge flows between subsidiaries much less important yet still considerable. This also corresponds to what they said

about the moderate importance of mobility between subsidiaries. Very few respondents found that the company centre shows any interest for HR experiences gained at subsidiaries and suggestions coming from there. This finding does not support the statements of research according to that reverse knowledge transfer [34] is getting more important in the knowledge transfer processes of multinational companies.

Table 2
HR knowledge flows (on a 1 to 5 scale, average) (Source: empirical research of the authors)

Knowledge flows in HR	The average of the answers
Knowledge flows within subsidiary	2.56
Knowledge flows from parent to subsidiary	2.63
Knowledge flows between subsidiaries	2.71
Knowledge flows from subsidiary to parent	3.08

⁽Explanation: $l = critical \Rightarrow 5 = not critical$)

Our findings correspond to international research results [32] which found that not only organizational structures and strategies influence the success of knowledge transfer, but also the characteristics of expatriates. If the knowledge of the parent firm is critical to the subsidiary's development and if personal factors play a critical role in knowledge transfer, then it is very important for the headquarters to send expatriates who are motivated to transfer knowledge.

The same can be stated about the ability of expatriates to transfer knowledge [22, 32]: Technological and management skills are necessary conditions for knowledge transfer, but not enough; an important condition for expatriate assignment is also that they need to be adaptable for knowledge transfer, to be able to transfer knowledge in a way that can be accepted and understood by the subsidiaries' employees.

4.2.2 Knowledge Transfer from Outside the Organization

External HR service providers also contribute to the learning processes in the organizations (e.g. consultants). As the data show (Table 3), external service providers were used most often in training and development. If we observe the key HR functions from the perspective of knowledge management we have to mention that in human resource planning and in performance assessment, almost none of the companies used the help of external service providers.

Research results regarding direction and facilitators of knowledge transfer within multinational companies were underpinned by specific knowledge management solutions of the surveyed companies.

Table 3
Role and use of external service providers in the different key functions of HR (Source: empirical
research of the authors)

Key functions of HR	Increased	Decreased	No Change	External providers not used
Human Resource Planning	1	3	3	67
Recruitment	8	28	18	19
Selection	7	21	17	28
Performance Evaluation	4	1	6	62
Training and Development	11	20	31	11
Compensation and Benefits	8	8	33	24
Industrial-Labour Relations	8	2	16	47
Employee Communication	4	3	18	48
HRMS/IT	9	3	23	38

Conclusions

Based on both theoretical and our own empirical research, we can argue that an important strategic challenge for multinational enterprises is to develop an organizational framework that supports and improves their knowledge processes. From the specific aspects of the acquisition and the accessibility of knowledge as critical organizational resources, we can mention the distance between the organizational units, the diversity of national cultures and institutions, language diversity, changes in the number of expatriates, and the relevance of knowledge for the organization; all of these can highly influence both the importance and the success of knowledge processes.

However, specific conditions such as the attitudes and motivation of the people concerned in the transfer of knowledge plays a role in successful fulfilment of goals. According to the findings of the survey conducted among Hungarian subsidiaries of multinational companies, the success of the knowledge transfer is dependent on the ability of the person to knowledge transfer and on the motivation to knowledge transfer, that is on his/her communication skills.

The results of the research also highlight that it is necessary to expand this research. There are several issues that remain unanswered at this moment and need further research.

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Integrating Logistics Cost Calculation into Production Costing

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Abstract: Production costing is a well developed area of cost management. There are several applications reported which make use of the up-to-date costing methods like activity-based costing. Nevertheless, research in product cost calculation has paid limited attention to logistics costing so far. This paper aims to investigate how logistics cost calculation can be integrated into production costing. The methodology applied relies on the multi-level indirect cost allocation technique as it corresponds to the nature of logistics costs appearing in production systems. The proposed costing model is tested by a numerical example. Based on the research results, it can be concluded that the integration of logistics functions into production costing yields clear advantages; however, its implementation may require considerable efforts and also some compromises concerning the methodological constraints.

Keywords: cost calculation; cost allocation; performance; logistics; production

1 Introduction

Logistics has become an important factor influencing the competitiveness of production companies. The logistics functions of production cover activities such as the procurement of inputs, the supply of manufacturing processes and the distribution of finished products. It is essential that reliable data are available on the costs and performances of these logistics operations so that the management decisions affecting logistics issues in production systems can be supported more effectively.

Production costing is a widely investigated and analysed topic in the literature. There are numbers of approaches on how to make the cost calculation of various products created in different manufacturing systems more accurate. As production processes can generally be planned and modelled in an exact way, the costing methods used have reached a high level of completeness. Although production companies have already recognised the importance of logistics functions, less attention has been paid to the independent evaluation of their costs and performances. To carry out such evaluations is often not possible as production costing regimes are not sophisticated enough to distinguish logistics related operations.

Thus it is worth examining how the calculation of logistics costs and the monitoring of logistics cost effectiveness can be incorporated into production costing. To do that, the first task is to review the literature and identify the relevant methodological background. Having defined the research framework, the principles of the proposed costing mechanism are elaborated by also taking into account the outcomes of relevant R&D projects and former publications. The modelling procedure aims at creating and demonstrating a possible production costing scheme which is able to determine the contribution of logistics functions to the product costs, and moreover, to evaluate the cost effectiveness of logistics activities operated in production companies.

Concerning the methodology, the multi-level indirect cost allocation approach is applied when setting up the costing model. It is a special form of the full cost allocation (FCA) technique. The application of this method is necessary because logistics-related costs emerge usually as indirect costs in production companies.

Another suitable approach could be the activity-based costing (ABC) technique, which is a widely accepted and utilised method of production costing – to be described further on. Nevertheless, ABC does not pay too much attention to the interactions between cost centres operating on various levels of the organisational hierarchy. Logistics functions, however, can be found in different levels of the production structure so a costing method considering the multi-level characteristics or the vertical integration of production may be more appropriate.

To illustrate the advantages of the proposed costing method, a pilot calculation is also carried out. It is not a real-life application as the input data are based on estimations. Nonetheless, the sample model depicts the operation of a typical production company having background logistics functions. So the experiences obtained through running this simple model may be relevant for drawing general conclusions. Of course, real-life implementations would need a sound adaptation of the developed costing model as each production company has its own operational specifications.

2 Methodological Background

Before developing the product cost calculation model including logistics functions, the relevant literature shall be studied carefully. The literature review covers production costing with special regard to logistics related subtopics.

Several case studies were conducted to find out what models of product costing the companies use and what allocation bases are applied. It was pointed out that accounting systems are mostly designed to meet financial accounting demands, so an additional costing model is necessary for product costing. Companies try to do their cost allocations as logically as possible within a limited timeframe and with other scarce resources. The main purpose of the introduction of product costing models is pricing and inventory valuation where the latter factor is usually less important [1].

Full-absorption costing, i.e. direct cost based overhead allocation, has often been criticised. It used to be a suitable tool, as long as the ratio of direct costs was high in production systems. Today's production systems are, however, automated complex systems with a high ratio of indirect costs where ABC can be applicable. Nevertheless, ABC as a parameter based method may require considerable resources. The costs of ABC can be reduced by using simulations [17].

ABC has been successful mainly in large scale industries by providing appropriate and accurate information on the consumption of resources. At the same time ABC has not received significant attention from small companies, which is why attempts have been made to study the application of ABC in such companies as well. The related projects aimed to develop ABC systems in order to produce more accurate cost information and provide information for making or buying, i.e. outsourcing decisions [13].

Several authors state that ABC has become a mature cost estimation and accounting methodology. Using ABC for cost estimation of manufactured parts is being practiced with an acceptable rate of success. A special application area is where the costs of the design and development activities for machined parts are evaluated. An essential conclusion of such assessments is that the discrepancy between ABC and traditional cost estimates grows as the products become more and more complex [3].

An attempt was made to integrate the benefits of ABC with other management principles like throughput accounting, target costing, life cycle costing and strategic accounting in order to establish a more realistic costing model of complex manufacturing processes. Although each model has its own particular merits, the common elements of them are the strong emphasis on business processes and the inclusion of relevant manufacturing characteristics, i.e. performance [11].

The production ABC models can be combined with other parameter based methods. These combined approaches can mainly be applied in the planning phases [19]. So ABC can be used as a planning tool and opens the possibility of applying more sophisticated planning procedures to tactical optimisation problems within production and operations management [21]. Even business process reengineering (BPR) evaluations can be carried out through using ABC [22]. Another example is when the quantitative determination of cost reduction through

task learning is performed using ABC, and then it is compared with traditional costing. Results obtained by these two techniques may be significantly different [2].

Logistics costs within production companies can only be separated in a difficult way. The reported logistics cost data are not accurate and their cause-effect mechanism cannot be evaluated either. So the effective control of logistics costs and the rationalisation of logistics activities are missing [6, 23]. A possible solution may be the introduction of ABC, as it is applicable to allocate indirect costs such as logistics costs. ABC can also be combined with the economic value added (EVA) method, which enables the inclusion of capital costs [23].

ABC is claimed to be an appropriate technique in computing the costs in production systems producing products according to a make-to-order principle. An extensive ABC model for evaluating the change in the production supply system was established with a detailed activity and cost driver analysis for company-intern storage systems. It has been concluded that ABC is the most suitable methodology in allocating the costs of indirect activities, such as storing and materials handling, which do not directly add value to the manufacturing of the product [20].

ABC is applied for determining inventory costs, which makes it possible to control inventory operations [4]. A dedicated costing system for order management in manufacturing companies using ABC and activity-based management (ABM) has been developed and integrated as a decision support system [14]. Modern manufacturing systems using material requirement planning (MRP) or just in time (JIT) supply techniques are evaluated by product cost calculation based on ABC. It has been proved that the push and the pull type supply systems can be compared with each other effectively through using improved logistics costing [18].

The literature review causes us to make the conclusion that although logistics costing elements can already be found in production costing, the independent and separate calculation or evaluation of logistics costs and performance are not typical in production systems. Another interesting finding is that almost all product costing projects, independently from the scope, rely on activity-based costing. It is also obvious that the accuracy and the usefulness of production costing can be improved significantly by the introduction of separate logistics costing functions.

As a consequence of the literature analysis it can be stated that the adoption of multi-level indirect cost allocation with special regard to logistics functions will probably deliver real advantages to product costing. By doing so, even the efficiency of logistics activities or operations performed in production companies may become visible.

3 The Proposed Costing Model

The production costing model supplemented with logistics cost calculation functions is built up in two steps:

- 1 defining the general structure of the costing model based on multi-level indirect cost allocation;
- 2 developing a concrete costing model depicting the operation of a sample production company having logistics business units/areas.

The first step utilises the research results published by the author of this paper [5, 8, 9, 10]. The general principles have already been elaborated but now shall be adapted to the specific needs of production costing. Special attention is paid to the integration of logistics related objects and relations. The basic ideas of the second step are also available [9]. Nevertheless, they need to be completed to make the model more comprehensive and consistent.

Figure 1 shows the general costing model based on multi-level indirect cost allocation. The model consists of cost objects, profit objects and relations connecting the objects.



General costing model based on multi-level indirect cost allocation

The cost objects are entities where the indirect costs are registered as primary costs. They are arranged into a multi-level hierarchy – which is why this is a scheme of multi-level indirect cost allocation. Cost objects can be business units

or technology centres contributing to the production of the profit objects or they might serve other cost objects. Each cost object shall be supplied with a performance indicator measuring its performance. These performance indicators are the so-called cost drivers.

Profit objects are the products which obtain revenues for the company. Direct costs are recorded in the profit objects. Note that the definition of model elements (objects) is different from the one of ABC: ABC uses cost/activity centres instead of cost objects and cost objects instead of profit objects.

The relations in the model reflect the performance consumption. As the cost objects have intern service relations with each other their total costs also contain the so called secondary costs which can be allocated by using the rate of the relative performance consumption, called performance intensity. So the total cost of cost object k can be calculated as follows:

$$TC_{k}^{co} = C_{k}^{pr} + \sum_{i=1}^{n} TC_{i}^{sco} \frac{P_{ki}^{co}}{TP_{i}^{sco}} = C_{k}^{pr} + \sum_{i=1}^{n} TC_{i}^{sco} p_{ki}^{co}, k = 1, 2, ..., n$$
(1)

where:

 TC_k^{co} - total cost of cost object k

 C_k^{pr} - primary cost of cost object k

 TC_i^{sco} - total cost of serving cost object i

 TP_i^{sco} - total performance of serving cost object *i*

 P_{ki}^{co} - performance consumption of cost object k at serving cost object i

 p_{ki}^{co} - performance intensity of cost object k at serving cost object i

Moreover, the allocation of the indirect costs to the profit objects from the relevant serving cost objects are also based on the relative performance consumption. So the total cost of profit object j can be calculated as follows:

$$TC_{j}^{po} = C_{j}^{d} + \sum_{i=1}^{n} TC_{i}^{sco} \frac{P_{ji}^{po}}{TP_{i}^{sco}} = C_{j}^{d} + \sum_{i=1}^{n} TC_{i}^{sco} p_{ji}^{po}, j = 1, 2, ..., m$$
(2)

where:

 TC_j^{po} - total cost of profit object j

 C_i^d - direct cost of profit object j

 TC_i^{sco} - total cost of serving cost object *i*

 TP_i^{sco} - total performance of serving cost object *i*

 P_{ii}^{po} - performance consumption of profit object *j* at serving cost object *i*

$$p_{ji}^{po}$$
 - performance intensity of profit object j at serving cost object i

It shall be noted that:

$$\sum_{k=1}^{n} p_{ki}^{co} + \sum_{j=1}^{m} p_{ji}^{po} = 1, \text{ for all } i = 1, 2, ..., n$$
(3)

It is obvious that performance indicators or performance intensities play a crucial role in the allocation procedure. Thus the selection of cost drivers and the measurement of performance distribution shall be carried out carefully. Besides technology information systems, the experiences of experts or managers responsible for the examined activity areas may be useful here.

If we would like to add mathematical methods when selecting cost drivers, regression or correlation analysis may be applicable, provided the time series of cost and performance data are available. If the proposals of experts can be obtained and they are ready to rank them, the analytical hierarchy process (AHP) methodology may give more exact results. AHP can also be used in extreme cases when the distribution of performances cannot be measured; here the weights resulting from the AHP calculation are regarded as performance intensities [7].

The cost efficiency of the cost object can be evaluated by calculating the average cost: total cost divided by performance. A high value of average cost may reflect a low level of capacity utilisation. Average cost values can also be used for preparing outsourcing decisions as the prices of extern services can be compared with the intern cost of performance creation.

Note that efficiency is a broader issue than cost efficiency. There are much more complex methods for evaluating the efficiency of certain business or technology units. Cost efficiency is one of the indicators measuring efficiency and shall be supplemented by other instruments, e.g. data envelopment analysis (DEA), when making complex assessments [15, 16]. DEA can even be combined with AHP, which yields a wider range of the efficiency ranking values [12].

Revenues are recorded in the profit objects. The margin of the profit object, as the indicator of its profitability, can be calculated by subtracting the total cost form the revenue. Another indicator of profitability is the cost-coverage ratio which can be determined through dividing the total cost by the revenue.

How can the logistics functions be incorporated into the general production cost calculation scheme defined before? Logistics functions in production companies are mainly background services of the core activity, i.e. manufacturing. Sometimes they serve the products itself. So logistics functions can be regarded as cost objects causing indirect costs and producing performances as intern services. They can be assigned to different levels of the cost object hierarchy depending on the organisational structure of the examined company. Another condition of adding logistics cost objects is the separated registration of logistics cost items and the separate measurement of performance indicators or intensities [6].

As logistics functions are cost objects in our model their cost efficiency becomes calculable through the average costs. These are indicators for supporting outsourcing decisions which are frequently considered in case of in-house logistics services. Due to the cause-effect based allocation of logistics costs, as indirect costs, the ratio of logistics cost in the total product cost can also be determined in a more exact way. Summarising the argumentation it can be stated that our theoretical model meets the methodological requirements set before (see Chapter 1).

Having built the general model, the concrete costing scheme is to be developed in the second step. It means that the appropriate profit and cost objects shall be selected, and then the intern service connections or performance relations between them shall be identified. Performance indicators and their dimensions are also to be added.

Here a rather general cost model of a production company is considered on the basis of empirical experiences. The basic structural elements have been gained by former research results [9]. At the same time, the model is further developed by including additional operational elements. The proposed costing model is shown in Figure 2.

The elementary profit objects in the sample model are the products (1...m). Their direct inputs are materials used and components mounted which represents the direct costs. The cost objects can be categorised into two groups:

- 1 the cost objects representing the general activity areas of the company (levels 5...6), such as general, financial or human management and IT (information technology);
- 2 the cost objects representing the units of tactical and operative control or execution (levels 1...4), such as production planning, purchasing, operative production control, maintenance, sales, distribution, production supply and manufacturing (1...x). This group is served by the cost objects of Group 1 and it serves the profit objects. There are also further intern service relations within this group, which can be seen in Figure 2.



Figure 2 Costing model of a sample production company having logistics functions

Let us see how the logistics functions are integrated into the cost allocation mechanism or operation model:

- purchasing is assigned to allocation level 3. It is served by the cost objects of Group 1 and by production planning. It serves manufacturing and products. Its performance indicator is order with the dimension of piece (i.e. number of orders);
- production supply is assigned to allocation level 2. It is served by the cost objects of Group 1 and by operative production control and maintenance. It serves manufacturing. Its performance indicator is movement with the dimension of piece (i.e. number of movements);

• distribution is assigned to allocation level 2. It is served by the cost objects of Group 1 and by production planning and maintenance. It serves the products. Its performance indicator is item with the dimension of piece (i.e. number of items).

4 Numerical Example

The advantages of the proposed cost calculation model can be revealed through completing a numerical example. This example demonstrates the operation, i.e. the procedures of the costing model. The input data necessary for running the model have been estimated. So not the numerical results itself but the functions supporting the decision making tasks shall be studied and evaluated.

Let us assume that our sample production company operates according to the model presented by Figure 2. It has 10 products (m = 10) and 3 manufacturing sites (x = 3). The assumed direct cost and revenue data for the profit objects (products 1-10) are summarised in Table 1 where "th. MU" means thousand monetary unit.

profit object	direct cost C_j^d (th. MU)	revenue (th. MU)
product 1	400	960
product 2	380	890
product 3	340	870
product 4	560	910
product 5	540	1200
product 6	680	1540
product 7	430	1320
product 8	520	1380
product 9	420	1210
product 10	300	1050

Table 1 Estimated direct costs and revenues for profit objects

The assumed primary cost (representing the indirect costs) and performance data of cost objects can be found in Table 2. The cost objects and their performances are listed on the basis of Figure 2.

To complete the cost allocations by using Equations (1) and (2) the performance intensities shall also be made available as input data. The cause-effect relations of Figure 2 helps identify what performance intensity data are needed.

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cost object	primary cost $C_k^{\ pr}$	performance TP _i ^{sco}		
	(th MU)	value	dimension	
gen. man.	40	2,800	(piece)	
IT	80	5,900	(GB)	
fin. man.	60	55,000	(piece)	
hum. man.	40	290	(person)	
prod. plan.	60	5,400	(hour)	
purchas.	180	22,000	(piece)	
prod. cont.	90	4,800	(piece)	
mainten.	780	12,000	(hour)	
sales	330	38,000	(piece)	
distribut.	630	19,000	(piece)	
prod. sup.	520	150,000	(piece)	
manuf. 1	760	120,000	(piece)	
manuf. 2	660	14,000	(piece)	
manuf. 3	870	13,000	(hour)	

Table 2 Estimated primary costs and performances for cost objects

		Table 3		
Estimated	performance	intensities	between	cost objects

p_{ki}^{co} (rec./ser.)	g. m.	IT	f. m.	h. m.	prod. p.	purch.	prod. c.	maint.	p. sup.
fin. man.	0.12	0.16							
hum. man.	0.11	0.13							
prod. plan.	0.14	0.09	0.05	0.06					
purchas.	0.09	0.11	0.19	0.06	0.24				
prod. cont.	0.04	0.12	0.05	0.05	0.30				
mainten.	0.07	0.07	0.09	0.11	0.16				
sales	0.12	0.11	0.24	0.06	0.12				
distribut.	0.08	0.06	0.11	0.07	0.18			0.10	
prod. sup.	0.02	0.03	0.03	0.05			0.13	0.08	
manuf. 1	0.08	0.04	0.08	0.19		0.12	0.29	0.25	0.35
manuf. 2	0.07	0.05	0.09	0.18		0.15	0.26	0.27	0.32
manuf. 3	0.06	0.03	0,07	0,17		0.14	0.32	0.30	0.33

Table 3 contains the assumed performance intensities determined for the performance consumptions identified between cost objects. The objects receiving (consuming) performances can be found in the first column while the objects

providing (serving) performances are listed in the first row of the tables. Table 4 demonstrates the assumed performance intensities determined for the performance consumptions identified between cost and profit objects.

p_{ji}^{po}	purchas.	sales	distribut.	manuf. 1	manuf. 2	manuf. 3
(rec./ser.)						
product 1	0.04	0.10	0.09	0.08	0.12	0.07
product 2	0.05	0.08	0.09	0.13	0.04	0.11
product 3	0.04	0.11	0.08	0.18	0.03	0.09
product 4	0.07	0.09	0.10	0.06	0.15	0.05
product 5	0.06	0.07	0.11	0.03	0.11	0.17
product 6	0.05	0.08	0.08	0.09	0.08	0.10
product 7	0.09	0.12	0.14	0.12	0.11	0.06
product 8	0.08	0.10	0.11	0.14	0.07	0.11
product 9	0.06	0.12	0.09	0.05	0.19	0.09
product 10	0.05	0.13	0.11	0.12	0.10	0.15

 Table 4

 Estimated performance intensities between cost and profit objects

In possession of the input data, calculation can be started. At first, the secondary cost, total cost and average cost data of cost objects are to be determined using Equation (1) by taking into account the corresponding cause-effect chains. Note that the sequence of the allocations is fixed; the costs of the cost objects in the lower levels can be calculated only after the costs of all preceding cost objects in the upper levels have already been calculated. The results are shown in Table 5.

Table 5 has been constructed by taking the fixed calculation sequence into account. Let us see how to calculate the resulting data of logistics cost objects by inserting the relevant input data and the preceding calculated data. The total cost of purchasing is 180 + 40.00 * 0.09 + 80.00 * 0.11 + 77.60 * 0.19 + 54.80 * 0.06 + 79.97 * 0.24 = 180 + 49.62 = 229.62 th. MU. The average cost is 229.62 / 22,000 * 1,000 = 10.44 MU/piece (MU/order).

The total cost of distribution is 630 + 40.00 * 0.08 + 80.00 * 0.06 + 77.60 * 0.11 + 54.80 * 0.07 + 79.97 * 0.18 + 814.21 * 0.10 = 630 + 116.19 = 746.19 th. MU. The average cost is 746.19 / 19,000 * 1,000 = 39.27 MU/piece (MU/item).

The total cost of production supply is 520 + 40.00 * 0.02 + 80.00 * 0.03 + 77.60 * 0.03 + 54.80 * 0.05 + 131.81 * 0.13 + 814.21 * 0.08 = 520 + 90.54 = 610.54 th. MU. The average cost is 614.54 / 150,000 * 1,000 = 4.07 MU/piece (MU/movement).

		total cost	average cost	
cost object	secondary cost (th. MU)	TC_k^{co} (th. MU)	value	dimension
gen. man.		40.00	14.29	(MU/piece)
IT		80.00	13.56	(MU/GB)
fin. man.	17.60	77.60	1.41	(MU/piece)
hum. man.	14.80	54.80	188.97	(MU/person)
prod. plan.	19.97	79.97	14.81	(MU/hour)
purchas.	49.62	229.62	10.44	(MU/piece)
prod. cont.	41.81	131.81	27.46	(MU/piece)
mainten.	34.21	814.21	67.85	(MU/hour)
sales	45.11	375.11	9.87	(MU/piece)
distribut.	116.19	746.19	39.27	(MU/piece)
prod. sup.	90.54	610.54	4.07	(MU/piece)
manuf. 1	506.04	1,266.04	10.55	(MU/piece)
manuf. 2	507.57	1,167.57	83.40	(MU/piece)
manuf. 3	539.61	1,409.61	108.43	(MU/hour)

Table 5 Calculated secondary costs, total costs and average costs of cost objects

Having calculated the output data of cost objects, similarly as in the case of logistics cost objects, it is possible to determine the indirect costs, total costs, margins and cost coverages of profit objects (products) by using Equation (2). The results are indicated in Table 6.

 Table 6

 Calculated indirect costs, total costs, margins and cost coverages of profit objects

		total cost		
profit object	indirect cost (th. MU)	TC_j^{po}	margin (th. MU)	cost coverage (%)
		(th. MU)		
product 1	453.92	853.92	106.08	112.42
product 2	474.99	854.99	35.01	104.09
product 3	499.92	839.92	30.08	103.58
product 4	446.03	1,006.03	-96.03	90.45
product 5	528.16	1,068.16	131.84	112.34
product 6	449.50	1,129.50	410.50	136.34
product 7	535.08	965.08	354.92	136.78
product 8	551.99	1,071.99	308.01	128.73
product 9	537.95	957.95	252.05	126.31
product 10	622.45	922.45	127.55	113.83

Let us see, for example, how to calculate the output data of product 1. The total cost is 400 + 229.62 * 0.04 + 375.11 * 0.10 + 746.19 * 0.09 + 1,266.04 * 0.08 + 1,167.57 * 0.12 + 1,409.61 * 0.07 = 400 + 453.92 = 853.92 th MU. The margin is 960 - 853.92 = 106.08 th. MU, while the cost coverage ratio is 960 / 853.92 * 100 = 112.42%. The other product costs, margins and cost coverages can be determined similarly.

As the relevant cause-effect relations have been identified in the costing model, the logistics costs of the products can also be calculated. Table 7 shows the socalled restricted logistics costs of the products including also the ratio of logistics costs within total product costs. Restricted logistics cost means that only the primary costs of the logistics cost objects are considered and allocated here on the basis of the multi-level performance consumptions.

profit object	purchas.	prod. sup.	distribut.	total l. cost	ratio of l. cost	
	(th. MU)	(th. MU)	(th. MU)	(th. MU)	(%)	
product 1	13.93	46.54	56.70	117.17	13.72	
product 2	15.66	49.19	56.70	121.55	14.22	
product 3	14.17	53.20	50.40	117.76	14.02	
product 4	19.21	44.46	63.00	126.67	12.59	
product 5	18.70	52.94	69.30	140.94	13.19	
product 6	15.62	46.85	50.40	112.88	9.99	
product 7	23.27	50.44	88.20	161.91	16.78	
product 8	22.09	56.00	69.30	147.39	13.75	
product 9	19.28	56.16	56.70	132.14	13.79	
product 10	18.07	64.22	69.30	151.59	16.43	

Table 7Restricted logistics costs of products

Let us see, as an example, how to calculate the logistics cost of product 1:

- cost of purchasing (cost items are allocated directly and also through manufacturing cost objects): 180 * 0.04 + 180 * 0.12 * 0.08 + 180 * 0.15 * 0.12 + 180 * 0.14 * 0.07 = 13.93 th. MU (to make it clear Figure 3 illustrates this allocation procedure);
- cost of production supply (cost items are allocated through manufacturing cost objects): 520 * 0.35 * 0.08 + 520 * 0.32 * 0.12 + 520 * 0.33 * 0.07 = 46.54 th. MU;
- cost of distribution (cost items are allocated directly): 630 * 0.09 = 56.70 th. MU.

Note, when the cost allocation is carried out directly it does not mean that the corresponding cost items are direct costs. They are indirect costs as they cannot be registered in the profit objects directly and need additional assignments on the basis of performance consumption. However, this assignment is carried out in one step.



Figure 3 Allocation of purchasing costs to product 1

So the total logistics cost of product 1 is 13.93 + 46.54 + 56.70 = 117.17 th. MU. The ratio of logistics cost in the total product cost is 117.17 / 853.92 *100 = 13.72%. The logistics costs and cost ratios of the other products can be determined similarly. If it is not the primary costs but the total costs of logistics cost objects (i.e. 229.62, 610.54 and 746.19 th MU instead of 180, 520 and 630 th. MU) which are considered and allocated; then the so called extended logistics costs of the products are determined. The results are shown in Table 8.

profit object	purchas. (th. MU)	prod. sup. (th. MU)	distribut. (th. MU)	total l. cost (th. MU)	ratio of l. cost (%)
product 1	17.77	54.64	67.16	139.57	16.35
product 2	19.98	57.76	67.16	144.89	16.95
product 3	18.07	62.46	59.69	140.22	16.69
product 4	24.50	52.20	74.62	151.32	15.04
product 5	23.86	62.15	82.08	168.09	15.74
product 6	19.93	55.01	59.69	134.64	11.92
product 7	29.69	59.22	104.47	193.38	20.04
product 8	28.17	65.76	82.08	176.01	16.42
product 9	24.59	65.94	67.16	157.69	16.46
product 10	23.05	75.40	82.08	180.54	19.57

Table 8
Extended logistics costs of products

Conclusions

Summarising the outcomes of the theoretical analysis and the numerical example it can be concluded that the proposed logistics costing methodology may deliver real advantages in product cost calculation:

- the logistics costs, as indirect costs, are allocated to the products in a more exact and transparent way so the distortions due to the arbitrary allocations are reduced;
- the cost efficiency of the logistics functions within production can be calculated accurately and the possible outsourcing decisions can be backed up more thoroughly and more precisely;
- the contribution of logistics activities or performances to the total product cost can also be determined thanks to the separate and at the same time integrated logistics costing tool. This terminology indicates that the logistics related data are handled separately but the logistics cost objects are integral parts of the entire product costing system;
- the identified cause-effect chains make it possible to track and trace the causes of logistics costs and cost ratios so that the interventions aiming to rationalise the logistics business-technology processes or to enhance the capacity utilisation of logistics units can be planned and executed more effectively.

Nevertheless, the model presented is not perfect; it still has methodological constraints:

- simplifications may be necessary when depicting the operational structure of the examined company;
- the separation of logistics-related cost and performance data may not always be completed entirely;
- the selection of cost drivers may lead to choosing the measurable and more simple indicators instead of the more appropriate but less measurable indicators. It shall be noted that the selection of cost drivers relies mainly on the subjective decisions of the experts as the applicability of mathematical approaches is usually limited;
- the distribution of performance consumption, i.e. some of the performance intensities may not be measured exactly and estimations shall be used instead.

There are several extra conditions of the implementation, such as the availability of the input data of appropriate quality, which may require additional data collection and extensive data processing. The utilisation of a dedicated information system supported by automated data processing is the best solution, as far as it is possible. Ensuring these conditions may, however, require considerable efforts and resources.

In spite of the constraints mentioned above, the calculated cost data are still more accurate than those of traditional costing regimes. Moreover, additional information are also delivered like the detailed indicators of logistics cost efficiency or the ratio of logistics costs, etc. That is why one has to consider the advantages and the resources (costs) of the implementation, as well as the acceptable level of methodological constraints before making a decision about the introduction of the improved logistics costing system.

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Performance Evaluation and Prioritization of Leasing Companies Using the Super Efficiency Data Envelopment Analysis Model

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Abstract: Although the leasing industry is a successful industry in Iran's economic conditions, there are few studies that deal with the assessment of leasing companies' efficiency. This article applies data envelopment analysis (DEA) models for the efficiency assessment and ranking of leasing companies on the Tehran Stock Exchange (TSE). Total asset, P/E, and ROE are considered as inputs and EPS, current ratio, and sales growth are considered as outputs of each DMU. The results indicate that both the CCR and BCC models are not capable of ranking the five considered leasing companies. Due to the failure of the standard DEA models to rank the efficient set of leasing companies, a super efficiency DEA model, namely AP-DEA, is applied. The unique feature of this study is the use of a super efficiency DEA model to rank the leasing companies of the TSE. Concluding remarks are also presented in the final section.

Keywords: performance evaluation; super efficiency; DEA; leasing companies

1 Introduction

One of the most important concepts in the financial market is the lease as an agreement in which one party gains a long-term rental agreement and another party receives a form of secured long-term debt. This means that the lessee gains a long-term contract for use of an asset and the lessor is assured of regular payments for a specified number of years. A leasing company is a financial unit which

serves such services. Since leasing has a vital role in economic development and growth and also contributes a major share in the gross domestic production (GDP) by supporting the channelizing of funds (Alam *et al.*, 2011a), assessing the performance of the leasing companies is a most important issue.

Generally, performance evaluation is the process of obtaining, analyzing, and recording information about the specific aspects of a company's or an organization's performance. Although the performance evaluation has various aspects (such as financial, customer, quality and processes), providing an opportunity for organizational diagnosis, improvement and development is the aim of the performance evaluation in all different viewpoints.

performance is of Financial one the main aspects of each company's/organization's performance, which is commonly evaluated using financial statement analysis and financial ratios analysis. For instance, Kantawala (2001) determined the financial performance of non-banking finance companies in India using three groups of financial ratios. He covered ten years from 1985-86 to 1994-95 and concluded that there would exist a significant difference in the profitability ratios, leverage ratios, and liquidity ratios of various categories of non-banking financial companies. Like Kantawala (2001), Ahmad et al. (2011a) examined the financial performance of the non-banking finance companies in Pakistan which were providing services such as investment advisory, asset management, leasing, and investment finance. They classified all considered ratios in three groups, profitability, leverage, and liquidity, and used ratio analysis to evaluate the performance. Alam et al. (2011a) evaluated the financial performance of Pakistani leasing companies between the years 2008 and 2010 via financial ratio analysis. They used seven financial ratios to assess the performance. Results of their study showed that the performance of leasing companies in 2010 was better than in 2009 due to a positive change of ratios from 2009 to 2010. In another case, Alam et al. (2011b) classified leasing companies using financial ratios and made horizontal and vertical analysis among leasing companies for the period 2006-2009. They concluded that leasing companies' ranking on the basis of net investment in finance lease is different from the ranking based on return on assets (ROA), return on equity (ROE), return on revenues (ROR) and lease ratio (LR).

Assessing service quality and customer satisfaction are other aspects of performance evaluation which are considered by Akhundi *et al.* (2010) in auto-industry leasing of Iran. They developed a model for the evaluation of service quality in auto-industry leasing based on indices explained by customers in focus group and surveyed for different periods using statistical techniques based on factor analysis.

Pierce (2003) examined the effects of organizational structure on the firm's strategy and performance of consumer automobile leasing. Pierce (2003) also demonstrated the significant effect of ownership structure on the firm's behavior

and performance. He suggests that being a subsidiary of a larger corporation may lead to a conflict between different goals within the firm and result in poor performance.

Among different performance evaluation approaches, DEA has been considered as an appropriate tool for measuring and analyzing efficiency and performance (Galagedera and Silvapulle, 2002; Joro and Na, 2006; Ho and Oh, 2008; Lo and Lu, 2009; Rouyendegh and Erol, 2010). Therefore, the DEA approach is applied in the present study.

In the literature, indices such as earnings per share (Samaras *et al.*, 2003; Kimyagari and Amini, 2007; Lo and Lu, 2009; Ho and Oh, 2008; Fasangari and Montazer, 2010), current ratio (Tiryaki and Ahlatcioglu, 2005; Albadvi *et al.*, 2007), total assets (Lo and Lu, 2009), price/earnings ratio (Tiryaki and Ahlatcioglu, 2005; Samaras *et al.*, 2006; Xidonas *et al.*, 2009), return on equity (Samaras *et al.*, 2003; Tiryaki and Ahlatcioglu, 2005; Kimyagari and Amini, 2007; Xidonas *et al.*, 2009), Sharpe, Jensen and Treynor (Redman *et al.* 2000) are considered for assessing the performance and ranking of companies. The indices considered in the current research are earnings per share, current ratio, total assets, price/earnings ratio, return on equity, and sales growth.

Data from Iran over 2005 show that the Iranian GDP was about 32 billion USD, 2 billion of which was earned from leasing companies (Akhundi *et al.*, 2010). This fact confirms the success of this industry in Iran. Unfortunately, despite the industry's success, there are few studies about this industry, especially as regards the performance of leasing companies. Considering this gap, we are motivated to evaluate the performance of leasing companies listed on the Tehran Stock Exchange (TSE). The other detected gap in the literature is the lack of prior data envelopment analysis (DEA) study on assessing performance of leasing companies, in spite of the ability and advantages of DEA in the performance evaluation model based on DEA for Iranian leasing companies.

2 Research Methodology

This section outlines the research methodology. As stated, in this study, DEA is used for assessing the performance of Iranian leasing companies. Therefore, a brief introduction to performance evaluation systems (PES) design, DEA, considered input and output variables, and a description of data source are presented in this section.

2.1 Performance Evaluation Systems (PES)

Developing an effective PES is required to achieve a precise appraisal and effective efficiency improvement. The primary goals of a PES are to provide a measure for comparing the same units, to produce accurate appraisal documentation, to plan an improvement scheme, and to obtain a high level of quality and quantity in the desirable outputs of the unit. The following steps can help managers to create an effective PES for financial appraisal:

- 1 Identify performance measures,
- 2 Develop an appropriate appraisal model,
- 3 Implement the model,
- 4 Draw a rough sketch for weak aspects,
- 5 Develop an improvement plan,
- 6 Set an evaluation schedule.

In the first step, standard performance measures must be extracted from the literature and other sources, such as expert opinion. Although identifying these measures may be one of the time-consuming steps of PES creation, the careful definition of such measures is very important for achieving a precise evaluation. In the second step, the PES should be developed in an unbiased manner. Therefore, an appropriate model must be chosen according to the special conditions of the case study. Then, the model should be implemented. The recognition of weak aspects of the performance, according to the results of the model, is done in the fourth step. Then, an improvement plan is designed based on the weak aspects. Finally, an evaluation procedure should be scheduled.

2.2 Data Envelopment Analysis

DEA, initially introduced by Charnes *et al.* (1978), is a nonparametric method to evaluate the efficiency of decision making units (DMUs). While not considering any assumption about the functional form of the frontier, DEA evaluates the performance regarding a number of inputs and outputs simultaneously. The DEA approach also does not require priori assumptions of the relationship between inputs and outputs, and they can have very different units. There are different versions of DEA according to its features. Two well-known features of DEA model are the structure of its returns to scale and orientations in efficiency analysis.

Based on the structure of returns to scale, there are two versions called constant returns to scale (CRS) or CCR (Charnes *et al.*, 1978) and variable returns to scale (VRS) or BCC (Banker *et al.*, 1984). In the CRS version, it is assumed that an

increase in the amount of inputs would lead to a proportional increase in the amount of outputs. In the VRS version, the amount of outputs is deemed to increase more or less than proportionally than the increase in the inputs. The CRS version is more restrictive than the VRS and usually produces fewer numbers of efficient units and also lower efficiency scores for all DMUs. This is due to the fact that the CRS is a special case of the VRS model.

Related to orientations in the efficiency analysis there are two well-known orientations. Input-oriented models are models where DMUs are supposed to produce a given amount of outputs with the smallest possible amount of inputs. Output-oriented models are models where DMUs are supposed to produce the highest possible of outputs with a given amounts of inputs (Charnes, 1994).

Suppose *n* DMUs with *m* inputs and *k* outputs; the CCR and BCC model related to DMU_p are shown in Table 1 as model (1) and (2), respectively, where, θ_p indicates the efficiency score of DMU_p , x_{ij} indicates the i^{th} input of the j^{th} DMU, y_{rj} indicates the r^{th} output of the j^{th} DMU, and λ_j indicates the weight of the j^{th} DMU.

CCR Model		BCC Model	
Min θ_p		Min θ_p	
s.t.		s.t.	
$\sum_{j=1}^n \lambda_j x_{ij} \leq heta_p x_{ip}$		$\sum_{j=1}^n \lambda_j x_{ij} \leq heta_p x_{ip}$	
$\sum_{j=1}^n \lambda_j y_{rj} \geq y_{rp}$	(1)	$\sum_{j=1}^n \lambda_j y_{rj} \geq y_{rp}$	(2)
$\lambda_j \ge 0, \ j = 1n, \ i = 1m, \ r = 1k$		$\sum_{j=1}^n \lambda_i = 1$	
		$\lambda_j \ge 0, \ j = 1n, \ i = 1m, \ r = 1k$	

Table 1 CCR and BCC version of DEA

2.3 Data Sources and Description

All data have been gathered from the TSE and from leasing companies' websites. Five companies, the Leasing Company of Iran (DMU_1) , Iranian Leasing (DMU_2) , Khodro-Ghadir Leasing (DMU_3) , Rayan-Saypa Leasing (DMU_4) , and Sanat-Madan Leasing Company (DMU_5) , are selected for the performance evaluation.

The present study uses the financial statements of the selected companies in 2010 because all required data were available in this year. The values of the six

considered ratios are calculated to use in the performance analysis and shown in Table 2.

Financial indices of Leasing Companies								
	Input (I)	DMU						
Index	Output (O)	1	2	3	4	5		
Earnings Per Share (EPS)	Ι	421	656	8	1339	307		
Current Ratio (CR)	Ι	1.68	1.58	1.03	0.91	1.23		
Total Assets (TA)	0	2612591	6108496	1200294	8394899	3030865		
Price/Earnings Ratio (P/E)	0	7.7	5.7	5.0	5.7	4.8		
Sales Growth (SG)	Ι	69.23%	116.40%	16.50%	76.10%	34.08%		
Return On Equity (ROE)	0	27.96%	32.30%	0.77%	51.96%	16.85		

Table 2	
Financial Indices of Leasing Companies	

The six ratios are defined and interpreted as follows:

- The *earnings per share* (EPS) index is the amount of earnings per each outstanding share of a company's stock. Two companies may generate the same value of EPS, but one could do so with less equity (investment). The company which uses less equity to generate the EPS would be a "better" company.
- The *current ratio* (CR) is a financial ratio that measures whether or not a firm has enough resources to pay its debts over the next year. Low values for the CR (values less than 1) indicate a lower ability to meet current obligations.
- The *total assets* (TA) is the sum of current and long-term assets.
- The *price/earnings* (P/E) ratio is the most common measure of how expensive a stock is. Companies with high P/E ratios are more likely to be considered "risky" investments than those with low P/E ratios.
- The *sales growth* (SG) is defined as increase in sales over a specific period of time.
- The *return on equity* (ROE) is amount of net income returned as a percentage of shareholder equity. In fact, ROE reveals how much profit has been generated with the money that a company's shareholders have invested.

It should be noted that EPS, SG, and CR are considered as input variables and P/E, ROE, and TA are considered as output variables. The variables are selected based on the variables chosen in earlier DEA studies in the related literature (See Powers and McMullen (2000), Luo (2003), Seiford and Zhu (1999), Ho and Zho (2004), Shih-Fang and Wen-Min (2006)). Before performance measurement, the
data are normalized by dividing the values of each index to its maximum value. Table 3 shows the normalized data.

3 Performance Measurement

In order to test the applicability of the different DEA models, four different models, including both input-oriented and output-oriented versions of both CCR and BCC models, are applied to the set of the 5 leasing companies. Table 4 shows the efficiency scores of the mentioned companies under the specific conditions of the four versions of DEA.

Inder	Input (I)	DMU				
muex	Output (O)	1	2	3	4	5
Earnings Per Share (EPS)	Ι	0.314	0.490	0.006	1.000	0.229
Current Ratio (CR)	Ι	1.000	0.940	0.613	0.542	0.732
Total Assets (TA)	0	0.311	0.728	0.143	1.000	0.361
Price/Earnings Ratio (P/E)	0	1.000	0.740	0.649	0.740	0.623
Sales Growth (SG)	Ι	0.595	1.000	0.142	0.654	0.293
Return On Equity (ROE)	0	0.017	0.019	0.000	0.031	1.000

Table 3 Normalized data

	Efficiency Score				
DMU	C	CR	BCC		
	Input-oriented	Output-oriented	Input-oriented	Output-oriented	
1	0.90	1.11	1.00	1.00	
2	1.00	1.00	1.00	1.00	
3	1.00	1.00	1.00	1.00	
4	1.00	1.00	1.00	1.00	
5	1.00	1.00	1.00	1.00	

Table 4 Efficiency scores of DMUs

As Cooper *et al.* (2001) stated, if the number of DMUs is less than the total number of inputs and outputs, a large number of the DMUs will be identified as efficient; the results of the four basic models of DEA demonstrate that these models do not work as a discriminant of an efficient unit from inefficient unit. Based on the CCR models, only one out of five units is detected as inefficient (DMU_1) and there are no inefficient DMUs according to the results of the BCC models.

As we know, the reference set for inefficient DMU is defined as the set of units on frontier that is considered as a target unit for it. According to the lambda's coefficients in the optimum solution presented in Table 5, the reference set of DMU_1 identified as the only inefficient unit is as equation (3).

$$RS(DMU_1) = \{DMU_3, DMU_4, DMU_5\}$$
(3)

Table 5Coefficient of lambda in the optimum solution

	λ_1	λ_2	λ_3	$\lambda_{_4}$	λ_5
DMU_1	0.00	0.00	1.22	0.27	0.01
DMU_2	0.00	1.00	0.00	0.00	0.00
DMU_3	0.00	0.00	1.00	0.00	0.00
DMU_4	0.00	0.00	0.00	1.00	0.00
DMU_5	0.00	0.00	0.00	0.00	1.00

Due to the failure of the standard DEA models to rank the efficient set of leasing companies, the super efficiency DEA model introduced by Andersen and Petersen (1993) is applied to rank the efficient units. This mathematical model is shown in equation (4).

Min θ_{p}

s.t.
$$\sum_{\substack{j=1\\j\neq p}}^{n} \lambda_j x_{ij} \leq \theta_p x_{ip} \quad ; \quad i = 1, 2, ..., m$$
$$\sum_{\substack{j=1\\j\neq p}}^{n} \lambda_j y_{rj} \geq y_{rp} \quad ; \quad r = 1, 2, ..., s$$
$$\lambda_j \geq 0 \quad ; \quad \forall j$$
$$\theta \text{ is free}$$
(4)

In the AP-DEA model, a DMU is efficient if its efficiency score is equal or greater than one. In other words, all inefficient DMUs have efficiency scores of less than one.

As can be seen in Table 6, the DMUs are ranked in ascending order as follows: DMU_5 , DMU_3 , DMU_4 , DMU_2 , and DMU_1 . Furthermore, DMU_1 is identified as an inefficient unit in the AP-DEA model as well as in both the input-oriented and output-oriented CCR model. Therefore, Sanat-Madan Leasing Company (DMU_5) and Iran Leasing Company are best and worst, respectively. These results are graphically shown in Figure 1 and Figure 2.

Table 6 Ranking of DMUs



Figure 1 Score of five DMUs (AP-DEA)



Figure 2 Ranking of five DMUs (AP-DEA)

Conclusions

Historically, the leasing operation in Iran goes back to the establishment of the Leasing Company of Iran, which was jointly financed by Iran's private sector, the Credit bank of Iran, and one of the leading French companies in this area, which legally began operation in 1975. In 1977-78, Sanat-Madan Leasing Company started its operations. Despite nearly four decades of leasing industry activities in Iran, few studies have dealt with an efficiency assessment of leasing companies or

leasing industries. Hence, the present research studied the performance of leasing companies on the TSE in the year 2010. Three input variables (EPS, CR, and SG) and three output variables (TA, P/E, and ROE) were considered in the current study. The results show that the Sanat-Madan Leasing Company, the second company established in the leasing industry of Iran, has better performance than the other leasing companies, and only the Leasing Company of Iran, the first company established in the leasing industry of Iran, is inefficient. Also, it was shown that the Sanat-Madan Leasing Company, Khodro-Ghadir Leasing, and Rayan-Saypa Leasing can be set as possible targets for the Leasing Company of Iran in order to improve its performance.

The results of the basic DEA models show their inability in ranking the efficient leasing companies. Although the present study applied the AP-DEA model to rank efficient leasing companies due to the failure of basic DEA models, there are other methods that can be used to rank the DMUs (See Seiford and Zhu (1999)) in future studies. Determining critical inputs and outputs can also be considered as another direction for future research.

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Learning Strategies and Styles in Vocational Education

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Abstract: Vocational education in Hungary has seen significant changes over the past 20 years. However, the adaptivity of the system is largely aggravated by certain problems of content, compensation and selection. As a result, the success of Hungarian public education, as shown by PISA research, lags far behind its possibilities. In our present paper the adaptive model of vocational education is outlined first, where teaching and learning strategies appear as regulating agents with a formative influence on the educational process. The preferred patterns of learning and teaching strategies typical of the individual yield the learning and teaching styles. In the second part of the paper, the results of a longitudinal examination performed among secondary vocational school students in Budapest are presented. The answers to the following questions are sought: how much learning strategy and style can be regarded as an individual characteristic, how it changes with the progress of studies, and whether it shows any correlation with the gender or specialization of the students.

Keywords: learning theory; learning model; learning strategy; Kolb's learning style

1 Introduction

As shown by the findings of PISA examinations, the success of public education in Hungary lags far behind its possibilities. [1] [2] The reasons for this may best be summarized by the adaptivity weaknesses of the education system and the vocational educational subsystem within that. As an answer by education policy to the significant sociological and economic transformations over the past 20 years, fundamental changes have taken place in the structure (continuous specialization: vocational orientation according to specialization, professional team basic courses, acquisition of labour-market professions), content (curriculum frameworks in professional basic subjects, competence based and modular training programmes in vocational education) as well as output requirements (complex, two-level graduation examination in professional basic subjects, professional and examination requirements) of education. However, problems arising from a selective school system have not yet been solved. Students of abilities different from former ones have appeared in vocational education due to the expansion of higher education. Vocational training has not fully been able to keep pace with these changes.

The adaptivity of the system of vocational education and the regulation of the educational process is largely made difficult by primary school achievement based further education (problem of selection), the application of methods less suitable to students' abilities (problem of compensation), and a decrease in the number of professional practices (problem of content). On account of these problems, the school is less able to balance the advantages and disadvantages originating in the differences of family background, which is reflected by students' achievements, too.

The conclusion to be drawn from PISA examinations is that the individual success of students is determined mostly by the social status of the family and the school, the frequency and quality of feedback on learning achievement, the amount of time allotted to and needed for learning, the relationship between teaching and learning strategies as well as the standards of self-regulated learning and motivation. These differences in achievement are already reflected by secondary school enrolment with students graded good continuing their studies at grammar schools mainly (the best ones at 8-year grammar schools), those graded fair at vocational schools, whereas those with a poor achievement and often of a disadvantage, suffering from difficulties in learning, behavior and integration, almost exclusively at vocational training schools (trade schools). This fact foreshadows the danger of differences in achievement at the primary school being deepened by secondary education. After that, it is not at all surprising that almost 20% of secondary vocational school students and more than 50% of vocational training school (trade school) students do not meet the standard requirements of competence necessary to adapt to a modern society.

To phase out this *problem of selection* is primarily the task of education policy. Difference between school types ought to be reduced on the basis of the principle of equal opportunities and equity, whereas that within the classroom increased in the field of learning achievement. This achievement is to be interpreted as an added value where factors not influenced by the school are also taken into consideration (e.g. family background, region of schooling).

The situation arising from the problem of selection may somewhat be helped by an incentive school microenvironment and innovative pedagogical activity, but teacher-centeredness still chararacterizes vocational education in Hungary. To solve this *problem of compensation*, a student-centered methodology that makes knowledge construction possible ought to take over methodology limited to imparting information. Child-centeredness, a better understanding of students, individual treatment and development, the need for compensation and differentiation focuses attention increasingly on the regulating agent of the educational process, where a diagnostic aspect and its necessary teaching and learning strategies appear in an emphatic form. From this a need for the contents renewal of technical teacher training naturally follows, taking the specialities of vocational education more into consideration.

A fall in the number of practices causes serious concern mostly in vocational school training. The approximation of *training content* to that of comprehensive schools resulted in three *problems*. Firstly, the professional knowledge of certified skilled workers failed to meet the standards of the labour-market (competence deficit), secondly the over-theoretical contents and the needs for developed cognitive abilities of the training contrasted the more developed psychomotoric skills of the students (need vs skill), and thirdly, as a result of these, students' career orientation, attitude and professional value preferences changed (motivation deficit). The latter also manifests itself in only about 30% of qualified skilled workers finding work in their area after leaving school.

2 The Objective of the Research

In comparing students, their differences are in practice explored. Teaching is to be considered effective only if the teacher selects their methods, forms and means (teaching strategies) by taking the different characteristics of students into consideration, too. Adaptive teaching focuses on either the correction of students' lack of knowledge (corrective teaching) or on strategy selection with regard to students' strengths (compensating teaching). Whether it be correction or compensation, it is important for us to know those variables, as "conditions" (existing knowledge, abilities, competences, attitudes, learning strategies and styles, motivation, environmental variables) that have most influence on the efficiency of both learning and teaching.

Three types of learning are to be distinguished with respect to objectives. The objective of *externally directed learning* is firstly the acquisition of the cognitive forms of knowledge, secondly the development of abilities by it, and thirdly the formation of attitudes. The objective of *learning targeted at acquiring efficient forms of information acquisition* is the preparation of students for independent learning. The third level is *self-regulated* or *meta-learning*, when the student recognizes how to learn successfully depending on the character of the curriculum and on subject requirements and to achieve this he is able to select the appropriate forms, means and methods of information acquisition.

On the basis of all this, the responsibility of teachers is to thoroughly get to know their students' learning characteristics in order to be able to develop their cognitive and motivational self-regulation. In accordance with that the Hungarian National Curriculum mentions the development of efficient independent learning among essential key competences on the one hand and, on the other, treats the question of teaching how to learn among the high priority tasks of development. The fundamental condition for efficient and independent learning is for the individual to recognize and understand his own learning strategies as well as the strengths and weaknesses of his abilities and expertise, whereas the role of the teacher is to give directions in connection with the acquisition and structure of as well as access to the syllabus, to have the effective methods and techniques of learning acquired by the student, and to become familiar with the particular learning methods, strategies, styles and habits of the students. [3]

The idea of a research series was delineated based on the above to focus on the reasons of success or failure in learning and to contribute thereby to the content and methodological development of technical teacher training.

Instead of a hypothesis test often applied in pedagogical research, research questions were prepared. The effect of variables in the research on success or failure is manifold. The simultaneously inquisitive character of both the longitudinal (the students taking part in the examination in a phasing-out system) and cross-sectional (each year in a particular year examined) examination models, focussing explicitly on vocational school students, would have limited research targeted at the acceptance or refusal of hypotheses. Therefore we arrived at several recognitions which transcend the boundaries of hypothesis justification and may be decisive from the point of view of our research topic.

Through the abilities and experience of the individual, characteristics and preferences are formed which will have an influence firstly on learning, secondly on problem-solving, thirdly on professional development and even on career choice. The most important question to be answered by the representative longitudinal research focussing on secondary vocational school students in Budapest is whether learning style may be interpreted as a characteristically individual speciality, which, as a part of the personality, mostly expresses a relation to the acquisition and application of information, which in a word is learning.

3 The Theoretical Background to the Research

3.1 Learning Theories, Learning Models

In comparing learning theory and learning model (teaching theory, teaching model), learning is to be interpreted in the former as a behavioral, cognitive, social, etc. change resulting from a particular situation, while in the latter as a process made optimal by taking external conditions into consideration. Whereas learning theories are primarily micro-level (describing the results of short term and elementary activities), are based on organized hypotheses and deal with

learning in general, learning models are macro-level (describing the results of long-term activities) and focus in concrete terms on a practical aspect, for example on the characteristics of classroom learning.

The various psychological directions hold different views on learning, or rather, they emphasize or appreciate different essentials of it. These theories have undergone significant development during the past decades and still coexist. Should any of the paradigms be considered, it is true of each that learning is treated in general and interpreted as a relatively lasting change in behaviour, and its result is achieved through practice. This change may manifest itself among other things in the individual's theoretical knowledge, competences, abilities, behaviour and attitudes. So learning is interpreted as a change in associations between images by the representatives of associationist psychology, in behaviour by those of behaviorism, in mental processes by those of cognitivism, in personality development by those of psychoanalysis, and in incentives of the personality by those of phenomenology. [4] [5] [6] Therefore learning has an outcome and this is change itself.

The most relevant category of the research is the adaptive educational model and the one named after Carroll and Bloom is to be highlighted. [7] [9]

According to Carroll, learning achievement depends on existing knowledge, general learning abilities (the ability of self-regulated learning), the degree of comprehension (general intelligence, verbal skills), several environmental factors (e.g. family, friends), the quality of instruction (the selection of appropriate methods and means, how organized the curriculum is) as well as affective and cognitive dispositions (e.g. interest, motivation, level of standards, self-image). Learning achievement is best shown by the pace (speed) and quality (failure rate) of learning and the durability of knowledge (recallability, mobilizability). The efficiency of learning is to be expressed by a ratio where time allotted to learning is divided by time needed for acquisition. The former comprises the syllabus-based classroom time planned by the teacher and the home learning time of the student, while the latter comprises the quality of instruction and the time need determined by the talents of the student. [7]

In the late 1990s, Huitt developed Carroll's model. In his transactional model, time allotted to learning is dependent on the time of acquiring the material as measured during checking as well as of active participation in the learning process, together with the time spent on the successful completion of allotted tasks. [8]

According to Bloom's model learning achievement is substantially influenced by four factors, namely the existing knowledge of the student, their level of motivation, the duration of the teaching-learning process and the quality of instruction. Time need as a factor appears here, too, originating primarily in the existing knowledge and learning differences of the individual. That is why the other three factors are to be selected in such a way as to ensure the safe acquisition of the material in each and every student's case; in other words, time allotted to learning should at least coincide with that needed for acquisition. [9]

Bloom and Carroll's teaching-learning models led the way to the model of mastery learning. [10] After the objectives of learning were carefully determined, syllabus content was broken up into small units and continuous feedback given on the level of acquisition, which made the necessary correction possible, thus ensuring even more time for each student to acquire the material with mastery.

The significance of model formation lies in helping to take into account the components of education as well as their interrelations. A process-based attitude contributes to the exploration of variables which determine the operation of the system. In view of these variables regulation may make the process optimal.

Based on the above, the conditions of model formation are to be determined.

- Competence clarification
- Determination of micro- and macro-environmental relations
- Consideration of all components of the complex system and their interrelations (holistic approach)
- Review of all variables from the system's point of view
- Consideration of the suitability components of regulation, thus the examination of the efficient and successful operation of the system, and an attempt at the optimal operation of the system (adaptivity)

As the suitability indexes of regulation, the following were introduced:

- *sensitivity* at what difference between variable output value and expected value intervention occurs
- *time of intervention* how long the real time need is

The precondition of adaptive education is for the system to be as sensitive as possible and the time of intervention as short as possible.

The following forms of adaptive education are to be highlighted:

- *correction* if the student's abilities (existing knowledge, particular skills) are not sufficient for syllabus acquisition they need correction
- *compensation* if educational methods, forms and tools are selected by taking the student's strengths in syllabus acquisition into consideration

The classified learning process (Fig. 1) and so learning achievement is determined by the following ("conditions"):

- student characteristics (e.g. existing knowledge, abilities, motives, attitudes, learning style)
- teacher characteristics (e.g. competences, attitudes, teaching style) [25]

- curricular educational objectives and requirements
- time needed for acquisition and time allotted to learning
- the student's micro- (e.g. school atmosphere, family background) and macro-environment (e.g. settlement, regional specialities, education policy)



Figure 1 The adaptive model for the educational process

Depending on learning achievement there are three feedback, regulating agents within the system, one on the teaching process (formative effect through change in teaching and learning strategies), one on the student (the possibility of the development of a self-regulated strategy) and one on the teacher (teacher competences develop).

3.2 Learning Strategies and Learning Styles

The decisively significant corrective elements of the model in Fig. 1 are the quality of teaching and learning strategies (suitability to objective and syllabus), time to be allotted to learning (in class and at home) and the abilities related to the comprehension of the syllabus. The highest level of learning strategies is the self-regulated learning strategy, when the student, surmounting his own cognitive and affective characteristics, processes the material by choosing the learning methods and means most suited to the requirements. The teacher's direct guidance in this cannot apparently be dispensed with in the beginning.

Teaching, learning and self-regulated (meta-learning) strategies are inseparable and parallel variables of the educational process. Their significance, dominance and mutual effect depend on the educational objectives, the content specialities of the syllabus, the didactic tasks to be solved as well as the age group characteristics of the students (Fig. 2).



Figure 2 The interpretation of teaching and learning strategy

The dominance of teaching strategies is typical of teacher-centered, that of learning strategies is of student-centered situations of education, respectively, while the self-regulated strategy is typical of independent learning. In the case of teaching-learning strategies the selection of the combination of method – form – means is primarily the teacher's task, and in the case of self-regulated learning the student is capable of it. The teacher obviously makes the selection of the teaching and learning methods, means and forms most suited to processing the syllabus in a way that contributes to the development of the student's self-regulated learning strategy as well.

A common feature of theories of learning style is that students are classified according to their cognitive characteristics and learning strategies along one- or multi-dimensional bipolar (usually cognitive) scales. Conclusions as to the efficient learning styles, forms and means of the student may be drawn from the preferred strategies related to learning style. Teaching strategies which produce the most preferred learning strategies can also be specified, and these in turn serve as a starting point for designing the learning environment.

The common feature of several theories is that only certain cognitive and sometimes affective individual characteristics are integrated into their system, which, however, reduces to a great extent the scope of validity of the given approach. From this, it also obviously follows that neither theory is capable of typifying all the learning characteristics of the individual in the proper way and in proper detail. The existing 60-70 theories can be classified into five categories, according to which learning style

- is biologically determined, including for instance sense modalities and cerebral hemisphere lateralization (Dunn – Dunn, Gregorc),
- reflects the characteristics of cognitive structures, including for instance certain patterns of abilities, too (Riding, Gardner),
- is an element of a relatively stable personality type (Jackson, Myers-Briggs),
- expresses the flexibly stable learning preferences of the individual (Honey – Mumford, Kolb, Kolb – Kolb, McCarthy),
- should be ignored and interest focussed on learning approaches, strategies, orientations and conceptions of learning instead (Entwistle, Sternberg, Vermunt). [11]

From the point of view of our research, the theory examining the learning preferences of the individual is to be highlighted. The most significant theory in this group is associated with the name of David Kolb, who has been studying learning style for more than 40 years. His Learning Style Inventory (LSI) is one of the most widespread measuring instruments in the examination of learning styles. His experimental theory of learning amalgamated the relevant and decisive movements of the 20th Century (John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers, etc.) [12]

His theory rests on six principles:

- Learning is interpreted as a relationship between the individual and the environment.
- Learning is interpreted as the holistic process of adaptation to the environment.
- Learning is to be regarded rather as a regulated process than an outcome condition.
- The student's existing knowledge and experience play a decisive role in processing new information.
- Piaget's adaptive theory is regarded as the basis of learning. Adaptation has two forms, namely assimilation and accommodation.
- Learning is a process of constructing knowledge, the result of which presents itself as a relationship between community knowledge and individual knowledge.

According to his theory, learning is a cyclical process where the stages of gaining concrete experience, reflective observation, abstract conceptualization and active experimentation can be well distinguished. Transition through these stages of information acquisition demands various abilities, attitudes and behavior from students, who vary in these fields. Kolb's LSI is able to show the dominance of these characteristics. In his two-dimensional polynomial system he distinguished learning styles according to the preferences of information acquisition (grasping concrete experience – abstract conceptualization; feeling – thought) and processing (reflective observation, comprehension – active experimentation, the application of acquired skills in new situations; observation – action). On the basis of preferences along axes he differentiated four kinds of learning style: Converger, Diverger, Assimilator and Accommodator. [12] [13] [14] [15]

At the end of the 1980s, Hunt and his colleagues extended the four-region model to a nine-region one by distinguishing four, so-called transitory (Northerner, Easterner, Southerner and Westerner) learning styles. [16] [17]

Later on Kolb and his colleagues determined the balancing style of learning. Students of this type show a considerable degree of balance along both dimensions. [18]

Harb and his colleagues attached an appropriate teaching style to each of Kolb's learning styles. In their opinion a diverging student needs a motivating teacher role, an assimilating one needs an expert, a converging one needs a trainer, while the accommodating one most of all needs a role which gives continuous feedback. [19]

Kolb's LSI served as a basis for the development of the measuring instruments of several further learning styles. Among them McCarthy's so-called 4MAT system may be distinguished ("teaching around the learning cycle"). The main objective was to create teaching situations, taking students' characteristics into consideration, which ensure the differentiated development of the individual. His theory combined Kolb's four learning styles with the cerebral hemisphere lateralization model. The stages of his learning process are the following: connecting to existing experience, observation, imagination, information transfer, practice, extension, refining, and performance. [20] [11]

Honey and Mumford developed their own theory also based on Kolb's model. [21] Experiential learning is regarded as a spiral cycle, with emphasis on continual development. The process starts with the stage of gaining experience, then continues with the stages of reflecting on the experience, critical analysis and generalisation, and planning the application of the newly acquired competence. At this point the cycle starts again but at a higher level. Students usually have a preferred stage, to which a respective learning style is linked: activist, reflector, theorist or pragmatist. Students with strengths at all four stages are seen as versatile or "integrated".

The question of sense modalities is echoed in several theories. They stand in the centre of the Dunn and Dunn theory for instance with the other variables, the circumstances of learning and the relation to them, being organized around it. [22] Stimuli are assessed by the human sense organs from four aspects: modality, intensity, location and duration. Based on sense modalities, Fleming distinguished learning styles, first the dimensions of visual – auditory – kinesthetic/tactile (VAK), then those of visual – auditory – read/write – kinesthetic/tactile (VARK). A visual student will primarily rely on images, the auditive one prefers learning through hearing, the verbal one will like to read the learning material and prefers written tasks, while the kinesthetic student will prefer movement, touching and action. [23]

4 The Methods and Means of Research

In the course of the vocational-pedagogical research the adapted version for students at secondary vocational schools of Kolb's Learning Style Inventory was used. In the questionnaire, students at each entry chose the one of four independent statements most as well as least typical of them, then they had to order the four statements into a hierarchy.

Our phasing-out system longitudinal examination was performed between 2007 and 2010, on paper in the first year and in an online form in the following three years (contribution by Attila Viola, teacher of engineering). The examination was performed with the participation of the Mérei Ferenc Institute of Education and Career Counselling (contribution by Judit Béky, consultant) at the request of the Department of Education, Children and Youth Protection, the Municipality of Budapest.

In the September of each academic year a preparatory class was organized for the teachers participating in the examination. They were also provided with a detailed printed measurement guideline. In addition, teacher identifiers were distributed by the help of which the measuring instruments could be given a preliminary try.

Measurement was carried out in the IT lab of the participating schools under the guidance of the teachers prepared. After the completion of the questionnaire students immediately received an assessment and an interpretation of the results, which largely contributed to the development of their own self-evaluation and the formation of their self-image.

Another feedback agent is the form-master, or the teachers working in the class who, on the basis of the results of the class, could acquire useful information in order to achieve their educational and teaching objectives with more efficiency. Therefore an online surface was created, where teachers could check their own class's results as well as their assessment and interpretation directly after the The students of 41 vocational schools in Budapest took part in the examination. 1,477 students from year 9, 1,206 from year 10, 1,242 from year 11 and 989 from year 12 participated in the examination considered representative as for the geographical position of the school and the gender and specialization of the students.

Starting secondary	— Longitudinal examination model $ ightarrow$				
vocational school	Date of examination				
	Autumn 2007	Autumn 2008	Autumn 2009	Autumn 2010	
September 2007	Year 9	Year 10	Year 11	Year 12	l ion
September 2008	-	Year 9	Year 10	Year 11	ona ona nati del
September 2009	-	-	Year 9	Year 10	Crc ecti ami mo
September 2010	-	-	-	Year 9	s, exe

Table 1
Examination models

Longitudinal research performed in the October and November of four academic years made the application of two examinations models (longitudinal, cross-sectional) possible (Table 1).

5 Results

5.1 Learning Strategies

In Kolb's model, the students' most preferred strategies are the acquisition of concrete experience and the active, practical application of acquired information. With respect to the type of information and its way of acquisition, besides an increasing deviation, a certain kind of stability (Fig. 3), while regarding the processing of information, besides a minimal change in deviation, a significant change of preference is to be observed (Fig. 4). With the progress of studies, the role in the learning process of practical application continuously increases, whereas that of observation, comprehension, though to a lesser degree, decreases. In this change the increasingly emphatic presence of technical basic subjects and chiefly of practical subjects has an apparent role to play, which demands a change in strategy of a particular circle of students. [24]



Figure 3 Means and standard deviations of learning variables I



Figure 4 Means and standard deviations of learning variables II

A stronger than medium negative correlation was measured among the learning variables (Table 2), which shows well the polarizing effect of Kolb's LSI.

Year 11	2009 - 2010					
Year 10	AE	RO	AC	CE		
AE	0.283	-0.400	-	-0.630		
RO	-0.410	0.203	-0.205	-		
AC	-0.132	-0.191	0.251	-0.345		
CE	-0.450	-	-0.251	0.255		

 Table 2

 Correlation between learning variables

Note: Absolute value low correlation values are not given in the chart. In the horizontal examination model the values below/above the main diagonal of the tables show the intercorrelation coefficient of the results of the lower/higher years at p<0.01 significance level in the given sample. Correlation coefficients along the main diagonal in the chart were determined on the basis of students' results in two consecutive years (2009 and 2010) (vertical examination model).

Through factor analysis the existence of two difference variables was justified; thus it can be stated that the relation of particular learning variables was appropriate and they belong to the same dimension.



Figure 5 The means of difference variables according to gender

Considering these learning strategies boys preferred generalization and conceptualization, while girls preferred the acquisition of experience. With the progress of studies there is an increase with both genders in practical application in new situations as well as observation and comprehension (Fig. 5).

In the dimensions of the type of information and the mode of its acquisition, there is a more significant deviation among individual students, which is mostly attributable to the gender and profession of the students. On account of the existence of professions chosen typically by boys or even more so by girls, it can be said that these two factors are related, i.e., that the most important influencing factor under examination in this respect is the gender of the student and, as seen earlier, their year. [24]

5.2 Learning Styles

Learning style can already be determined on the basis of learning variables. If learning style is interpreted in the four-region model, it can be seen that the assimilating learning style is the least typical one. 25.7% of boys have a converging and 23.8% a diverging, while 27.5% of girls have a converging and 22.4% an accommodating learning style. The rate of the assimilating style is a lot smaller with boys (17.2%) than with girls (22.4%); that is, highly critical thought and intuition is less characteristic of them. The high number of classification as converging is not surprising since it follows for the simultaneously preferred abstract conceptualization and creative application of the acquired information. The symmetry of the diverging style is quite high with boys, which testifies to strong imagination and problem sensitivity.

A more sophisticated and detailed image of students' learning process preferences was expected of the application of the nine-region model.

Before the interpretation of the results, we consider it important to confirm that the limit values of particular regions were always classified among the so-called transitional regions, whereas the ones along their borders among the balancing region. This can be seen well from the relative frequency distribution chart in the vertical examination model (Fig. 6). Apart from the minor decrease in the number of balancing style students, no significant change is to be observed; that is, the ratio of classification does not change in the two consecutive years. The number of students in the transitional region is significant. With regard to the number of students with high preferences in both dimensions, the least of them is classified as assimilating while the most as diverging.

Using the cross tab analysis, the learning style classifications of 2009 and 2010 were collated first, and as shown by Fig. 7, changes of significance scale are to be observed. Based on the measurements in the two consecutive years, it is to be established that the classification of only about 20% of the students remained the

same. Three cases were different. Only 13.3% and 13.9% of accommodating and assimilating style students, while as many as 27.2% of converging ones, got the same classification.



Figure 6 The distribution of learning styles in the vertical examination model



Figure 7
The distribution of learning styles in the vertical examination model

Therefore converging students can be said to have the most stable learning style while accommodating ones the most unstable one. The reason for this is the change in information processing preferences, because with students of this style, the role in the learning process of application in a new situation decreases and, simultaneously, that of reflection on experience (observation) increases.

Shifts were mostly observed with regard to neighbouring regions, especially in the direction of the balancing region. The number of shifts from the balancing region to the other eight was somewhat smaller. The "instability" of the transitional (e.g. westerner, easterner) regions is apparently the most significant. The classification of the learning style of students whose learning variable values fall on border regions changes the most. Significant changes are to be observed in the northern-eastern direction, too; that is, preference difference decreases with respect to the preferred syllabus content as well.

We were also interested to see whether there was any relation between the learning styles of 2009 and 2010 and, if yes, in what way and to what extent. The chi square test was applied in order to determine the relation between the two variables. Learning styles determined in the two consecutive years show a significant relation with each other (χ^2 =267.152; df=64; p<0.01) and a medium relation is demonstrated (Phi coefficient: 0.371, contingency coefficient: 0.348).

Based on the 2010 vertical examination (Fig. 8), it can be seen that, with the progress of studies, in the nine-region model marked change occurs in the ratio of two styles. The rate of converging students doubles (7.0%; 15.7%) while that of the so-called eastern style ones decreases by almost 50% (17.3%; 10.7%). The proportion of balancing students is by far the highest, at around a stable 20%. It means that the ratio of those students is unchanged in the learning process, of whom the four stages have an equally important role to play. Learning style and year are significantly interrelated (χ^2 =78.734; df=24; p<0.01), but this relation is quite loose (Phi coefficient 0.153, contingency coefficient 0.151).

In the course of vertical measurement the learning style classification of students in two consecutive years was also examined. Medium strong correlation between the results is demonstrated with the classification in 2009 having a minor forecasting ability for 2010. (E.g. with respect to years 9-10 χ^2 =170.064; df=64; p<0.01; Phi coefficient 0.513; contingency coefficient 0.456; λ =5.6%).

Learning style and specialization are significantly interrelated (χ^2 =53.302; df=24; p<0.05); however, this relation is quite loose (Phi coefficient 0.113, contingency coefficient 0.112). It cannot unambiguously be established that there is one particular learning style among students which is primarily typical of one specialization only. Therefore we can only say that certain learning styles occur in greater numbers with a given specialization.



🖾 Accommodator 🖸 Northerner 🗖 Diverger 🖾 Easterner 🖾 Assimilator 🖾 Southerner 🖾 Converger 🗔 Westerner 🗳 Balanced

Figure 8 Changes in learning style ratio with the progress of studies



Figure 9 Changes in learning style ratio with the progress of studies I

The horizontal measurement made it possible to compare the ratio of learning styles in particular specializations. Apart from the agrarian area in the case of the first three specializations, the majority of learning styles can essentially be characterized by stability, which reinforces its attitude-like quality. Their common characteristics are the increase in the ratio of the converging learning style and the decrease in the diverging one with the progress of studies (Figs. 9 and 10). Apart from the humanities, the ratio of the balancing learning style is the most significant, while it is the northerner style which is the most dominant there; in other words, concrete experiences rooted in one's own experience have a more decisive significance in the course of learning. However, no special preference has been established with students regarding the method of processing the syllabus.



Figure 10 Changes in learning style ratio with the progress of studies II

Since the number of students in the agrarian area is small for the necessary ratio of representation, the cross tab analysis of all the participating students in the area was performed (96 students in year 9, 78 in year 10, 44 in year 11 and 55 in year 12). Looking at tendencies, apart from the converging style, no significant deviation from the previous year was observed, except that the hectic quality typical of the small sample disappeared. It is still the diverging and accommodating styles that are the most characteristic in this area, contrary to the converging and assimilating ones. It can be observed here, too, that with the progress of studies, after year 9, the majority of styles becomes balanced to a certain extent. In other words, the learning style of students seems to settle according to the characteristics of syllabus-content acquisition as well as the teaching style of the teachers. It means that changes occur mostly in the regions around the axis.



⊠Accommodator □Northerner □Diverger ⊠Easterner ⊠Assimilator □Southerner ⊠Converger ⊠Westerner ∎Balanced

Figure 11 The ratio of learning styles according to gender (2010)

It is only in the technical as well as the economic and service specialization that significant correlation can be shown in connection with years and learning style (χ^2 =23.269 or 27.301; df=24; p<0.05 or p<0.05), however, this relation is quite loose (Phi and contingency coefficients at 0.203 and 0.218) and the forecasting ability of the year is also very poor here (λ =4.5% and 4.7%).

Comparing the distribution of learning styles according to gender, basically two differences are to be observed (Fig. 11). With boys it is mostly in the converging, assimilating and southerner regions, whereas with girls it is in the westerner, balancing and easterner regions that a more significant deviation from the similar values of the other gender can be observed. This is attributable to the different preferences of the two genders in the dimension of information acquisition. The ratio of balancing style students is the most significant, at 20%, with both genders. Despite all that no significant correlation between students' gender and learning style was shown in the nine-region model (χ^2 =10.057; df=8; p=0.261).

Conclusions

Learning strategy is to be interpreted as a complex system of procedures where methods, forms and means are united in an organic relationship. The particular preferred patterns of learning strategies typical of the individual are interpreted as learning style. With respect to learning, certain strategies (the method of information acquisition, sense modality) show some sort of stability while others (the method of information processing and its application) continuous change. Various characteristics are to be observed with respect to students' specialization and gender. Due to the change in strategy preferences only about one fifth of the students may be said to have a settled and stable learning style. With the progress of studies shift mostly in the direction of balancing regions is to be observed.

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