

The Process of Forming the Regional Innovation Strategy

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Abstract: The regional innovation strategy is recognised as a powerful driver of economic development at regional level. Over the years the methodology of developing the regional innovation strategy has been broken down into three phases: 1) building up consensus, 2) analysing of the innovation potential in a region, and 3) defining priorities and action plan. The aim of the article is to present the regional innovation strategy as a driver of economic development in a region, to explain the content and the process of forming the regional innovation strategy and to give the view on practical approach to developing a regional innovation strategy in the Banska Bystrica region. Attention will be given to building up the consensus in Banska Bystrica region, to the detailed analysis and evaluation of regional innovation potential as the outcomes for forming the regional innovation strategy in Banska Bystrica region (stress is placed on a detailed analysis of economic potential and sector trends, on analysis of entrepreneurs needs, on analysis of technological offer and support to entrepreneurs and on analysis of the research and development state in a region of Banska Bystrica). Results of the analysis are of high importance and are viewed as the basic preconditions for the definition of main priorities for increasing innovation capacity in the Banska Bystrica region. For each of the stated priorities system measures of the strategy are described together with the set of proposed pilot activities. 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: regional innovation strategy; the process of forming regional innovation strategy; consensus building up; analysis of regional innovation potential; SWOT analysis; priorities; measures and activities in regional innovation strategy

1 Introduction

The present stage of world economy development is influenced by the globalization process. The individual states and regions must cope with its impacts and create conditions for the continual restructuring of its own economy. One of the restructuring tools is formed by innovation processes which lead to the higher productivity and higher competitiveness. The innovation processes form the conditions for better market application of companies, resulting in the economic

development of regions and the state [7]. It is proved by the experience of advanced European regions for which the support of research, development and innovation belongs to the key priorities [2].

Several studies dealing with innovation confirm that the key to increased wealth and more a competitive economy is to be found at the regional level. This is because regions are closer to the companies, small and large, that are the engines of growth, and due to this proximity they are better placed to provide support and initiate dialogue with all the relevant actors (research institutions, universities, financing institutions, public agencies). Together they can form a common vision, mobilise all efforts to achieve that vision and respond quickly and flexibly to any needs that may arise. Immediate contact of regional administrative bodies with all relevant actors enables also better setting the programmes, schemes and supporting activities.

The regional innovation strategies are one of the main policy tools to support of innovation at regional level. The formulation of a strategy is perceived as a tool to deal with the future. The regionalization of the planning and running of the innovation process leads to the permanent validity of the regional structure activities [9].

The aim of this article is to present the regional innovation strategy as a powerful driver of economic development at a regional level, to formulate the basic steps in forming the regional innovation strategy and to give a practical view on the process of forming a regional innovation strategy in the Banska Bystrica region (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 Regional Innovation Strategy – Driver of Economic Development at a Regional Level

Innovation has been broadly recognized as an important factor in economic growth. The systems of innovation can be found at all levels of the economy, such as having a national, regional and sector perspective (2). There are several differences between national and regional levels. Compared to the national level, regions are important for the proximity of all actors and possibility to create social capital. Geographic proximity has the potential to create competitive advantages in terms of interaction, learning, access to skills and cooperation in development and business. Regional economies can be understood as the places of collective technological learning.

The strong interaction between learning, social capital and regional effects has been leading experts to pay more attention to the regional level of innovation, resulting in concepts such as industrial districts and innovative milieu and, more

recently, in regional innovation strategies. These concepts try to identify the precondition for the economic growth of regions, basically based on innovation and learning, and to identify some key issues related to innovation activities in the region. All concepts have shown the increasing importance of support for innovation.

According to Koschatzky and Gundrum regional innovation support has three major tasks (6):

- the activation of potential regional resources for the development and application of new technology,
- the inter-linkage of region-specific resources in regional innovation networks that comprise all the relevant actors in industry, science and policy, and
- the integration of regional networks into supra-regional technology cooperation systems.

The regional economy is a complex system which goes beyond the development of sector policies delineated in isolation. It involves more than specific efforts to increase spending on R&D, support to SMEs, or support to high-tech activities. It focuses on developing integrated approaches based on the characteristics of different territories. It establishes networks of institutions and stakeholders, creates space for them to develop constructive dialogue and uses their inputs in the decision-making process. This approach of this “third generation” innovation is newly supported by the European Commission. It is not considered a linear process that starts with research, eventually leading to development translated later into growth in the territories that have more capabilities. That is a product of policy-mix including several bodies and stakeholders in which the territories, their specificities and conditions are paramount. On the other hand, specialization is very important to gain regional competitive advantage. Functioning innovation systems include strong input suppliers and demanding customers, and firms which compete with each other for customers but also cooperate (6).

New understanding of innovation in the last years has showed the importance of a systemic approach and has led to a more integrated approach by implementing measures in the area of innovation. The regional innovation strategy is one of the main policy tools for the support of innovation at a regional level. The drawing up the regional innovation strategy comes from the explicit need to have a basic document which can cover the problems of innovation in the framework of a concrete region because innovation represents one of the main tools for establishing the knowledge-based economy, which is a basic pre-requisite for achieving the Lisbon Strategy objectives, not only at the national, but also at the regional level [16].

The regional innovation strategy approach, which today is widely recognised as a powerful driver of economic development at the regional level, began as an ambitious, unusual experiment. Its emphasis on systematic and strategic thinking was groundbreaking for its time. The development of a regional innovation

strategy encourages regions to reach a consensus on medium- and long-term objectives and to design policy actions in order to meet them [11].

This process relies on a broad-based, bottom-up approach, combined with top-down input, incorporating all regional stakeholders. It opens the minds of many policy-makers to the actual needs of businesses and to their expectations and capacities with regard to innovation [3]. Business requirements feed into a wider assessment of a region's needs and assets, often in the form of a formal SWOT analysis detailing the innovation capacity of the region in the wider, international context. The resulting data powers a dialogue organised around intelligence.

This open, free-flowing dialogue enables stakeholders to develop a shared vision, the driving force behind the successful development and implementation of all policy actions. This integrated approach involves strengthening the bond between the public and the private sector to boost the region's innovation system and thereby increase productivity and competitiveness. But an innovation strategy is more than dialogue and words; it is a call to action. The potential benefits to all stakeholders and to the region as a whole are usually apparent early on in the process, a fact which helps to secure the active, long-term support of the various contributors [17].

While there is no single methodology outlining how a regional innovation strategy should be taken forward, there is an underlying common philosophy. This is illuminated in the methodological guides published in the Innovation regional strategies website.

The process of forming the regional innovation strategy can in general be divided into three phases [17]:

Phase 1:

Consensus-building – the establishment of managing and executive units of the project, an information campaign, achieving the consensus between those involved in the regional and innovation development, establishing coordinated cooperation with the project partners, specifying the project goals and preparation of the detailed working plan.

Phase 2:

Analysis – a detailed analysis of the regional innovation system; an analysis of the enterprises' innovation needs, an analysis of services and institutions for supporting and financing innovation, an analysis of a technological offer, the identification of shortcomings and barriers, SWOT analysis.

Phase 3:

Defining priorities and action plans, formulating the regional innovation strategy – draft of strategic fields of the regional innovation strategy, of priorities and measures, the formulation of the Action plan and a set of pilot activities, draft of principles for the regional innovation strategy implementation, working out the monitoring and evaluation system.

3 The Process of Forming the Regional Innovation Strategy in Banska Bystrica Region

The Regional Innovation Strategy of the Banska Bystrica region has been worked out in the sense of the European Union philosophy, which on the basis of the member states experience, even prior to its enlargement in the year 2004, concentrates first of all on the development of small and medium-sized innovative enterprises, but does not forget the task of larger companies either.

The Regional Innovation Strategy of the Banska Bystrica region has not come into existence as an isolated document, but rather it is in agreement with basic strategic documents both at the regional and national level, and at the European level as well, because innovation has become the center of their attention. When proposing the Regional Innovation Strategy the multinational documents formed the basic initial documents which were adopted by the European Union in the concept of the EU structural fund strategic planning, and the national documents influencing the functionality of the system supporting research, development and innovation in the framework of the state. It is in agreement with the “Slovak Republic Competitiveness till 2010 Programme” (the so called Lisbon Strategy for Slovakia) and with the Innovation Strategy of the Slovak Republic. Following The National Strategic Referential Framework of the Slovak Republic for the years 2007-2013 the Regional Innovation Strategy of the Banska Bystrica region is in accordance with the operational programme “Competitiveness and the Economic Growth”, with the operational programme “Research and Development” and with the operational programme “Education”. At the same time this document is a detailed elaboration of Priority 2.1 with the title “The development of the knowledge-based economy and innovation, and of the programme of social, economic and cultural development of the Banska Bystrica self-governing region” [12]. The process of forming the regional innovation strategy in Banska Bystrica region had three phases.

3.1 Consensus-Building – Phase 1

The main aim of the first phase was to establish the project organizational structure. The management of the project consists of the steering committee, project coordinator and the project partners’ representatives. It was built up in such a way that it represents and ensures the principle of consensus and partnership in the region, which is an inevitable condition for the draft and especially for the implementation of the regional innovation strategy.

The main task of the steering committee is to ensure the successful implementation of regional innovation strategy project. The members of steering committee (19 members) represent the project in specific areas of their activities, decide the strategic objectives and orientation of the project, represent institutional support, facilitate achievement of regional consensus among key institutions in the region and evaluate achievement and strategy heading.

The project coordinator is in charge of managing the strategy of the preparation, implementation and evaluation of the regional innovation strategy project. The expert groups are an important mechanism for building regional consensus. They joined representatives of the public and private sector at the following tasks: a) assessing and commenting on the preliminary results of analysis, b) analyses results evaluation and recommendations for the development strategy, c) working out the specific parts of the regional innovation strategy, d) drafting priorities, measures and possible pilot activities on the basis of the analyses results.

The expert groups were thematically focused on five fields [12]:

- building up the innovation awareness in the region,
- management of human resources for research, development and the innovation development,
- cooperation among science, research, development and industry,
- financing of research, development and innovation development and legislative system,
- infrastructure for support of research, development and innovation development.

3.2 Analysis of the Innovation Potential of Banska Bystrica Region – Phase 2

With the aim of identifying the Banska Bystrica region's needs and specific features, the following surveys were conducted during the year 2007:

- a) analysis of economic potential and sector trends,
- b) analysis of entrepreneurs' needs,
- c) analysis of technological offer and support for entrepreneurs:
- d) SWOT analysis of the innovation potential in the Banska Bystrica region.

The analyses mutually confront the sides of supply and demand in the field of innovation in the Banska Bystrica region. They have been completed with terrain survey at enterprises and research and development organizations with the aim of identifying needs, barriers and recommendations in the field of creation and utilization of the innovation.

The results of the innovation potential analysis created the basis for formulating the SWOT analysis of the innovation potential in the Banska Bystrica region.

a) Analysis of Economic Potential and Sector Trends

The main aim of the analysis was to qualify the basic economic characteristics of the Banska Bystrica region and to analyze the sector structure of the economy, as well as the efficiency of individual branches and their importance for regional economy development.

The Banska Bystrica region is the largest of all the regions in Slovakia. It is situated in southern part of central Slovakia. The dominating industry branch in the region is metallurgy (from the viewpoint of revenue and employment) which represents over 60% of the region's total industry export. Further important sectors are the pulp and paper industry, the pharmaceutical industry, the wood processing industry, the engineering industry and the manufacture of building materials. The northern part of the region demonstrates a rather high degree of industrialization. The southern part of the region is the base of the wood processing industry and other branches complementary to agriculture. The forestry industry, logging and wood processing are also of a great importance.

The economic structure of the Banska Bystrica Region has been characterized in recent years by a gradual strengthening of the service industry and ongoing decline in agriculture. In the branches of industry and building, a rather distinct recovery can be seen in last two years. There are 15 enterprises from our region put on the Hi-tech sector. Prevailing number of enterprises in the region, however, work in the sphere of the lower technological level; 74% of enterprises are of L-tech and ML-tech areas [13].

b) Analysis of the Innovation Needs of Enterprises

On a sample of 333 companies, the above-mentioned research identified the attitude towards innovation, the rate and need of innovation introduction, the main sources of innovation, the level of cooperation in innovation activities, the factors limiting innovation activities and the options of the enterprises – in what they would need help and what in their opinion the Innovation Strategy of the Banska Bystrica region should contain. The questionnaire survey was completed with personal discussions at 34 enterprises and with a workshop with 20 engineering enterprises, where the possibilities of creating an engineering cluster were discussed. Most of the enterprises addressed were from the industry sector (67%) because it is generally known that it is here that the highest number of innovations and innovative solutions arise. The return rate of the questionnaires (87%), especially from the side of engineering companies, proves that this branch belongs to those which have the highest innovation potential in our region [13].

According to survey results of the enterprise innovation needs analysis, it can be stated that:

- Enterprises understand what innovation is and its positive influence on company development, but over 60% of them do not have innovation strategies elaborated.
- A high percentage of companies stated that they introduced product, process, marketing or organizational innovations in the years 2004-2007. After the personal consultations, however, it could be said that a lot of companies are not able to orientate themselves in the problems of innovation, and that they confuse this notion with any step bringing them profit.

- Financial support from foreign sources was gained by very few enterprises; most of them gained the financial assistance from structural funds and from the government.
- Internal sources, information from clients and customers and internet were considered by the enterprises the most important information sources for innovation activity. Astonishing is underestimation of the importance of information sources from universities, public research institutions, consultants, commercial laboratories or research and development institutes.
- Suppliers of equipments, materials, components and software, as well as clients and customers, were considered by the enterprises to be the partners who contributed the most from the point of view of innovation development; the weakest cooperation was developed with the government institutions, with competitors and with universities.
- The enterprises showed the greatest interest in future cooperation in innovation activities with advisory companies, innovation centres and universities.
- Inconsistent results concerning the present and future interest of enterprises in cooperation with universities and research institutions originates from the insufficient mutual communication, from the psychological barrier especially of small entrepreneurs to address the universities with the aim of solving the problem together.
- A lack of own financial sources and the high costs of innovation prevent them from innovation activities. The enterprises need the greatest assistance in the area of financing innovation activities, and in support for export and education.

c) Analysis of Technological Offer

The analysis of technological offer consisted of these two parts:

- analysis of organizations dealing with research and development (R&D),
- analysis of supporting organizations for entrepreneurs.

The aim of this analysis was to gather information on the institutions responsible for innovation development in the region and on supporting organizations for entrepreneurs, in order to identify the offer of these organizations for the application sphere and the extent of commercialization of research and development outputs and the extent of cooperation of research and development organizations with the entrepreneurial sphere. A further aim was to gain information on support and financing for research, development and innovations and on the main obstacles to applying creativity in the field of research and development activity and in the creation of innovations.

The survey showed that most organizations dealing with research and development in our region are from the engineering sphere (46%), chemical and pharmaceutical industry (18%), electrical industry, ICT (18%) and forestry (18%).

It is especially the industrial research and development linked with specific manufacturing enterprises. Its highest innovation potential is also confirmed by activity in the sphere of rights to intellectual property.

There are two universities in the region of Banska Bystrica. Matej Bel University offers a classical university spectrum of possibilities for study in the fields of education, social, economic and law sciences, arts, natural sciences, information sciences, mathematics, ICT and social services. The Technical University in Zvolen, as a top research and development and educational institution, fulfils its main task in closely connected fields of study and research in forestry, wood processing, ecology, environment and other related fields.

Results of R&D Organizations Analysis

- Research and development results in the addressed organizations are directed especially to large enterprises (30%), less to smaller and medium-sized enterprises.
- Questioned organizations execute the transfer of the results into the production and entrepreneurial sphere by means of cooperation agreements, sales of made-to-order solutions and by the execution of joint projects. The transfer of intellectual property by means of franchising operations is used only sporadically.
- The utilization of the research, development and innovation results of the questioned organizations in the entrepreneurial sphere had a rising tendency from the year 2004 up to the year 2006. In 2006 the average value of research, development and innovation results utilization out of the number of implemented outputs into the entrepreneurial sphere reached the value of 66% and the average estimated utilization rate of these results in 2007 was 60%.

Results of the Analysis of Supporting Organizations for Entrepreneurs

Nowadays there is a sufficient number of organisations in the Banska Bystrica region providing services for entrepreneurs. However, only a few of them provide services for research, development and innovations as well. The geographic coverage of the territory by these organisations reflects the industrial strength and the entrepreneurial background of individual areas.

As regards the element structure, we mean especially Regional business centres/Business innovation centres/Centres of first contact – there are 6 of them and they have been working for a long time (from 6-14 years) in our region. Further, there are the regional offices of Chamber of Industry and Commerce (2), industrial unions and associations and regional development agencies as well. In the Banska Bystrica self-governing region trade communities and associations work as well, and especially active are the Regional constituent of the Slovak Trade Chamber and the Trade community of Zvolen. It is important that the respondents understand the Regional Innovation Strategy which is being prepared as a system for supporting the innovation in the region. In accordance with the

response evaluation it should focus its measures and tools on creating a complex regional system of innovation support so that it contains:

- Creating an institutional network of innovation support in the region.
- Creating regional financial tools for supporting innovation. The aim of this measure should be the proposal and creation of regional financial tools in such a way that they supplement and widen the national financial tools.
- On the basis of the innovation potential analysis it is possible to formulate the SWOT analysis of the innovation potential in the Banska Bystrica region.

d) SWOT Analysis of the Innovation Potential in the Banska Bystrica Region

The SWOT analysis is the starting point for defining the priority fields as a basis for the future establishing of the Regional Innovation Strategy of the Banska Bystrica region. The main results of the second phase “Analysis“ are summarized briefly as follows [12].

Strengths:

- 1 Interest of the regional administration in supporting an entrepreneurial and innovation environment in the region.
- 2 Technical University, National Forestry Centre and Institute of Forest Ecology as an R&D basis for wood processing and ecology.
- 3 Matej Bel University as a centre for education in the area of social and natural sciences.
- 4 The existence of basic and applied research and state testing laboratories.
- 5 An educated labour force.
- 6 Secondary and vocational school system network.
- 7 A sufficient number of supporting, advisory and consultancy centres for entrepreneurs.
- 8 Traditions and potential in industrial production, mainly in the engineering, wood processing, metallurgy, glass, chemical and food-processing industries.

Weaknesses:

- 1 Enterprises and R&D institutions have not elaborated any innovation strategies or long-term visions of development.
- 2 Low orientation of SMEs towards existing possibilities of financial support for enterprises.
- 3 Limited financial and human resources for innovation in SMEs.
- 4 Low awareness of cooperation need.
- 5 High share of production with low added value.
- 6 Financial and moral undervaluation of well-educated technical labor force.

- 7 Insufficient linkage between R&D and enterprises.
- 8 Persisting traditional thinking and a fear of innovation; orientation towards existing and conservative customers and on achieving short-term profit.

Opportunities:

- 1 Integration into international collaboration.
- 2 Orientation of EU policies for support for research, development, innovation, and information technologies.
- 3 The dynamic growth of the economy of the Slovak Republic.
- 4 Possibility to use finances from structural funds and other funds of the EU in the programming period 2007-2013.
- 5 Dynamic development of IKT.
- 6 Involvement of regional government into coordination of innovation process in the region.

Threats

- 1 Unfavourable demographic development.
- 2 Drain of highly qualified labour force to other regions of the Slovak Republic or abroad.
- 3 Persisting lack of interest in technical education.
- 4 Misunderstanding of the need for clustering of companies.
- 5 Insufficient government investment in R&D.
- 6 Rising energy prices, dependence on foreign suppliers.

3.3 Priorities, Measures and Activities for Regional Innovation Strategy Implementation - Phase 3

On the basis of the accomplished analysis, EU methodology, the experiences of developed European regions, terrain researches and the work of expert groups, the proposal of *five priorities for increasing the innovation capacity of Banska Bystrica region* has been developed. For each of stated priorities there are described system measures of the strategy, together with examples of proposed pilot activities.

Priorities:

A Innovation policy and culture in the region

Innovations are a tool of competitiveness of a company and the whole region in the conditions of a knowledge-based economy. The Banska Bystrica region must create an innovation-stimulating environment and integrate the support for innovation into its strategic plans and policies in the scope of the Program of Economic and Social Development. To put strategic plans into practice, it

is necessary to create a new innovation culture, which includes the opinions, motivations and attitudes towards innovation, as well as the behaviour of subjects in the scope of innovation process [5]. To achieve this aim three main measures were formulated and for every measure concrete activities were formulated.

Measures:

- 1 Creating regional innovation awareness. The aim of this measure is to increase the innovation culture and innovation awareness of all innovation elements of the region as a group, and therefore to increase the quality of business environment. The main activities recommended were: the organization of conferences, seminars and workshops about innovation, the creation of business web-portals containing information about innovation, media support for innovation development, etc.
- 2 Increasing awareness in the field of intellectual property rights. The aim of the measure is to increase the awareness and understanding of the importance of innovation protection and the reasons for protecting intellectual property. The main activities recommended were: publishing promotional materials about intellectual property protection and the promotion of intellectual property through an innovation web-portal, etc.
- 3 Support for innovation development by the regional government. The aim of this measure is to create framework conditions for innovation development in the region. The main activities are: to incorporate the priorities and measures of a regional innovation policy into the regional and national strategic programmes, to create a system for promoting, monitoring and updating the regional innovation policy.

B Human Resources for Innovation

Human and intellectual capital is the most important prerequisite for creating and implementing innovation. Managerial, scientific, technical, economic and entrepreneurial skills and knowledge run through the whole innovation process [10]. The level of the citizens' education impacts positively on the prosperity of the region as a whole. Its progressive increase should be one of the main priorities of the long-term orientation of the Banska Bystrica region. For this priority three main measures were formulated.

Measures:

- 1 Support of lifelong education and career counseling. Fast progress in science and technology in past decades and the development of knowledge-based economy has caused changes in the labour market demands for workforce qualifications. Higher employee flexibility, including graduates and those with further education, is required. In scope of this measure it is therefore recommended to support activities for the development of lifelong education [1]. These activities were suggested: to create educational courses according to practical needs, to

propose the strategy of lifelong education in the region and to change the forms of lifelong education – transfer to learning organization.

- 2 Improvement of the conditions in the field of creativity and technical skills at schools. The aim of this measure is to increase the number of candidates applying for the study of natural sciences and technical fields, to lead students to creative thinking and to develop innovative and business knowledge and skills among graduates of higher education. The main suggested activities are: to organize thematic seminars for teachers and students with the aim of making science and technology more attractive, to prepare teachers and students for starting their own businesses, to set up an original organisation – an educational facility (institution) for children, teenagers, and parents, in order to influence the thinking of mainly the young people towards creativity.
- 3 Support for updating the curriculum according to practical needs. The aim of this measure includes supporting activities to improve and integrate the readiness of all school graduates with the needs of the workforce market.

C Cooperation in Innovation Development

An innovation process of a higher quality in an enterprise will not work without intensive cooperation with research and development organizations and with universities. This cooperation belongs to the signs of knowledge-based economy and is a source of company and regional competitiveness. Economic theories and experience show that another source can be regional clusters, because they significantly contribute to a higher application of innovations [8]. Cooperation in the innovation development will not work without multinational cooperation in solving science and technical tasks, without the exchange of best practices as well as the reciprocal exchange of research and development staff. For this priority three main measures were formulated.

Measures:

- 1 Support of cooperation between R&D and practice. The aim of this measure is to increase the number of small and medium enterprises involved in research and development activities on a regional, national and multinational level, as well as the higher use of research and development capacities for small and medium enterprises in the region. The main suggested activities are as follows: to organize thematic workshops for entrepreneurs with the participation of universities, research and development institutions, and supporting organizations for entrepreneurs; to more effectively promote research and development programmes for small and medium enterprises; to support the participation of small and medium enterprises in R&D programmes and others.

- 2 Support for partnership-building, networks and clusters. The aim of this measure is to create effective networks and partnerships with the emphasis on innovation and enterprise development, with the aim of increasing the competitiveness of the Banska Bystrica region and of stimulating the cooperation of small and medium enterprises in the scope of branch clusters. The aim of suggested activities is to improve conditions for initiating and creating clusters by promoting a common awareness of the benefits and possibilities of creating clusters; to integrate small, medium and large companies in the clusters, as well as companies with foreign capital, research and development, and educational and consulting organizations; to work out a methodological guide and financial support for feasibility studies and the creation and operation of the clusters, and others.
- 3 Strengthening of international cooperation and mobility. The aim of this measure (as well as the aim of suggested activities) is to utilise and enhance international cooperation in the field of innovation with to the goal of adopting acquired information on practical skills and reliable methods used by more developed European regions to the regional innovation system. For the effective development of Banska Bystrica region, continuous monitoring and comparison of this region to those developed European regions is necessary, as well as is following trends in the field of innovation support. Therefore by this measure the participation of the Banska Bystrica region in international projects and networks for innovation support and transfer of the best practices is recommended.

D Support of Innovative Companies

The implementation of innovations proceeds in companies. Therefore a healthy and well-operating business sector is one of crucial assumptions of innovative performance in the region. Small and medium enterprises are generators of new jobs and they play an important role in the innovation process. On the other hand, they have limited access to information, scientific knowledge and especially to financial sources for innovation. These companies generate qualified jobs directly in the region and favourably influence the development of progressive industries [9]. One of the most effective and economically most beneficial ways of implementation research and development outcomes into practice is the foundation of new and innovative small and medium-sized enterprises. Therefore five measures were formulated.

Measures:

- 1 The foundation of new, innovative small and medium-sized enterprises. The subject of this measure is to support the creation of innovative small firms and spin-off companies in progressive industries in the region, to create a system for supporting new, innovative companies in developing

programmes, and incubation services for starting companies, including their financing. Suggested activities were recommended: to support the creation of innovative small and medium enterprises and spin-off companies in progressive industries of the region, to implement spin-off programmes (incorporating the education of potential businessmen, services for starting businessmen, support incubation for starting companies, financial aid for new and starting companies) and to organize innovation competitions and award innovation prizes.

- 2 Support for existing innovative companies. During the implementation of this measure, sectors of small and medium enterprises, which can play an important role in the growth of regional competitiveness and by development of knowledge-based economy, will be identified. It is vital for these sectors that they be provided with specific development, financial and infrastructure programmes. Activities were recommended to process the main regional development trends in the high-tech sector using for example the methodology “technology foresight”, to support chosen high-tech sectors with the use of grants, tax and other incentives, to increase the attractiveness of the region for investors in high-tech and other industries of the knowledge-based economy, and to give assistance to small and medium-sized enterprises with marketing activities.
- 3 Support for technology transfer. The transfer of technology and knowledge represents an intermediary link between research and development organizations and application sector [4]. Services in technology transfer, including the search and evaluation of commercial potential of R&D inputs, the development of these inputs to commercially applicable form and their implementation either using licensing or the creation of spin-off companies, are not developed in our region yet. The development of presented process assumes an improvement in R&D marketing activities and the motivation of researchers towards practically focused research. The measure also involves the training of specialists in particular services, defining research and development supply and the creation of a database containing demand and supply for research and development outcomes.
- 4 Support for the creation, protection and use of intellectual property. The aim of this measure is support of innovative activities applying European principles in the protection of intellectual property (to develop services in the area of intellectual property protection and assistance with licensing activities, to establish methods for entrepreneurs and R&D employees and procedures for the formal and informal protection of intellectual property).
- 5 The establishment of regional financial instruments for the support of innovation. Financing is a weak point in the innovation process, not only in our region. The system of public support assigned to small and

medium enterprises is not developed enough and unable to adequately resolve financing for innovative processes [8]. Financing is also a limiting factor in the creation of an innovation infrastructure and supporting services for innovation. The aim of the suggested activities is the design and creation of regional financial instruments that would properly supplement state financial instruments. Investments should concentrate on the creation of an innovation infrastructure, the operation of their particular units and consultancy for small and medium enterprises. Support assigned to business should include providing grants and loans, including loan security and other fees. This aid will be directed towards financing pre-manufacture stages and towards the purchase of licenses and intellectual property protection. It is necessary to support programmes for assisting financing innovations with the use of commercial resources for e.g. Risk Capital, Business Angels, etc.

E Regional Infrastructure for Innovation

Only a small part of small and medium enterprises possess sufficient know-how for the realization of all activities of the innovation process; therefore it is necessary to fill this gap with services of specialised consulting organisations. A tangible infrastructure is also vital for the development of innovation, for e.g. sufficient incubator spaces, including equipment, innovation centres, etc. To achieve this priority two measures were formulated.

Measures:

- 1 The creation of an institutional framework for the support of innovation activities in the region. There are currently in our region enough organisations providing services for entrepreneurs. However, only a part of them also provide services for research, development and innovation. The measures recommend working out a feasibility study of the establishment of a network of subsidiary institutions, so they can effectively and at an expert level provide suitable scientific services, such as scientific and technical information, information about norms, EHK regulations, and consulting in the fields of intellectual property, marketing, implementation of new products into production, technology foresight, etc.
- 2 Support for building infrastructure and advisory services for innovation. The experiences of European regions significantly confirm the positive role a well-functioning tangible infrastructure plays in the creation and exploitation of innovation. It includes mainly technological incubators, technology and innovation centres and scientific parks. Technology incubators represent effective tools for assistance to emerging innovative businesses [15]. It is also vital to support the establishment and development of technology and innovation centres. One perspective is

the support for building a scientific park, which is still missing in the region. And important is also support for the existing network of supporting organisations, such as regional business centres, business innovation centres and centres of first contact.

Conclusion

A new understanding of innovation over the last years has confirmed the importance of a systematic approach and has led to a more integrated approach to developing measures in the area of innovation. One of the main policy tools for the support of innovation at the regional level are regional innovation strategies. The regional innovation strategy is viewed as a powerful driver of economic development in regions. The objective of a regional innovation strategy is to encourage and facilitate new ideas and innovation through the creation, diffusion and exploitation (or commercialisation) of new knowledge. The regional government authorities can directly intervene through the supply of R&D, education and capital that match the needs of local firms and which increase the absorptive capacity and innovative capability of firms.

The development of a regional innovation strategy is viewed as an opportunity for regional actors and firms to engage in a process of collective learning which can introduce new thinking about traditional problems and potential solutions. What this viewpoint reflects is that instead of settling for top-down handling, regional innovation strategy projects strive for a bottom-up approach. Actions developed as a part of an innovation strategy emerge as a result of research and broad-reaching discussion with the relevant actors within the region.

To increase the probability of policy success, the regional innovation strategy needs to account for the region-specific context because it provides opportunities but also sets limits to what can be achieved. Strategy should take the history of the region as a basic starting point and identify regional potentials and bottlenecks accordingly. To avoid regional lock-in, it is crucial that the strategy be open to newcomers and new policy experiments.

Over the years the methodology of developing the regional innovation strategy has been broken down into three simple measures: 1) build consensus, 2) analyse the potential and the needs and 3) develop the strategy. The priorities, measures and activities mentioned above are just broad outlines of a comprehensive methodological system. The methodology ensures that a regional innovation strategy is not an end in itself but can evolve into a powerful tool for innovation and growth.

A regional innovation strategy is not “just a piece of paper”. It epitomises the combined will of a region’s social and economic actors to pursue a common goal and shape the future of their region.

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Macro and Micro Economic Factors of Small Enterprise Competitiveness

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Abstract: Our assumptions, made on the basis of evaluating completed questionnaires that have been returned reflect our impressions. During the survey, businesses considered developments in the business environment as definitely favourable. In addition to reporting increasing uncertainty, they deemed Hungary's political climate in the last years, domestic markets and social changes as having marked effects. After Hungary's accession to the European Union, small and medium sized enterprises (SMEs) cannot perceive major impacts of accession, or blame the prevailing political situation for all changes. Small businesses do not capitalize on the opportunities offered by the European Union, do not make efforts to apply for EU grants and funds, or do not attempt to penetrate new markets. In our opinion, the companies participating in our survey are not aware of the opportunities available to them. Among the economic policy factors, a reliable monetary policy has the most benevolent impact on the operation of businesses. A survey of micro economic factors shows the most important areas to develop.

Keywords: competitiveness research environment; economic policy factors; effects of EU enlargement; environmental factors and responses; micro economic factors

1 SME Competitiveness Research Environment

Several institutions conduct SME research in Hungary and the neighbouring countries: universities, colleges, and research and development institutions. Below we shall only look at one segment of the research to evaluate the factors of competitiveness of the Hungarian SMEs, or more specifically family businesses, leading to conclusions on the competitiveness of SMEs through their review.

The Competitiveness Research Centre attached to Budapest Corvinus University Corporate Economics Department has analysed the competitiveness of Hungarian companies since 1995. Its latest report published in 2004 contained the following chapters, analysing the main factors of competitiveness (10):

- Environment of corporate operation
- Corporate strategies, strategic management

- Organisation and operation
- Impacts of EU accession

The majority of the companies involved in the research are medium-sized and large companies, and the share of small companies is only 5%. Consequently, the conclusions apply mainly to large companies, therefore, and the description below does not relate to them.

The situation of SMEs is regularly analysed by the Small Enterprise Development Institute and, after its integration into the Ministry of Economy and Transport, the ministry, in an annual report. The structure and methodology of the reports is consistent, looking at the factors affecting the situation and development of SMEs according to the following criteria (11):

- Ownership structure
- Participation in networks
- Capital investments
- Revenues and export
- Profitability
- Productivity, efficiency
- Financing

The questionnaire-based survey of the Ministry of Economy and Transport, conducted in 2003, contained the following key conclusions:

- Approximately, two thirds of SMEs consider that the economy of the country is stagnating or slightly improving; they mainly sell in the retail market, and they have moderate development, for which they rely almost exclusively on their own resources.
- 16-20% of SMEs are in the initial or declining phase of their lifecycle; they consider their situation bad and have a pessimistic future vision as well.
- 15% of SMEs are in the phase of growth or maturity with a good position and optimistic future vision. The analysed factors of competitiveness are positive, and these enterprises use bank loans for their development projects as well.

In summary, in terms of status analysis, the research conducted on approximately 2000 enterprises has brought more unfavourable conclusions compared to the previous surveys. Despite many valuable conclusions, the report does not provide any closer guidelines for research in terms of definition or influencing factors.

Professor Mugler, who has been devoting his literary and public life activities to the research and development of the SME sector for many years, defined the two main directions of research in his first book as follows (12):

- Definition of the concept of entrepreneur and analysis of his impacts on economic development.
- Distinction of SME strategic potential, primarily in the different phases of the lifecycle.

Consequently, he analyses in detail the issues of strategic planning, marketing, controlling, and resource management as well as the SME basis. In fact, he considers these aspects the key areas of the viability and development of SMEs.

In his second book, Professor Mugler (13) analyses the key factors of development, breaking them down into external environmental factors and internal (resource) factors. Looking at typical changes, he tries to identify the specific driving forces for the development of SMEs in the different phases of the enterprise lifecycle using various development theory models.

Professor Belak approaches the development abilities of SMEs from the management side. He also divides the influencing factors into external and internal factors, structuring development potential as follows (14):

- Political, strategic and operational opportunities.
- Coincidence of development potentials, i.e., availability of resources required for the opportunity within the enterprise.

In terms of the opportunities and problems of Slovenian enterprise development, he reaches the same conclusions as those which apply to most reform countries in the 1990s. He lists the following main influencing factors of SME competitiveness, which typically hindered development at that time:

- Harmony between competition opportunities and operational performing ability,
- Social, economic and partner relations,
- Crisis and change management experiences (lack of them),
- Future vision ('survival' enterprises),
- Harmony between organisational and personal potential.

Assistant Professor Mojca Duh analyses the role and importance of organisation and personal relations on the example of Slovenian enterprises (15), which typically determined the developing capability and competitiveness of a large number of SMEs.

MER Evrocenter (16), edited by Professor Belak, published the results of many years of activities and co-operation of the MER research group, as the book repeatedly refers to the role and impact of synergy effects within and between enterprises operating in the new and old EU member states, as a new element of competitiveness. This is how the possibility of SME involvement in networks, associations and clusters has been brought into the picture as an instrument to boost competitiveness.

Professor Lubica Lesakova describes a very similar situation in her presentation analysing the situation and future opportunities of SMEs in Slovakia (17). The number of employees, market share, and export figures are used to illustrate the economic role of SMEs, while the main factors of competitiveness are summarised as follows:

- To implement an effective management scheme
- To possess skilled personnel and management staff
- To apply for innovative, modern and efficient technologies
- To achieve high quality in their products and services
- To put more effort into networking, subcontracting and developing clusters

László Szerb and his research team have been studying various segments of the SME environment in Hungary for a long time, for example:

- Entrepreneurship teaching and entrepreneurial ability of students
- Entrepreneurial culture
- The correlation of SME increase to the international environment

His statements on the subject of SME competitiveness were utilized in our research by (19) on the basis of analyzing the factors influencing the development and increase of SMEs in Hungary. In addition, a considerable part of the distributed questionnaires – mainly from country-side regions – could be collected with his cooperation, and we thank him for it.

Over the past few years, attention has moved towards family businesses (FB) in the Central and Eastern European countries, in cooperation with MER Net. In this context, in 2003 the following objectives were set as a target for research (18):

- The situation of FB in cooperative countries and their importance for the development of international economies;
- The state of existing research and consulting databases, including data about FB;
- Particularities of external and internal factors influencing the development and operation of FB.

As a result of years of preparation, an international R+D Cooperation Agreement was elaborated at the end of 2004 by our SME research, development and international publication activity with the above mentioned researchers, who are experts on the subject, and Central-Eastern-European Universities respectively. The cooperation aims at increasing the partners' scientific, technical and economic R+D level and at monitoring, utilizing and forming the continuously renewing international technical level. The means of achieving our goal is the coordination of partners' R+D activities, the regular exchange of experiences between research

organizations – e.g. the Management, Enterprise and Benchmarking (MEB) yearly conference of Óbuda University – and further use of synergy effects.

The above short and fragmented summary illustrates the research environment in which the Óbuda University SME research team has been working for more than ten years now.

2 Sampling and the Method of Survey

This report has a double goal: on one hand compiling, classifying and introducing factors usable for examining the competitiveness of SMEs; on the other hand, providing a simple survey of the status of the competitiveness of local small enterprises, based on the responses to the questionnaires. Further analyses are underway, e.g. the regional distribution, or differences by sizes, and the results will be published later.

The sample of businesses used in the survey comprised independent legal entities employing no less than 10 and no more than 49 persons, and having net annual sales revenues not exceeding a HUF amount equivalent to EUR 7 million, or a balance sheet total not exceeding a HUF amount equivalent to EUR 5 million.

When launching the survey, we selected the businesses for the purposes of the questionnaire from the database Magyar cégek by Dun & Bradstreet Hungária Kft with a view to the number of people employed, the business activity and representativeness, based on the data of the Central Statistical Office.

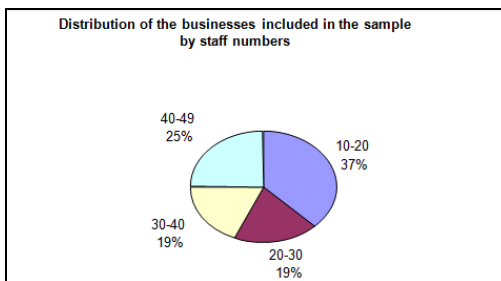
At the start of the survey, a database consisting of more than 300 companies was set up, and a questionnaire was forwarded to the majority of the businesses as an attachment to electronic messages, and the minority received it by post or in person. In 2007 and 2008 we received 247 suitably completed questionnaires. This means the sample makes up 1% of the active small enterprises in Hungary.

The questionnaire is 20 pages long, and endeavours to cover all fields of corporate operation. The questionnaire was compiled partly on the basis of a questionnaire elaborated by the Centre for Research in Competitiveness at the Corvinus University of Budapest, adapted to small businesses.

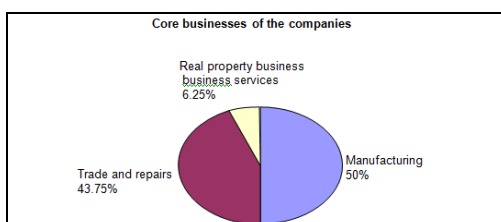
Fundamental Features of the Sample

Representativeness of the database was examined in the light of certain characteristic features which can be compared with the available economic statistical data.

Distribution by Staff Numbers



Core Businesses of the Companies



The questionnaires were sent to companies active in three characteristic sectors including a large number of businesses. The selected sectors included: manufacturing, trade, repairs, real estate agency and business services.

Representativeness of the Sample in a Breakdown of Core Businesses

	Population	Sample
Manufacturing	40%	50%
Trade and repairs	38%	43.75%
Real estate and business services	15%	6.25%

The data of the above table reveal that the distribution of our sample according to sectors differs from the composition of the population, mainly in that it has more companies active in manufacturing, trade and repairs. The sample has fewer companies in the real estate and business services sectors

Regional Distribution of Businesses

For the sake of simplicity, we divided Hungary into two parts to reflect regional distribution: Budapest and the countryside. 43.75 per cent of the questionnaires were completed by companies active in Budapest, and 56.25 of them by businesses located in outside the Budapest area.

Regional Composition of the Sample and the Population

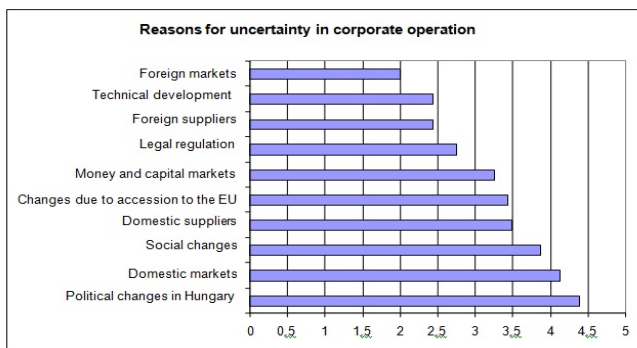
	Population	Sample
Budapest	25%	43.75%
Countryside	75%	56.25%

The table shows that fewer companies were included in the sample from the countryside than in the population, and more businesses contributed to the survey by information from Budapest.

3 Findings of the Survey on the Macro-Economic Factors

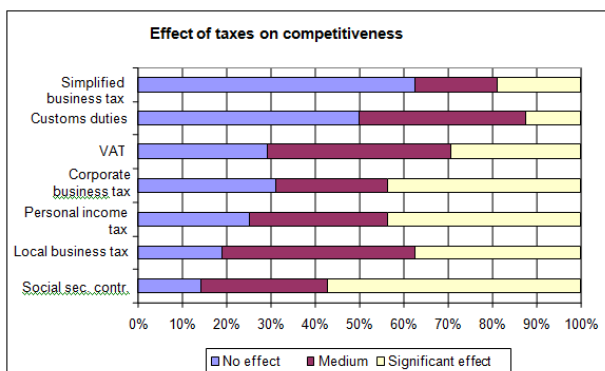
Reasons for Uncertainty in Corporate Operation

In Hungary, the most important reason for uncertainty is the political factor, followed by domestic markets and social changes. Foreign markets, technical and technological development and foreign suppliers can be regarded as relatively stable environmental segments.



Effect of the Individual Kinds of Taxes on Competitiveness

In connection with the individual kinds of taxes and rates, we asked the respondents about their effects on competitiveness. Most businesses consider social security contribution (50%), corporate business tax (43.75%) and personal income tax (43.75%) as the predominant factors.

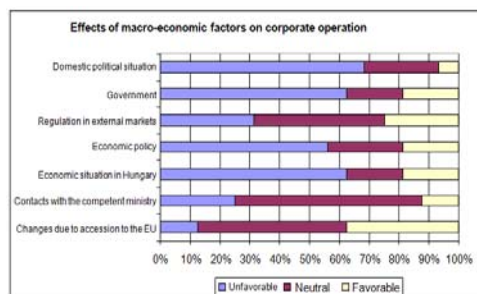


The majority considers the simplified business tax (62.5%) and customs duties (50%) as having no impact on competitiveness. 43.75 per cent of the businesses considered local business tax as having medium impact.

Major Effects of Macro-Economic Factors on Corporate Operation

Small businesses consider the domestic political situation (68.75%), the domestic economic environment (62.5%) and the activity of the government (62.5%) as the key factors affecting their business activities.

Changes due to accession to the European Union (37.5%) were evaluated as a favourable macro-economic factor by most of the companies.

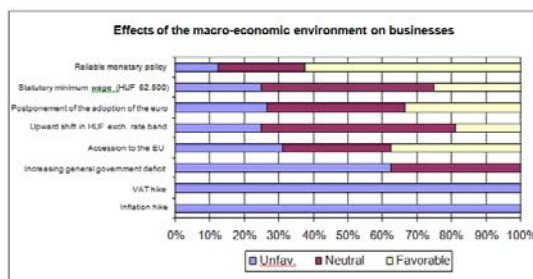


Effects of the Macro-Economic Environment on Businesses

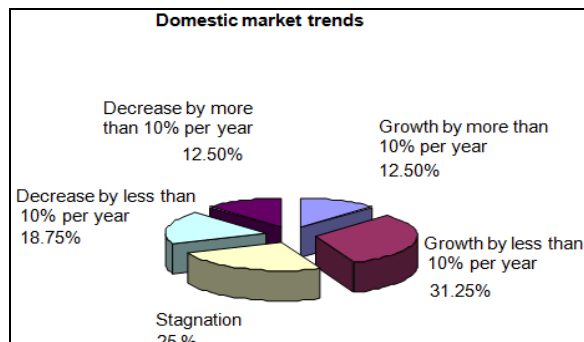
Certain significant economic factors of the macro-economic environment were also evaluated separately from the point of view of corporate operation. The findings show that reliable monetary policy (50%) is the only one of the listed factors that was regarded as a definitely supporting factor. The second most favourable factor was accession to the EU (37.5%). The factor considered by the respondents as the third most favourable was an upward shift in the HUF exchange rate band (31.25%).

All respondents considered the rise in two of the unfavourable factors – inflation (100%) and VAT (100%) – as detrimental to their businesses. The third such factor included the general government deficit (62.5%).

Postponement in the adoption of the euro (56.25%) and the specific level of the statutory minimum wage (50%) were seen as neutral factors.



Trends in Domestic Markets in the Past Three Years



The majority of businesses thought that their turnover had been growing in the domestic market.

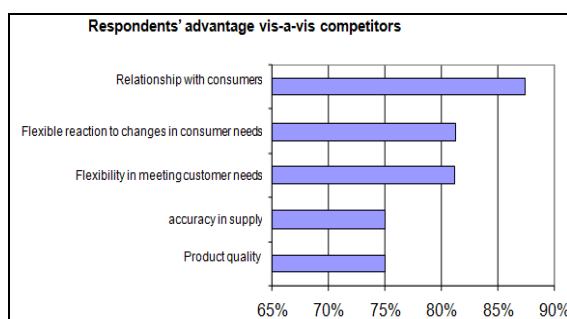
Competitors

The majority of companies know their competitors and are aware of their financial standing. The majority of the companies (62.5%) have 4-5 major competitors.

We requested the companies to compare their own performance on the basis of 45 considerations with their most powerful competitor, and indicate the fields they wished to improve. The following three figures show the results of the comparison to competitors.

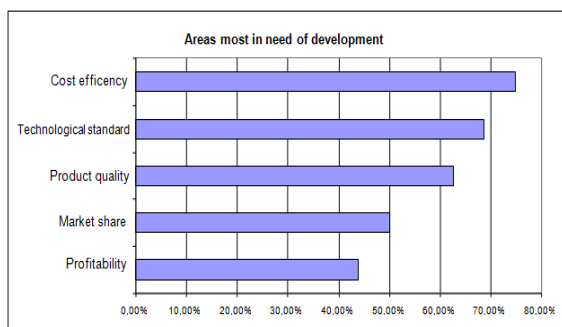
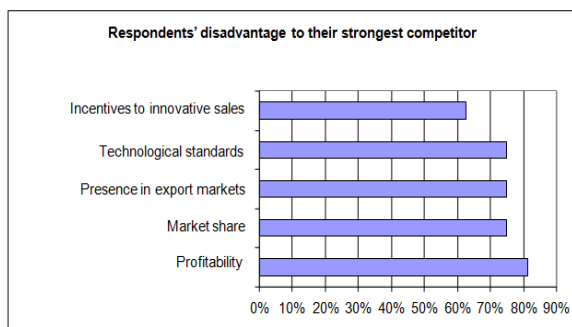
In what follows, our survey tackles the best, the worst and the five areas most in need of development.

The majority of businesses are of the opinion that their contacts with the consumers are the most successful field, followed by flexible reaction to the changes in consumer needs. Next come accuracy in supply and product quality.



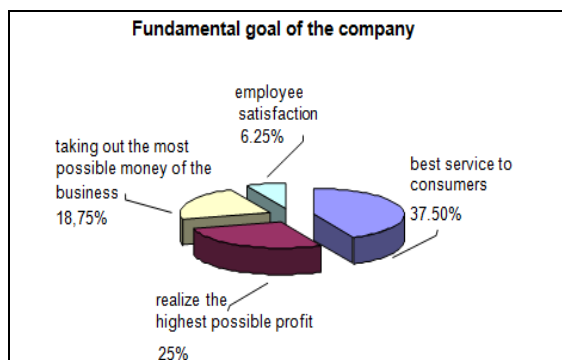
The weakest points in comparison to competitors are profitability, market share, presence in export markets, technological standards and incentives to innovative sales.

The fields they wish to develop do not necessarily coincide with fields in which these businesses fall behind their competitors. Among the fields to be developed, cost-efficiency was indicated by most of the respondents, followed by technological standards, quality of goods, market share and level of profitability.



Fundamental Goal of the Company

37.5 per cent of the businesses considered the provision of the best possible service to consumers as their fundamental goal. 25 per cent of the respondents envisaged the realisation of the highest possible profit as their fundamental objective.



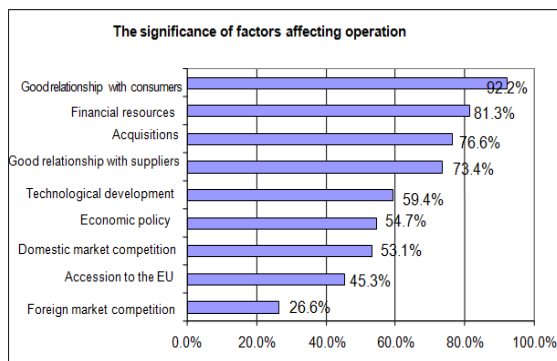
Taking the most money out of the company was seen as the primary goal by 18.75 per cent. Only 6.25 per cent of the respondents considered employee satisfaction as a fundamental goal.

Significance of Factors Affecting Operation

The respondent businesses considered good relationships with their customers as the most powerful factor affecting their operation (92.2%). The second most important factor included financial resources (81.3%).

Other significant factors included acquisitions (76.6%) and good relations with suppliers (73.4%).

Accession to the EU (26.6%) and foreign market competition (45.3%) were factors considered to have the least effect on their operation. The 26.6 per cent assigned to accession to the EU is much stranger; in an earlier issue, this factor was considered as one of the most important elements.



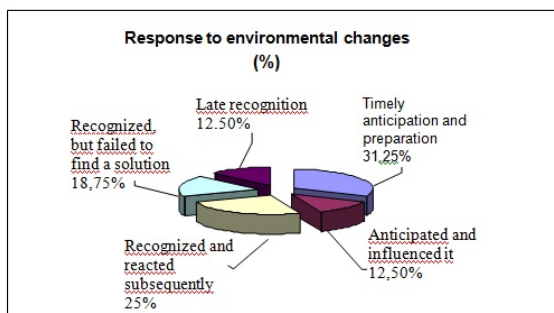
Response to Environmental Changes

In the interviewed businesses' opinion, the most frequent response to environmental changes is the timely recognizing of changes and consequent timely preparation for them. This was indicated by 31.25 per cent of the businesses.

18.75 per cent of the businesses claimed that they had recognized changes but could not adjust because they failed to find appropriate solutions.

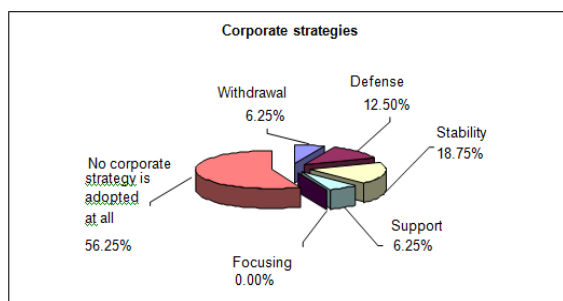
12.5 per cent of the participants in the survey recognized environmental changes late.

This means that 43.5 per cent of the businesses reacted on environmental changes extremely well; however, if subsequent reaction is also considered appropriate, 68.75 per cent of the businesses may be deemed to have good adaptability. This favourable picture is slightly more subtle due to the fact that the businesses evaluated themselves.



4 Findings of the Survey on the Micro-Economic Factors

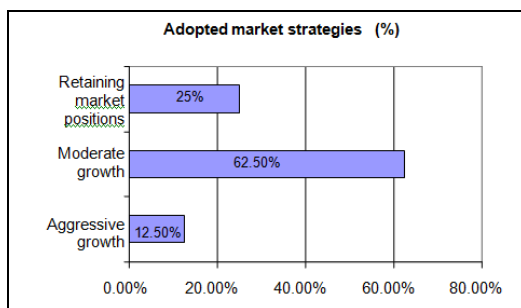
Corporate Strategies



Only 12.5% of the businesses have written strategic plans and most of them do not follow any market strategy at all (56, 25%). 6.25% of those with a corporate strategy withdraw, 12.5% have a defensive strategy and 6.25% follow an aggressive strategy. None of the companies in the survey has a focusing strategy to follow.

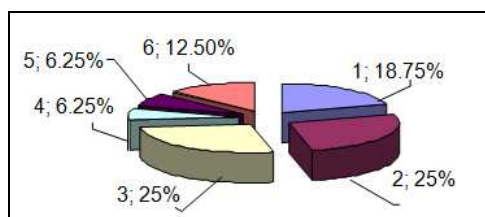
Market Strategies

In connection with the implementation of a market strategy the respondents evaluated three main objectives. For the majority, the most acceptable objective was moderate growth (62.5%). This is followed by the retention of market share (25%), whereas aggressive growth was valued only by a smaller group (12.5%).



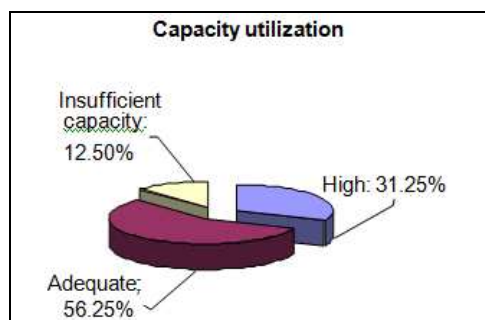
Business Plan

Most of the businesses included in the survey do not make business plans; 18.75% of them do not make a business plan at all (1). 25 per cent make plans in their heads but they do not discuss those with their colleagues (2). Sometimes plans are put down on paper, but in 25% of the businesses it is not harmonized with anybody (3). 6.25% of the businesses prepare production, purchasing, labour, cost, performance and liquidity plans on a regular basis (4). Businesses make an analysis of the regularly prepared plans and explore the reasons for deviations from the plan (5) in 6.25% of the enterprises. After detecting the reasons for deviating from the plan's data they implement the necessary measures (6) in 12.5% of the businesses.



Capacity Utilization

31.25% of the businesses included in the survey utilize capacity only to a small extent, 56.25% of them think they utilize it properly, and 12.5% have insufficient capacity.



Capital Investments

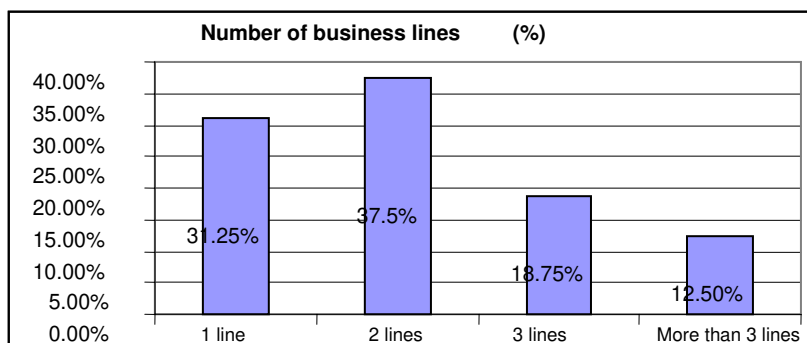
Most businesses in the survey (75%) had had an investment project exceeding HUF 5 million in the last three years. The invested funds were used for buying a new business facility, an office, machinery and vehicles. In 81.25% of these investments, a loan was used at least in part for funding. Borrowing is not seen as a serious problem for most of the small businesses (61.25%); however, because of the high interest rates and insecure future they do not prefer long term loans. 61.25% of the businesses have investment plans for the next 3 years of a value over HUF 5 million.

Tender Applications

12.5% of the businesses in the survey had participated in some kind of tender and had been granted support. Their applications were successful in all the cases and the allocated funds had been used.

Business Lines

31.25% of the businesses pursue a homogenous activity. 37.5% of the businesses are engaged in two different business lines, 18.75% of them in three lines, and 12.5% in more than three lines.



New Products and Services

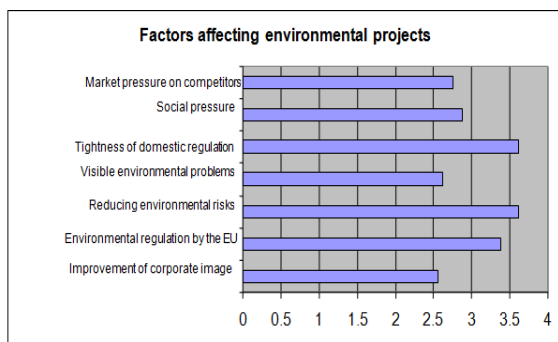
62.5% of the businesses launched a new product in 2006. New production technology was introduced at 25% of those asked in 2006. According to the answers given by the businesses, at 75% of them the parameters of products and services do not change frequently.

Information Technological Background

93.75% of the businesses have internet access, but only 43.5% of them have websites.

Environmental Projects

None of the businesses surveyed have an environment centred management system.



In the last 5 years 43.75% of the businesses have implemented projects with the purpose of environmental protection (e.g. building a sewerage system).

The environmental performance of the businesses questioned depends primarily on the regulations of the authorities. The second most important factor is the environmental legislation of the European Union. The third most important factor is the visible problems of environment. The most important driving engines of environmental investments are official expectations coming from various places. Improvement of the company's image and the market pressure of competitors impose the smallest motivating force on the businesses.

Employees

62.5 of the businesses recruit new employees by the help of advertisements. 25% try to find new work force via friends. 12.5% of the businesses have already used the services of employment offices.

We asked the persons filling in the questionnaire to rank the 6 features below according to their relevance in selecting the new employees.

The ranking according to the survey:

- 1 The practice and experience of the employee;
- 2 The qualification of the employee;
- 3 Sympathy;
- 4 Age;
- 5 How he/she fits into the current staff;
- 6 References.

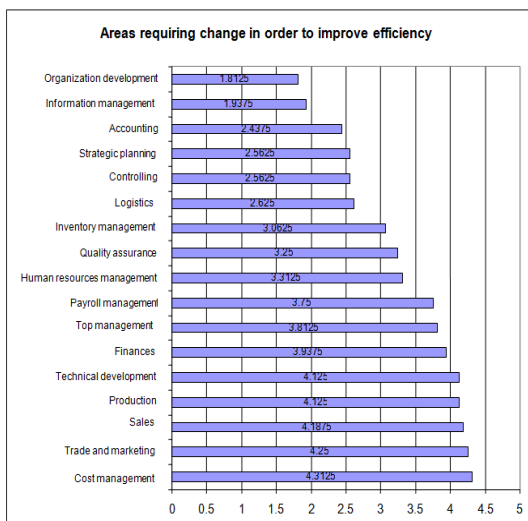
According to the employers, it is relatively difficult to find the necessary experts in the labour market.

56.25% of the managers of the businesses in the survey studied in vocational secondary schools or grammar schools. 31.25% of them graduated from a college/university. 12.5% of them have qualified as skilled workers.

Areas in Need of Developing the Improvement of Efficiency

In order to improve the efficiency of the business activity, companies think that there is still a lot to be done in the transformation of cost management, trading /marketing and sales.

In order to reach good management, more than just the average changes will have to be introduced in the field of production, technical development, finances, top management and payroll management.



Organisation development, information management and accounting are those areas where company experts feel the least necessity for changes.

Supplier Performance

The performance of supply on time is 84 per cent. In other words, corporate managers experienced some kind of delay in 16 per cent of the cases. Problems related to supply quality arose in 18.75 per cent of the cases. In terms of volume, 90 per cent of the performances are correct, i.e. problems are found with the volume of freight on every tenth occasion. Invoice accuracy is 89 per cent. Thus problems are encountered in connection with invoices in 11 per cent of the cases.

84 per cent of the freight was found to be undamaged. This means that 16 of 100 cargos arrive at their destinations in a damaged condition. In 56.25 per cent of the cases more than four suppliers were used; 31.25 per cent of the businesses worked with four suppliers, and 12.5 per cent had less than four suppliers.

Payment Discipline

68.75 per cent of the respondent businesses claimed that they had never or very rarely paid their suppliers late. However, 12.5 per cent of them pay regularly or frequently late. A survey of the payment discipline from the seller's perspective

reveals that 31.25 per cent of their customers are regularly late with payment, while 37.5 per cent answered that their partners performed on time and late payment was rare.

Default penalty interest continues to be the most frequently applied sanction for late payment. The second most frequently used sanction is that new orders are performed only after the debt has been paid. Customers who pay late may subsequently purchase goods only for cash from every fourth business. Only 12.5 per cent of the businesses use the possibility offered in legal sanctions. The customer is no more provided service and option is applied only in extreme cases.

Summary

Our assumptions made on the basis of an incomplete evaluation of the completed questionnaires that have been returned reflect our very first impressions. Stressing the above, we wish to point out the following statements and correlations.

Small businesses active in manufacturing predominate in the sample. Rural businesses are underrepresented in the sample.

During the survey, businesses considered developments in the business environment as definitely favourable. In addition to reporting increasing uncertainty, they deemed Hungary's political climate, domestic markets and social changes as having marked effects.

Years after Hungary's accession to the European Union, SMEs cannot perceive major impacts of accession, or blame the prevailing political situation for all changes.

Small businesses do not capitalize on the opportunities offered by the European Union, and do not make efforts to apply for EU grants and funds, or attempt to penetrate new markets. In our opinion, this is due to the lack of information; the companies participating in our survey are not aware of the opportunities available for them.

Among the economic policy factors, a reliable monetary policy has the most benevolent impact on the operation of businesses.

Micro economic factors show a very interesting image about SMEs and suggest the most important areas to develop are those such as cost management, trade and marketing, production, technical development and finances.

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The Integration and Requisite Holism of the Enterprises' Governance and Management as Preconditions for Coping with Global Environmental Changes

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Abstract: The main goal of our research was to determine the modes of governance and management in examined enterprises and to see how well enterprises are prepared to cope with difficult economic conditions caused by the crisis which started in 2008. The presence of advanced modes of management (evolutionarily described as cognitive and integral or integrative management) is the necessary precondition to deal with difficult economic times. The research results show that the more advanced cognitive and integrative modes of management are present to a greater extent in larger enterprises; they are present in smaller enterprises as well, but only to a lesser extent. The research was carried out in Slovenia, a former socialist country and EU member. The findings of our study may also have implications for other countries with a similar make-up.

Keywords: enterprise; management; governance; integral management; developmental modes of management

1 Introduction

The 2008-09 economic downturns [34] have led to reduced potential output growth, rising unemployment and soaring public debt. To recover, countries need to find new and sustainable sources of growth. Countries' economic difficulties came at a time of increasing political pressure to meet various social challenges (ibid), many of which are global in nature (such as climate change) or require global action (health, food security, the growing scarcity of clean water). Such challenges require co-ordinated efforts by countries through supply-side and demand-side interventions. Innovation and coherence in policy interventions is necessary to address these and other problems in an affordable and timely manner (ibid). Important players in national and global economies are enterprises which are prepared differently to cope with difficult economic conditions caused by the

(financial, economic, social, environmental, values, responsibility, etc.) crises begun in 2008.

Due to this crisis as well as to the complex and fast changing global environment, the number of factors a company must consider in any decision become huge, much more complex. Current predictions [56] are that the environment for all organizations will become even more uncertain with every passing year. Therefore, it is very important that enterprisers keep track of (inter)national developments and position them for long-term competitive advantage. "The best prepared" enterprises will survive the recent crisis: creative, able to learn and innovate, and prepared to change itself in many ways if necessary [31, 33, 50, 51, 56]. Paul Laudicina, the president of the international consulting company A. T. Kearny revealed in a recent interview three very important characteristics such enterprises possess [54]. First, they use planning processes which help them to understand the changes in business environment. Second, these companies are capable and ready to take risks, and to do so quickly. Third, these are companies which take seriously the managing of their cash flow and profit so that they are able to invest when they identify an opportunity.

A new benefit for the current and coming generations should also be provided through innovations (see [31]). The radical changes needed in our economies to get out of the current crisis also include innovation in governance and management process (see [50]) toward integration and requisite holism of enterprises' governance and management [1, 2, 3, 4, 20], as well as ethics planning as preconditions for enterprise ethical behaviour [5]. The innovation of planning and management criteria must be oriented towards greater social responsibility and requisite holism [29, 30]. About the needfulness of the responsible enterprise governance and management (process innovation) see [49, 50, 52].

The above stated ideas indicate the importance attached to the manner in which enterprises are governed and managed; this means the presence of adequate governance and management processes, the instruments used (e.g. used of advanced planning methods), and the structure and competencies of decision-makers involved. Different models of management (e.g. strategic management models, models of integral management) have been developed to present what an enterprise should do in terms of governance and management processes, instruments and people involved. Especially, the models of integral management stress the importance of integration and the requisite holism of the enterprise's governance and management (see e.g. [2, 20]).

The main goal of our research is to determine the modes of governance and management in examined enterprises. The research aims to contribute both quantitatively and qualitatively to our understanding of how well enterprises are prepared to cope with difficult economic conditions caused by recent crisis using data from Slovenia, the former socialist country and EU member. The findings of the study may also have implications for other countries with a similar make-up.

We divided our paper into four chapters. Following the introductory chapter, the second chapter briefly discusses the evolutionary stages of management as well as some models of integral management. In the third chapter, the research goals, methodology, sampling and data collection are presented, and the research results are discussed. The last chapter outlines the most significant conclusions for enterprises wishing to survive and cope with complex global environmental changes and suggests direction for future research.

2 Theoretical Backgrounds

In the scientific and professional (business) literature, management has been presented differently from the evolutionary perspective. The early stages of the management evolution are very often described as budgeting, controlling and long-range planning. In later stages progress was made toward the development of business strategic planning, corporate strategic planning and strategic management [2, 18, 55, 56]. The theoretical approaches to schools of thought in strategic management from the integrated strategic management perspective are briefly explained by Criado, Galván-Sánchez, and Suárez-Ortega [9]; for a brief introduction to schools of strategic thought, see for example [16], [48] and [26]. In the last two decades we have been able to observe substantive progress toward the development of integral management. Among those management researchers who foresaw such an evolution of management was also Slovenian researcher and teaching Professor Janko Kralj. He described four major stages in the evolution of management: empirical, rational, cognitive and integrative management [21, 22, 23, 24]. Empirical management is oriented towards the present situation (from hand to mouth) by the autocratic decision-making of an individual who bases decisions on intuition. Rational management considers skills (routine, Taylorism, exceptions) and is characterized by group decision-making where decisions are based on exceptions. Cognitive management is oriented towards knowledge and considers the participative decision-making of enterprises stakeholders. The participative decision-making should be understood in such a way that the responsible person makes the final decision and takes responsibility for it. Integrative management is a higher developmental level of cognitive management, taking into account the growing complexity of changing conditions as well as the changes in science as a whole, consciously searching for multiple objectives (Figure 1).

As the latest stage Kralj reveals integrative management; similarly, some other authors described the latest stage of management evolution as the stage of integral management (e.g. [20]). Different models of integral management have been developed during this latest stage. The models of integral management help to understand management problems in a structured way without losing sight of coherence.

MODEL FORM	M1 EMPIRICAL	M2 RATIONAL	M3 COGNITIVE	M4 INTEGRATIVE
Period	before World War I	between the wars	during World War II and after	beginning in 60s and more developed after 2000
Directed toward	crisis	routine	knowledge	wisdom
Management technique from theory X to Y	command X	co-operation X-Y	collaboration Y-X	reciprocity Y
Dealing with people	autocratic	bureaucratic and/or technocratic	participative	highly participative
Importance of decision-maker	individual	group	organisation	alliances of individuals and groups in organisation
Basis for decision-making	hunches	taylorism, routine and natural resources	knowledge and human resources	wisdom and congruency
Technique of decision-making	intuition	exception	basic objectives	consciously searching for multiple objectives
Organisational form	central	decentralised by functions	federal decentralisation by autonomous units (SBU)	integrated autonomous units and "constellations"

Figure 1

Characteristics of the developmental models of management [21]

They are a picture of how an enterprise performs and are therefore also the most useful frameworks for research and education (see [47]). In Slovenia, one of the earliest and still contemporary/up-to-date/of general application models of integral management is the one developed by Kralj. The author introduced his idea and the results of his research work about the policy-making of an enterprise in the book *Politics and Policy of an Enterprise in a Market Economy* [21]. The organizational policy is understood in a creative sense and the expression "organizational policy" (business policy, the enterprise's policy, corporate policy, etc.) should not be mistaken for the "policy or policies" as they are usually used in literature, in the sense of a general guide to action or procedures and rules. We will discuss in more detail the model of integral management developed by Kralj which also presents the basis for research methodology used in the empirical part of our research. The model is presented in Figure 2.

In the author's integral management model [21], the political or interest behaviour of the stakeholders and the enterprise's philosophy are powerful factors of an enterprise's policy-making. The real background of policy-making and of managing the enterprise policy lies in the interests of its stakeholders and therefore in their interest behaviour. The stakeholders of an enterprise are their owners (shareholders or stockholders) and directors, managers, employees, market and financial participants, public finance institutions, and dependent societal infrastructure, as well as the enterprise itself, the general public, and the state.

POLITICS OF AN ENTERPRISE • factors of policy	POLICY OF AN ENTERPRISE • basic components of policy
INTEREST INTERWOVEN (POLITICAL) BEHAVIOUR OF THE ENTERPRISES STAKEHOLDERS <ul style="list-style-type: none"> • Interests of the owners and directors. • Interests of the employees. • Interests of the market stakeholders. • Interests of public fin., soc. infrastructure. • Interests of the management. • Interests of the enterprise itself. • Interests of the public. • Interests of the state. • Interactive influencing and responding. 	CONCEPTIONS, MISSIONS, PURPOSES AND OBJECTIVES OF THE ENTERPRISE, ITS PARTS AND BUSINESSES <ul style="list-style-type: none"> • Basic policy: central conception, mission and purposes. • Developmental policy: course of the development (orientation) and developmental basic objectives. • Current policy: current direction and current basic objectives.
<div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">INFLUENCES</div> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">STARTING POINTS</div> ENTERPRISE'S PHILOSOPHY AND SUBCULTURES <ul style="list-style-type: none"> • Subcultures and views (general opinion) of the stakeholders influenced by the environment - beliefs, views of life, values: parliamentary democracy, multiplicity of diversity, human rights, legal state, civil society, market economy etc. • Beliefs of the enterprise: opinion about the enterprise, accepted values, standpoints toward people and knowledge, basic concept about operations. • Standpoints of the enterprise's stakeholders: willingness to cooperate, commitment to the enterprise and endeavour to implement them. 	<div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">POSSIBILITIES</div> <div style="text-align: center; border: 1px solid black; width: fit-content; margin: 0 auto; padding: 2px;">ABILITIES</div> CREATIVE DIRECTING TOWARDS OBJECTIVES OF THE ENTERPRISE <ul style="list-style-type: none"> • Key areas of enterprise's policy. • Guidance (policies) and rules of objectives oriented conduct. • Strategic decision-making (strategies). • Congruent structures.
EXECUTING THE ENTERPRISE'S POLICY <ul style="list-style-type: none"> • Programmed direction in execution of the policy of an enterprise, parts and businesses and implementation of basic objectives, planned and other goals and tasks, by the interwoven activities of COMPI (informing, planning, motivating, organizing, co-ordinating and controlling) and operational decision-making. • Executing and implementing. 	

Figure 2

General model of managing the enterprise's policy [20]

The word "interest" means, within the model, the expected benefits or advantages. The interest may of course vary depending on the relationship of the stakeholder to the enterprise and on his/her culture. A successful enterprise attains its own objectives while also meeting the respective interests of the stakeholders, i.e. achieving the expected benefits, at least to some degree. The starting points could form the philosophy or culture of the enterprise. Usually in an enterprise there are several different cultures among the stakeholders, and a properly shaped enterprise philosophy can assure sharing starting points based on sharing interests of a successful enterprise. According to Kralj, the components of such a philosophy are views, beliefs and standpoints.

The enterprise's policy is expressed in the Kralj's model through conceptions, purposes, mission, and objectives in the dynamic dimensions of the basic, developmental and current policy which represents the prevailing perception of the needs and possibilities of the enterprise. The ability to make the most of them depends on creative directing towards the objectives and goals set: the key areas

of the policy, guidance ("policies"), strategic decision-making (including powerful tools of strategies) and on the keeping of a congruent structure all the time. The execution of the enterprise's policy should be carried out through activities which are within the model summed up in the acronym COMPI (in reversed order: informing, planning, motivating, organising, coordinating/controlling), and through operational decision-making. Of course, nothing will happen without the work and operations in the implementation phase.

The described Kralj's model is not the only acknowledged model of integral management developed in Slovenia. A group of researchers from Slovenia took the initiative for developing the "MER Model of Integral Management" ("MER Model"¹) which takes into consideration special transition conditions (for description of the model see: [2], [20], [15]). The MER Model has been developing for almost twenty years and is the result of research cooperation between researchers from universities and other research institutions from different (mainly European) countries. The MER model also incorporates many of Kralj's cognitions. In this way researchers (and praxis) still give recognition to Kralj's model. This gives us one more reason to use the methodology based on Kralj's model in our research also.

Among many world-wide acknowledged models of integral management we would like to stress the ones developed by Bleicher [7], David [10], Hinterhuber [19], Wheelen and Hunger [55, 56], and the St. Gallen Management Model [44, 47]. Space limitation does not allow us to discuss these models in detail. The main characteristic of integral management models is the integration and requisite holism of the enterprise's governance and management. For example, in the MER model of integral management the authors [20] stress: "... Management processes, instruments and institutions are horizontally and vertically integrated in 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. ... The integration of management with philosophy, culture, ethics, entrepreneurship, synergy and ecology should not be isolated only to certain part of an enterprises and/or its environment. This integration of management with an enterprise (as a narrow environment) and enterprise's environment (as a broader environment) should be carried out regarding all previous listed factors (philosophy, culture, ethics, entrepreneurship, synergy and ecology), all environmental spheres (economic, cultural, natural, technological, political and social environment), and places (market, operational and cognitive) of an enterprise...".

The authors of models of integral management stress the importance of integration of processes at different hierarchical levels (i.e. political/normative level, strategic, and operative/operational management level) into one holistic and complex

¹ MER is acronym: M – Management, E – Entwicklung (in German) → Development, R – razvoj (in Slovene) → Development.

process. Therefore, in many models, 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 (see e.g. [20]). With this idea we will use in continuation the term "management" for describing the holistic and complex governance and management process.

3 Research

3.1 Research Goal

According to Ernst & Young's European attractiveness survey [17], Europe will not remain a winner without completely reinventing its growth strategy. A new business model must be found and thus also an increase of funding efforts towards direct support for the innovation of enterprises' management. The Global Competitiveness Index 2009–2010, which measures the overall competitiveness ranking, ranks Slovenia at the 37th place (out of 133), which is 5 ranks [46] better compared with the 2008–2009 ranking.. But The World Competitiveness Scoreboard [57], which presents the 2010 overall rankings for the 58 economies covered by the World Competitiveness Yearbook (WCY), ranks Slovenia at the place 52 (with an achievement of only 48.689% competitiveness compared to Singapore 100.000%). In comparison with the year before, this is very concerning because Slovenia fell for 20 ranks: from rank 32 to rank 52, mostly because of her economic performance and government and business (in)efficiency. If Slovenia wants to compete with the most developed (European) countries, it will have to foster economic growth. Slovenia will not be able to achieve this goal without successful and fast-growing enterprises and a dynamic process of creating new enterprises [43].

The above-stated ideas lead to the need for our research on the presence of different modes of management in Slovenian enterprises. The main goal of the empirical research presented in this paper is to determine the modes of management in examined enterprises and to explore to what extent the process of striving towards integration and requisite holism of the enterprise's governance and management within the environment and in enterprises' relations with the environment is present in Slovenian enterprises. The typology of different modes of management used in our research is based on Kralj's description of the different evolutionary stages of management, as briefly described in the previous chapter. To continue, we describe the research methodology, sampling and data collection procedure, as well as research results are presented and discussed.

3.2 Research Methodology

In our research we used a case study research methodology. As proposed by Yin [58] we used a multiple case study approach, where replication logic was possible. Since an enterprise can be at the same time from some perspectives advanced and from others backward, we designed our research based on Kralj's method, which takes into consideration a scientific perspective of the management evolution. Kralj's method [21, 22, 23] enables us to examine the presence of four developmental modes² of management (empirical, rational, cognitive and integrative management). The method was originally entitled "The method for reviewing the enterprise policy" and is based on the author's model of integral management already introduced.

The method may be summarized briefly in terms of the total 60 variables, which are divided into five subgroups covering five different dimensions of an enterprise: the environment (18 items), the enterprise as a system within this environment (12 items), the philosophy of the enterprise, the interest behaviour and subcultures of the stakeholders (13 items), the basic components of policy (13 items) and the criteria for measuring the quality of policy (4 items) (Table 1).

For each of the 60 variables, presented in Table 1, Kralj developed a list of their characteristics for each developmental mode of management. These lists were used when examining enterprises included in the sample. For each variable (item) 100 points are allocated among four developmental modes of management: empirical, rational, cognitive and integrative. Nowadays one expects fewer points in the first two (empirical and rational) and more of them in the last two modes (cognitive and integrative). The averages (in points as well as in percentage) are compounded for the groups of variables and for the enterprise as a whole.

Table 1

Variables for the determination of four developmental modes of management [21]

THE ENVIRONMENT	THE ENTERPRISE AS A SYSTEM
(1) Natural conditions and ecology, (2) Influences of science and technology, (3) Societal order, (4) The economic policy of the State, (5) Situation of the international affairs, (6) Markets, (7) Finances, (8) Economical development, (9) Societal organizations of the production, (10) Buyers and clients, (11) Financiers, (12) Chambers of trade etc., (13) Trade unions, (14) Scientific organizations, (15) Relations toward societal infrastructure and public financing, (16) Degree of intervention of the State and Communities, (17) The influence of the political organizations, (18) Public opinion and standpoints toward it.	(19) General operating ability, (20) The size of the enterprise, (21) The place and the role of the division of work, (22) The structure of the business, (23) The outfit for business operations, (24) The phases in the development with respect to the societal effectiveness, (25) Financial ability, (26) Resources, (27) Organization of process and structure of the organization, (28) Informatics, (29) Human resources characteristics, (30) Abilities of managers and experts.

² The author sometimes describes them as the evolutionary models. However, in the context of this research the term »mode« defines better the difference in governance and management practice.

PHILOSOPHY OF THE ENTERPRISE, INTEREST BEHAVIOUR AND SUBCULTURES OF THE ENTERPRISE STAKEHOLDERS	BASIC COMPONENTS OF POLICY
(31) Views, (32) Influence of the hierarchy of needs on the values, (33) Freedom as a value, (34) Participation in decision making as a value, (35) Equality as a value, (36) Rationality as a value, (37) Progress and stability as a value, (38) Purposes as the express of interests, (9) Central conception, (49) Development idea from the aspect of mission, (41) Standpoints towards people, (42) Standpoints toward knowledge, (43) Key concepts of operations.	(44) Consciousness about policy, (45) Basic objectives and goals, (46) The technique of direction towards objectives, (47) Decision-making basis, (48) The mode of leading people, (49) Situation direction, (50) Strategic decision-making, (51) Congruence of structures with objectives and goals as well as the strategies, (52) Enterprise policy-makers, (53) Application of the management sciences for policy-making, (54) Expressing and communicating the policy, (55) Confirmation of the policy, (56) Managing the policy of the enterprise form the viewpoint of co-operation, or from the aspects of parent enterprise and controlled enterprises.
CRITERIA FOR MEASUREMENT OF THE ENTERPRISE POLICY QUALITY	
(57) Measuring the quality of business operations, (58) Enterprise-political criteria, (59) The criteria of success (effectiveness), (60) Key areas of policy.	

3.3 Sampling and Data Collection

For the purpose of this research, judgmental sampling was used, in which population elements were selected based on the expertise of the researchers. One of the reasons for choosing judgemental sampling was the fact that the case study research methodology used in our research is usually implemented on a smaller sample because of the higher costs in comparison to full quantitative research techniques. We believe that by using such a procedure, the representative enterprises of the population are included. Data were collected through in-depth case studies, including face-to-face structured interviews with 50 managers of Slovenian enterprises; in many cases the respondents were also owners. The basis for conducting interviews was the already presented list of characteristics of 60 variables originally developed by Kralj.

All examined enterprises were private ones with the following legal forms: 32 (64%) limited liability companies, eight (16%) joint stock companies, nine (18%) individual private entrepreneurs and one (2%) limited partnership.

The size of the examined enterprises was defined by the quantitative criteria of the Slovenian Companies Act [59], and these are: number of employees (headcount), annual turnover and total balance sheet. Large enterprises are enterprises which exceed the criteria for micro, small or medium-sized enterprise, shown in Table 2.

Table 2

The quantitative criteria of the Slovenian Companies Act for defining the size of an enterprise

Enterprise category	Headcount	Annual turnover	Balance sheet total
Micro	< 10	≤ € 2 million	≤ € 2 million
Small	< 50	≤ € 8,8 million	≤ € 4,4 million
Medium-sized	< 250	≤ € 35 million	≤ € 17,5 million

We did not use the additional qualitative criteria for distinguishing enterprises by size due to difficulties in application of such criteria (see [13], [28]). Out of 50 enterprises, 15 (30%) were micro enterprises, 16 (32%) were small enterprises, 10

(20%) medium-sized enterprises and nine (18%) large enterprises (see Figure 3). In such a way all size classes were included in the sample. The size distribution of enterprises in Slovenia is as follows: 93.2% are micro enterprises, 5.4% are small enterprises, 1.2% are medium-sized and 0.2% are large enterprises [43]. The comparison of Slovenian and EU countries shows that the structure of the Slovenian economy in terms of the share of enterprises by size, the employment share, and the average number of employees per enterprise is very similar to the EU average, less so regarding turnover per enterprise and value added per employee.

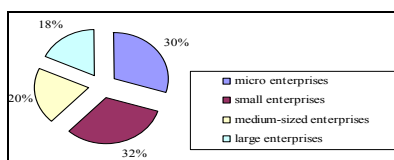


Figure 3

Size structure of the research sample

The main business activities of the enterprises examined were manufacturing (13 enterprises), construction (12 enterprises), wholesale/retail (8 enterprises), financial and insurance activities (4 enterprises), professional, scientific and technical activities (3 enterprises), administrative and support service activities (3 enterprises), accommodation and food service activities (2 enterprises), information and communication (2 enterprises), agriculture (1 enterprise), transportation (1 enterprise), and arts (1 enterprise). However, the structure of different management modes in connection with the businesses' primary activities.

3.4 Research Results and Discussion

The research results of the presence of different modes of management in different enterprise size classes are presented in Figure 4. The presence of the mode of management (i.e. empirical, rational, cognitive, and integrative) is expressed in percentage and is calculated as an average value for the size class.

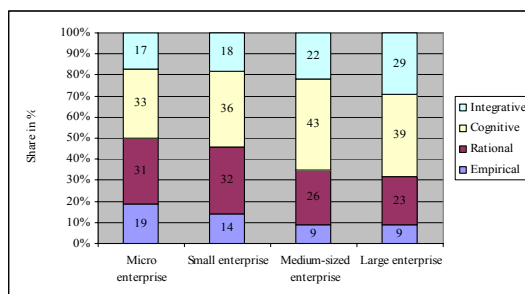


Figure 4

The presence of different modes of management in examined enterprises

The research results show that the more advanced modes of management (cognitive and integrative) are present to a greater extent in larger enterprises. In the average micro enterprises the presence of empirical, rational, cognitive and integrative management is 19/31/33/17. The first two modes (less developed ones) are presented within micro enterprises to the same extent (50%) as are the more advanced cognitive and integrative management. In small enterprises the more advanced modes of management are presented to a greater extent (54%) than the less developed (46%). In medium-sized enterprises the presence of less developed modes of management is even smaller (35%), and in large enterprises only 32% whereas the presence of more developed modes of management is 65% in medium-sized enterprises and 68% in large enterprises.

However, detailed analysis of the research results show that there are exceptions within size groups. Within micro enterprises there are two enterprises in which the presence of less developed modes is around 70%, as well as two enterprises in which the presence of advanced modes of management is around 70%. Also within small enterprises we found one case in which the less developed empirical and rational modes of management prevail (more than 70%), as well as examples of enterprises in which the more developed modes of management prevail (between 63% and 76%). Within medium-sized and large enterprises, where advanced modes of management prevail, we found only one case in each size group where the less developed modes of management are present slightly more than 50%.

The research results are in accordance with the cognitions of many researchers (e.g., [36]) who describe the more pragmatic, personal and informal way of managing of SMEs, especially of micro and small enterprises. These enterprises are characterized by the lack of time for planning long-term strategic objectives due to the influence of the owners-managers and the crucial role they play in the day-to-day running of their businesses ([35], [28] and references cited there). Research studies reveal that only a small minority of micro and small-business owners-managers were prepared to delegate responsibility for, or the control of, any managerial or strategic functions [27]. Detailed analysis of the medium-sized and large enterprises in the sample show that among them we can find “new” enterprises (established in the beginnings of the 1990s when the possibilities for establishing private enterprises in Slovenia were opened), as well as previous socialist “old” enterprises which successfully “survived” restructuring during the transition period in Slovenia. According to Pučko [40] these “old” enterprises survived the process of corporate restructuring in the Slovenian transitional environment consisting of four stages: crisis, revitalization, strategic change, and growth. The period after the year 2001 the author described as a post-transitional stage, which is no longer part of the restructuring process of “old” enterprises. It is a period when “healthy” enterprises compete on the market. These enterprises are aware of the sources of their competitive advantages, which are also in the quality of management and in the capabilities for fast adaptation to changes in the global environment.

In Figures 5-9 results for different subgroups of variables for different enterprises' size classes are presented. Research results of the subgroup "The environment" show how enterprises see and treat the environment changes according to the enterprises' size (Figure 5). The results indicate that examined enterprises see the environment as medium reasonable developed providing suitable conditions for business operations, with more attention attached to domestic markets, even though there is also orientation towards international markets, with developing financial markets, and some interest and cooperation with research institutions (such as universities). However, we can also observe that the share of less developed modes gets smaller with the increasing size of the enterprise. Research results suggest that larger enterprises see the environment as better developed and providing better conditions for the functioning of the enterprises than smaller enterprises do. These observations are in accordance with the findings of many authors that smaller enterprises have fewer possibilities to influence environmental changes than larger enterprises have [38, 39], and therefore these smaller ones see the environment as more "hostile" than the larger ones do. Peinado, Peinado and Esteve [37] have discovered that the ability of an enterprise to adapt and respond to environmental opportunities and threats constitutes a key factor in the search for survival and competitiveness. Their results show that the intentionality of strategic change is closely related to how managers perceive and interpret environmental changes. As regards the influence of stakeholder pressure on the adoption of environmental practices see Sarkiz, Gonzalez-Torre, and Adenso-Diaz [45].

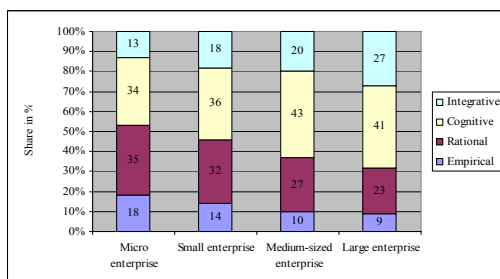


Figure 5

Analysis of the subgroup "The environment"

Considering the subgroup "The enterprise as a system", the results show a tendency very similar to that of "The environment" (Figure 6): that is, a tendency towards more advanced modes with an increase in the enterprises' size, which means from adequate to great and reliable operating ability, towards a growing awareness of the enterprises' developmental stages, the harmonization of the enterprises' structures with goals and objectives, a developed information system and more professional management. See Delgado-García and De la Fuentesabat [11] as to how managers' negative affective traits are related to more conformist strategies and more typical performance, whereas positive affective traits seem to

promote outcomes that deviate from the central tendencies of the industry (also that strategic conformity mediates the relationship between CEO negative affective traits and typical performance).

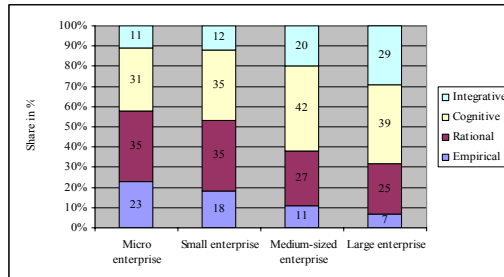


Figure 6

Analysis of the subgroup “The enterprise as a system”

Considering the subgroup "Philosophy, interest behaviour and subcultures", we can observe a tendency toward more advanced modes (i.e., cognitive and integrative) within all size groups, present together in 61% of micro, and up to 69% of large enterprises (Figure 7). This means that there exists to a great extent the cohabitation of different subculture values adapted in the philosophy of the enterprise (which is in accordance with some recent research results from Duh and Belak [14]). The concepts are defined, developmental and clear; the standpoints towards people are according to the theory Z; knowledge and innovativeness are appreciated.

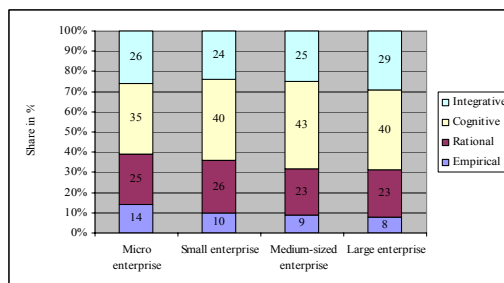


Figure 7

Analysis of the subgroup “Philosophy, interest behaviour and subcultures”

Research results for the subgroup "Basic components of policy" show a strong presence of cognitive mode in all size classes (ranging from 33% in micro up to 47% in medium-sized enterprises), followed by rational modes in micro and small enterprises, whereas in medium-sized and large enterprises the integrative mode is present between 24% and 30% (Figure 8). The results indicate that in micro and small enterprises we can observe pragmatic as well conscious approaches toward governance and management, whereas in medium-sized and large enterprises the conscious approach prevails with developed systems of objectives oriented to

markets, finances, human, and organizational business functions, with the integration of all kinds of knowledge and science for decision-making, participation, orientation towards knowledge and wisdom, strategic decision-making and strategic management. These observations are in accordance with the findings of many authors (e.g. [55]) that there is a lack of strategic planning practice in smaller enterprises. The frequently cited reasons are: (1) not enough time, (2) unfamiliarity with strategic planning, (3) lack of skills and (4) lack of trust and openness. Research studies often indicate that the strategic planning process can be far more informal in small enterprises than in large corporations (see [28] and references cited there). As stressed by Wheelen and Hunger [55] some studies have even found that too much formalization of the strategic planning process may actually result in reduced performance, because it detracts from the very flexibility that is a benefit of small size. The authors therefore point out that the process of strategic planning, and not the plan itself, is probably the key to improving business performance (see also [28]).

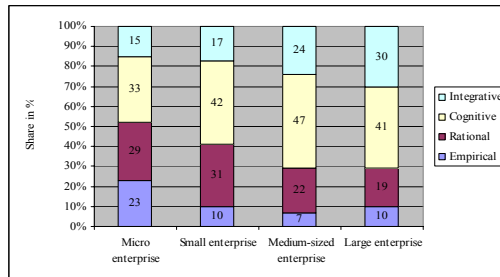


Figure 8

Analysis of the subgroup “Basic components of policy”

Research results of the subgroup "Criteria for measurement of the enterprise policy quality" show that the presence of different modes varies according to the size of the enterprises (Figure 9). More advanced modes are present to a greater extent among medium-sized and large enterprisers than in micro and small ones.

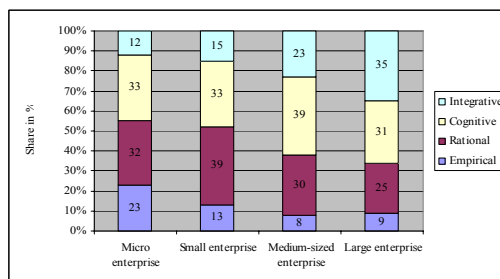


Figure 9

Analysis of the subgroup “Criteria for measurement of the enterprise policy quality”

Conclusions

We saw the start of the worst global recession since the 1930s in the fourth quarter of 2008. Yet, after dealing with the initial shock, companies went to work to prepare for the inevitable recovery. Senior leaders began wondering how the competitive landscape of their markets would change, and which actions would best prepare their organizations to compete in a new and changing world [8]. Consequently, businesses need new bases and methods [32], taking into account new values, culture, ethics and norms of humans, including their personal and personality's development, leading both humans and businesses to their own requisite holism. We believe that integration and requisite holism of the enterprise's governance and management are a precondition for coping with global changes. Therefore, the main goal of our research was to determine the modes of governance and management in the examined enterprises and to see how well Slovenian enterprises are prepared to cope with difficult economic conditions caused by the recent (financial, economic, values, responsibility, social, environmental, etc.) crisis. Dixon, Meyer and Day [12] developed a theoretical framework of organizational transformation that explains the processes by which organizations learn and develop dynamic capabilities in transition economies. We believe that at least the smaller enterprises we analyzed should develop dynamic capabilities that will support their growth in a competitive market economy and will orient them toward integrative management.

The results of our research show that the more advanced cognitive and integrative modes of management are present to a greater extent in larger enterprises; they are present in smaller enterprises as well, but only to a lesser extent. The research findings suggest that the examined enterprises are in different developmental conditions and therefore differently prepared to cope with current difficult economic situation. However, the research results are in accordance with the ideas of many researches who revealed the more pragmatic, personal and informal way of managing of SMEs, especially micro and small enterprises. Since the study reveals that within the group of "smaller" enterprises we can find exceptions (especially toward a more integrative approach of governance and management) future research should also be oriented toward the examination of the correlations between the management mode and the type of enterprise. For example, whether there are any correlations between fast growing enterprises and management mode utilised (see [28] and references cited there). Future studies should also be directed toward the examination of the correlation between the presence of different modes of management and the performance of the company, Research studies should be conducted on the differences in the mode of management in different life cycle stages of an enterprise (see e.g. [6], [7]).

We are aware of the limitation of our research, which is based on self-assessment. However, self-assessments were the only possible option and unfortunately results could not be questioned or tested by outsider's evaluation. We are aware that the opinions on the business can vary strongly according to the people offering them. When more people within the enterprise were interviewed, a wider view of each

enterprise was at our disposal. Therefore, future research should take into consideration this limitation as well.

The research results have (and should have) broader usefulness: they are important indications for owners and management in the examined enterprises. As was stressed by Kralj [22], the main point of the method is that in this way it is possible to get a diagnosis of the enterprise and to propose suggestions and measures for its improvement. It is possible to find out the directions of measures according to the characteristics of each item examined, for the groups of variables and for the enterprise as a whole. Managers especially (who are in many smaller enterprises also the owners) should use the results as a basis for making improvements. Namely, the performance of a particular enterprise depends not only on market conditions but, as well, on the management; with effective management an enterprise can operate successfully even under unfavourable market conditions [41]. Since "Top Performance is not a Coincidence" [53], the method used in the research and results of individual estimation as well as the results for the whole sample, are an important basis for making those decisions which encourage the innovation that plays a central role in the knowledge-based economy [25, 42] and that enables sustainable development and the excellence of an enterprise. The results of other enterprises can serve as a basis for benchmarking.

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How to Overcome (SME) Crisis: Serbian Case

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Abstract: In the period of transition (2000-2009) Serbia established institutions and developed a legal framework for SME support. The number of SMEs increased from year to year and, more importantly, from 2005 the number of new working places became in excess to those which disappeared in companies in restructuring. The global economic crisis influenced the Serbian economy negatively and the SME sector, as well. However, one has to bear in mind that even before the crisis the Serbian development model has faced its limits. Namely, it was not sustainable in the medium term. A set of measures were introduced by the government and the national bank of Serbia in an attempt to curb recession, but were partially late and slightly weak. Modest signs of economic recovery appeared in Serbia in 2010. Considering that the growth rate is positive, but low and insufficient, the SME sector has to be recognized as more important factor for the recovery. As the first phase of SME support has ended it is important to change the policy emphasis to more intensive one. The point regarding SME support in the future is to introduce measures especially for fast growing small companies and gazelles, in an aim to overcome recession and make whole economy more competitive on international market.

Keywords: entrepreneurship; small and medium scale enterprises; transition

Introduction

During the transitory period in Serbia (2000-2010) a great deal of supportive measures toward SMEs development were realized, but one has to bear in mind that extensive phase of this support is almost ended. Therefore, the character of policy support for SME development must be changed.

Starting after political changes in October 2000 improvements were made especially regarding the institutional and legal framework. Serbia has started to narrow discrepancies in SME development to other countries in transition, and

even in some elements have become better off in comparison to some of the EU members.

During late 2008 a negative influence of the global economic crisis could be recognized in the Serbian economy: enterprises faced liquidity problems, foreign demand decreased, banks were not ready to lend as readily as before. The government and the national bank of Serbia introduced measures in order to help economy financially and to prevent recession. However, employees and economic experts consider that those measures were partly late and, more importantly, weak. Recognizing that the problems were more serious than first thought the government signed a stand-by arrangement with the IMF by which financial support of €2.9 billion would be realized by April 2011.

During the 1990s in circumstances of overall crisis in Serbia, SMEs were in some ways companies better adapted, and suffered less, although without any governmental support. In the period of transition the Serbian fast GDP growth was based mainly on excessive public and personal consumption, with increasing regional discrepancies and a deindustrialization trend. So, this growth became unsustainable in the medium term. In circumstances of Global economic crisis and facing growth limits, the role of SMEs in economic development became even more important than before.

The evidence clearly pointed out that small and medium scale enterprises faced serious problems in 2009, as in spite of stronger (especially financial) support results were worse than before. One can see that it is very important now to change the targets of support measures towards more intensive ones. This means that knowledge-based companies and fast growth ones – so-called gazelles - must be priorities in the future. At the same time, those measures are in line with Serbia's wish to join the EU, as they are part of "EU 2020 Agenda".

The aim of the paper is threefold: firstly, to illuminate the main characteristics of SME development in transition period; secondly, to consider the negative outcomes of the global economic crisis on Serbian SMEs; and thirdly, to highlight the need for more qualitative SME support in the future.

1 The First Phase of SME Support – Quantitative One

After political changes in the late 2000s Serbia started the transition toward a market economy with great expectations. During the period 2001-2007, Serbia realized a number of market reforms, achieved macroeconomic stability and a high rate of economic growth, privatized prevailing number of companies, and started the process of joining EU, with the harmonization of a number of laws and other adjustments. GDP increased in the period by 5.4% on average, with the peak

in 2004 (9.3%) and industrial production by 1.3% per year (see Table 1). Macroeconomic stability improved considerably, as retail price index decreased from 92% in 2001 to 6.8% in 2008, with exchange rate stability and increasing foreign exchange reserves¹. It was partially due to public finance reforms and introduction of hard budget constraints, as the public finance deficit in the period 2001-2003 was transformed into surplus (of 2% of GDP), for the first time in years. Although unemployment was still very high (more than 20%), employment started to rise in 2004 (0.5%) and 2005 (0.9%). Free formation of wages resulted in their high increase – over 10% per year in real terms. At the same time average monthly wage per employee increased from EUR 102 in 2001 to EUR 320 in 2008.

Table 1
Serbia - Key Macroeconomic Indicators (Increase %)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
GDP	5.1	4.5	2.5	8.4	6.2	5.7	7.5	5.5	-2.8
Industry	0.1	1.8	-3.0	7.1	0.8	4.7	4.6	1.1	-12.6
Trade	19.8	23.9	13.8	18.0	26.5	7.7	22.8	6.6	-11.7
Traffic	9.6	6.9	5.0	4.8	4.4	10.4	1.7	0.4	-14.9
Export	10.5	20.6	32.8	27.8	27.2	43.4	38.1	24.3	-26
Import	28.0	31.8	33.2	43.8	-2.7	25.9	41.5	23.3	-34.7
Inflation	40.7	14.8	7.8	13.7	17.7	6.6	10.1	6.8	6.6

Source: Ministry of Finance of Serbia

The SME sector was very important for overall economic growth and development. In 2008, as the last year before World economic crisis, the SME share in total turnover was 66.6%, 59.1% in total added value of the non-financial sector and 58.7% in total profit realized².

The total number of economic agents reached 303.5 thousand in 2008, due to constant increase in number of SMEs. As more than 7 thousand entities were established in this year one can see slowing tendency of new company establishment (22% in 2006 and 18% in 2008), while at the same time number of closed companies increased (from 10% to 13% respectively).

Although the total number of SMEs is increasing, the structure is not improving very much. Micro enterprises are still dominant with a share of 95.7% in the total number of companies. At the same time, SMEs have high concentration by industry: two industries, mostly, trade and processing industry; and regionally in two regions, only Belgrade and the South Backa region.

¹ Foreign Direct Investment reached maximum of 4.4 billion EUR in 2006, mainly due to privatization.

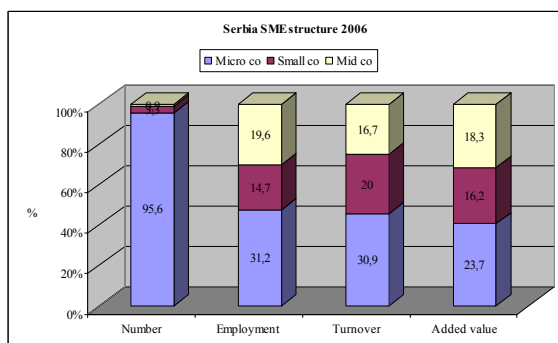
² Ministry of Economy and Regional development, Republican Development Bureau, Republican Agency for SME Development, Report on SME Development in 2008, Belgrade, 2009

The SME sector was very important in opening new working places. In the period 2004-2008 the number of working places increased 24.9% (or 187.5 thousand), which offset the number of employees who left big companies under restructuring.

The SME sector was also important for investment activity. Its share in total investment was 48.1% and the share in the non-financial sector even more, at 58.7%. The share of its investment in GDP increased from 29% in 2006 to 40% in 2007. If we consider the investment structure, then one can see that almost ½ of investments is in equipment, but the share of investments in construction is still too high at 43%.

The SME sector is more competitive due to the less than average cost of employees and cost of wages per hour. It is interesting to note that after deterioration in the period 2004-2006 the ratio of cost of wages/value added improved in the period 2007-2008, and now it is on average for the non-financial sector.

The comparative analysis between the Serbian SME sector and EU³ showed that Serbian SMEs are on the EU average according to number of enterprises and employment and according to share of turnover in total GDP. However, Serbian SMEs are well below the EU average according to turnover per employee, added value per employee and profit per employee. The same situation is due to investments, as investments per employee in Serbian SME sector was €4,100, while in the EU it was €7,400 and investments per company €12,200 in Serbia and €31.700 in the EU.



Source: Republican Development Bureau

In the period under consideration institutional conditions for SME and entrepreneurship development and their strengthening were considerably improved. The growth in the number of SMEs and small shops was result of

³ Ibid

improvement in the overall business climate and stimulation measures from governmental to local level, as well. The main activities were oriented toward⁴:

- Improvement in the overall business climate,
- The establishment of institutions responsible for SME support,
- Strengthening of the legal infrastructure for SMEs,
- Tax, custom and investment incentives,
- Financial support.

According to World Bank and International Financial Corporation analyses, Serbia was labeled as the leader of reforms in 2005 and improved its place from 95th to 68th position in 2006⁵. According to the report, the Serbian improvement in business climate was encouraging: the time necessary for founding an enterprise was 7 days, for registration 13 days, for licenses issuing 279 days, and for tax payment 279 hours per year. At the same time, the period for custom declaration issuance was shortened to 12 days for export and 14 days for import. The investment climate improved as well; the index of credit reporting was 6 and index of investor preservation was 5.3. The liquidation of enterprises became easier then earlier, as for court disputes it was necessary 635 days and 2.7 years for regular liquidation. In comparison to other surrounding countries in transition, Serbia was well positioned, even in some segments better positioned than some new EU members. All in all, realization of “SME Development Strategy 2003-2008” pushed Serbia from the group of countries with modest market reforms into the group of countries with fast reforms.

The encouraging results mentioned above were not achieved overnight, but with persistent and overall efforts. The Serbian government enacted the “Strategy for SME and entrepreneur support in the period 2003-2008”⁶, in line with the European Charter for SME Development, which was realized especially through the “Operational Plan for SME support in the period 2005 – 2007”⁷.

Firstly, an extensive and complex network of supportive institutions was founded: the Ministry for the Economy, as the responsible agency for SME and entrepreneur development with broad network of local and regional agencies, and the Council for SME and Entrepreneurs, as an inter-ministerial body responsible for dialog with representatives of the SME sector.

Secondly, the growth and development of SMEs were achieved through an improvement in the general conditions for business, but also through supportive

⁴ Ministry of Economy and Regional development, Republican Development Bureau, Republican Agency for SME Development, Report on SME Development in 2007, Belgrade, 2008

⁵ In 2005 155 countries were included and 175 in 2006, Doing Business 2007, World Bank

⁶ Ministry of Economy and Regional development, Belgrade, 2002

⁷ Ministry of Economy and Regional development, Belgrade, 2004

measures and activities from the national government to the local level as well, such as, law changes and the legal harmonization with transition good practice, which were encouraging for business.

Table 2
SME Development Index

		Share of private sector in GDP %	Share of SME in GDP %	Share of SME in total employment %	GDP PER CAPITA (US\$/capita)	SME Development Index	
						-	(US\$/capita)
Croatia	2003	65,0	57,0	55,7	7.402	0,21	1.527,5
	2005	65,0	56,3	56,5	8.925	0,21	1.845,3
	2007	70,0	56,6	64,2	13.120	0,25	3.337,2
Romania	2000	60,0	65,6	46,9	1.674	0,18	309,0
	2007	70,0	72,2	64,4	7.636	0,33	2.485,3
	2008	70,0	70,8	76,7	8.185	0,38	3.111,3
Bulgaria	2001	70,0	16,2	46,1	1.723	0,05	90,1
	2007	75,0	39,0	48,9	5.176	0,14	740,3
Slovakia	2001	80,0	40,8	59,1	3.907	0,19	753,7
	2007	80,0	45,5	71,9	13.887	0,26	3.634,5
	2008	80,0	48,1	72,4	22.081	0,28	6.151,7
Serbia	2001	40,0	40,0	45,1	1.536	0,07	110,8
	2007	55,0	58,3	65,5	5.387	0,21	1.131,4
	2008	60,0	59,1	67,2	6.782	0,24	1616,1

Source: Szabo A. *et al.* - *The impact of the economic crises on SMEs in selected CEE countries*, ERENET Profile Vol. V, No. 3, June 2010

Thirdly, an increase in knowledge and capabilities within small and medium scale enterprises and craftworks was realized.

Fourthly, different non-financial support measures were involved, and financial ones, as well.

Fifthly, a number of measures were developed to implement innovation and high technology.

Sixthly, donor help and support to SMEs from different foreign governmental and non-governmental institutions were important, especially if one takes into account the overall lack of sources.

In recent years, the Serbian situation regarding SME has deteriorated, as overall market reforms have lost momentum. The World Bank investigation for 2008⁸ pointed to a worsening business climate in Serbia. Serbia was ranked as 86th, while it was 84th in 2006. Compared to other countries in the region it is better ranked than Croatia (97), B&H (105) and Albania (136), but worse than Hungary (45), Romania (48), Slovenia (55), Macedonia (75) and Montenegro (81).

⁸ World Bank, *Doing Business 2008*, Washington DC, 2009

According to the Report, in 2008⁹ 23 days were necessary for company establishment. Companies faced 20 procedures in order to get different kind of approval for construction, for electricity, for telephone etc., for which even 204 days were necessary. For a new employee, the company has to spend 18% of wages. Considering the credit procedure within banks, Serbia has improved its position 8 places and now is ranked as 13th. Regarding tax and other duties, procedures are still very complex – 66 payments per year. For import procedures a company needs 14 days to finish. Severe problem in Serbia is collecting of dubious claims for which even 635 days are necessary and 28% of total claims have to be spent. The similar situation is regarding procedure for closing business - 2.7 years.

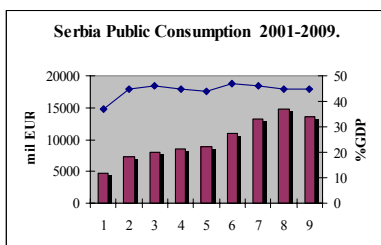
2 Serbian Development Model was Non-Sustainable

In the period of 2001-2008 Serbia achieved a high rate of growth of GDP. However, one has to bear in mind several negative developmental factors. Firstly, the statistical basis was very low, as during the 1990s GDP was more than halved, due to break-up of the single market of the former SFR Yugoslavia and because of overall sanctions introduced by the international community. Secondly, this high growth was based mainly on an increase in public and personal consumption. Thirdly, as fiscal policy was expansive and monetary policy too restrictive at the same time, although a high rate of growth was achieved, it was in fact suboptimal, from the point of view of potential and, more importantly, from the point of view of the needs and expectations of citizens. Fourthly, the structure of GDP formation was not useful, as the growth of industry and agriculture were lower than average, considering that they produce tradable goods.

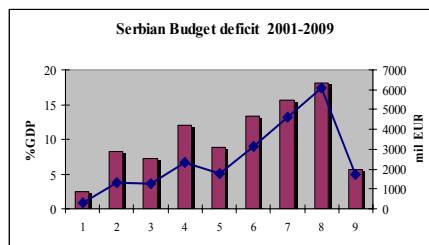
Therefore, one can conclude that this kind of growth became unsustainable in the medium term, even before world economic crisis started. As public consumption during the second half of the decade became of the expansive sort, monetary policy was restrictive more than necessary, in order to control overall macroeconomic stability. For instance the share of public consumption in GDP was 45-50% and the increase in indirect tax duties was 9.8% p.a.¹⁰. The more-than-restrictive monetary policy, together with not-well-coordinated macro policies produced a less than potentially possible rate of growth of GDP. Although inflation was lowered considerably and controlled better than before, it is still higher than in neighborhood and especially in comparison to inflation level in Euro zone (between 6.6-40.7% in the period 2001-2009, see Table 1).

⁹ Ibid

¹⁰ Source: Ministry of Finance RS

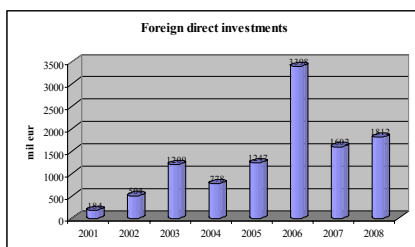


Source: Ministry of Finance RS

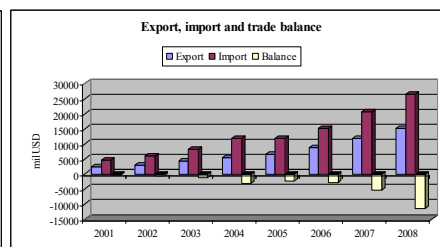


Source: Ministry of Finance RS

The deindustrialization trend during whole transition period has not been useful to the Serbian economy. It has resulted in important changes in the structure of GDP formation, as now 2/3 of GDP is formed by services. The main problem regarding deindustrialization is the decreasing volume of tradable products for foreign markets. Consequently the foreign trade deficit - high and increasing – has appeared. The foreign trade deficit reached the maximal level of US\$ 12 billion in 2008¹¹. It was partially offset by foreign direct investments (FDI), (green field partially and privatization mainly). The national bank of Serbia introduced from September 2006 the policy of appreciation of the Serbian dinar, similarly to the policy in Romania and Croatia, and unlike the policy of depreciation which was pursued for decades in fast growing economies, the so-called Asian tigers. The policy of appreciation favored companies who imported and discouraged those who exported. Inevitably it could not lead to restructuring of Serbian economy in order to become more competitive on the international market. So the Serbian economy became highly dependent on FDI inflow.



Source: National Bank of Serbia



Source: National Bank of Serbia

In the last quart of 2008 the global economic crisis started to impact negatively the Serbian economy: foreign investments inflow shrank; instead an outflow of capital started, saving deposits within banks decreased considerably, credit conditions worsened (for companies it was very difficult to collect claims, especially from government and public companies) and lastly, foreign demand weakened. The institutions responsible for macroeconomic policy, the government and the national bank of Serbia, were surprised when the world financial crisis started to influence the Serbian economy, and they were late and weak in reaction, and more

¹¹ National Bank of Serbia

dangerously, they underestimated consequences. The national bank reacted promptly, which was positive, but the measures were weak and partially in the wrong direction, unfortunately on the back of companies.

The national bank of Serbia in October 2008 started to improve overall liquidity in the banking sector by decreasing the compulsory reserves requirement, while at the same time increasing the interest rate on governmental bonds up to 17.5% (explaining that the idea was to curb inflation expectations). The interest rate was extremely high and in contrast to all other central banks (all other central banks put down the interest rate in order to prevent a recession). The so-called Wiener agreement between NBS and foreign banks (foreign banks represent $\frac{3}{4}$ of the Serbian banking sector) was achieved by which Serbian exposure would stay the same as before, during the whole of 2009¹².

The government reacted late (at the beginning of 2009) introducing weak stimulation measures, insufficient to prevent the recession. The Serbian government in October 2008 firstly promised only measures which were involved at the beginning of 2009: increasing the amount of insured deposits of citizens from 3 to 50 thousand Euros, annulling tax duties on saving deposits (capital gains) and tax duties related to securities transfers. In order to prevent a recession, the government supported a credit lines (subsidized interest) for companies with liquidity problems and for investments and credit lines for citizens for consumption and mortgage credits¹³.

In the first half of 2009, the country's budget suffered from the low collection of taxes and other duties. The stand-by arrangement with the IMF was revised into financial support of 2.9 billion Euros (March), mainly to overcome the budget deficit, which was firstly estimated at 3% of GDP and drop of GDP estimated to 2%. The new revision of the arrangement with IMF in November 2009 showed modest improvements in the economic climate during the year and in collecting budget revenues as well, but the budget deficit problem remained, as the estimation of the deficit increased to 4.5% of GDP¹⁴. This means that the problem was postponed to the medium term period.

During 2009 saving deposits recovered fully (for more than €1 billion) within banks and reached more than Euro 6 billion¹⁵. At the same time, credit expansion, which was very high for several years, slowed considerably (11% p.a.) and, more importantly, credit portfolio of banks has changed structure in favor of government and public companies, which is more secure for banks, but it is not useful for economic recovery. Foreign currency reserves increased to more than 12 billion Euros, mainly due to financial support related to the stand-by arrangement with the IMF. Interest rates on state bonds (the referent interest rate

¹² Source: National Bank of Serbia

¹³ Source: Ministry of Finance RS

¹⁴ Source: Ministry of Finance RS

¹⁵ Source: National Bank of Serbia

of the national bank) was down by that time to 9.5% at the end of 2009, but it was still too high, considering that it was at the same time the minimal active interest rate for banks. The foreign exchange rate at the beginning of the crisis dropped by 20%, but stabilized during the year and again started to decrease at the end of 2009 (7%), in spite of NBS intervention on FX market by more than 600 million Euros (with a 12% further drop in 2010).

Table 3
Serbia - Financial Supports during Crisis

Sort of credit	Financing structure	Conditions	Total volume
Liquidity	Government 2 bill RSD for interest subsidies Total support 80 bill RSD	l' 5.5%p.a. Forex clouse Period 12 months	Shops 20 th.€ Small ent. 50 th € Medium ent. 0.5m € Big ent. 2 m €
Investments Republican Development Fund	RDF 5 bill RSD share 30% credit Total support 17 bill RSD	l' Euribor +4%p.a. Forex clouse Period 5 years	Shops 30 th.€ Small ent. 200 th. € Medium ent. 1.5m € Big ent. 4 m €
Consumer credit and leasing	Government 1 bill RSD for interest subsidies Total support 20 bill RSD	l' 4.5%p.a. Forex clouse Period 7 years	
International	EIB 250 mil € KFW 100 mil € EBRD 100 mil € Italian Gov 30 mil € IMF 1.46 mlrd €		

Source: Ministry of Finance RS

The NBS and governmental measures were in the right direction, but late and weak. From the third quarter of 2009 there were the first signals of recovery, or rather a stop of the recessionary trend. During the crisis the export sectors of the economy suffered mainly from lowered demand; the chemical industry, iron and metal processing and domestic-oriented sectors with high rates of growth in previous years, such construction, traffic and trade. The financial sector was facing two problems: –an underdeveloped financial market and a weak economy – of both companies and employees – which implied the limit for further rapid development of the kind achieved in the first phase of transition¹⁶.

From the third quart of 2010, the main economic problem became an increasing inflation rate. It was mainly due to the increase in agricultural prices and as a consequence of the Dinar depreciation. With a monthly increase higher than 1% in August and September, 2010 ended with an inflation rate of 10.3%¹⁷.

At the same time there were signals of (modest) economic recovery. Industrial production in 2010 was higher by 3% in comparison to the year before. Retail trade had also increased from July for the first time since the end of 2008,

¹⁶ National Bank of Serbia, Inflation Report

¹⁷ Republican Statistical Office

although it was still lower than a year earlier (-0.4%). According to estimates, the GDP increased in the first and second quart (0.9 and 1.8% respectively) and for the whole of 2010, with an estimated increase of 1.5%¹⁸.

Due to the Dinar depreciation, for more than one year the export volume increased more than imports (21% and 7% respectively). It is encouraging sign that in import structure, raw materials and equipment increased the most, which might produce a further increase in industrial production. For 2010, one can expect a current balance deficit € 2.7 billion and FDI inflows of €1.1 billion.

3 Serbian SMEs Suffered During the Crisis

During 2009 the development of the Serbian SME sector slowed considerably, after the period of 2004-08 in which the sector had become an important factor in the economy in market reforms and in revitalization. In 2008, SMEs accounted for 35% of GDP and 43.2% of total employment. More importantly, the SME share in total foreign trade was 45.5% of total export and 59.3% of total Serbian import¹⁹.

Two important questions arise if one looks at the relationship between the economic crisis and entrepreneurship:

- How recession influences entrepreneurial activities?
- How entrepreneurship can change the trend from decreasing into increasing?

One can see that recessions can make room in old markets and sources, as some inventive people can see business opportunities as circumstances change. There are no straightforward answers when looking at start-ups only, but rather one must look at all types and phases of entrepreneurial activities. The results of the GEM 2009 Report highlighted this question differently by type and phase of activity²⁰.

More theories are related to the second question. The best innovations started during the great recession in the 1930s. The study, which used data from GEM reports pointed out the positive correlation between innovative start up based, on the one hand, and GDP cycles with a two-year time lag, on the other hand²¹. They concluded that entrepreneurship is not independent from cycle. Baumol argued that there is constant rate of entrepreneurship among different societies, while

¹⁸ Republican Statistical Office

¹⁹ Estimation of Republican Development Bureau

²⁰ GEM Report 2009

²¹ Koellinger P. and R. Thurik - Entrepreneurship and the Business Cycle, Tinbergen Institute Discussion Paper, TI 2009-032/3, Erasmus School of Economics, Erasmus University Rotterdam, EIM Business and Policy Research, Zoetermeer, The Netherlands, Tinbergen Institute, 2009

institutions, rules and norms influence the linkage between entrepreneurship and development²².

In the GEM Report for 2009 two new ratios were added in order to envisage the climate for start-ups and their development in comparison to year earlier. Not surprisingly, more than a half of entrepreneurs found that it was more difficult to start, although in transitory economies especially, they are driven by their own needs and are not closely linked to global circumstances. Generally speaking, entrepreneurs are more positive about business development than about start-up, but those already matured are more pessimistic.

In the GEM Report for 2009 the questions were raised regarding the relationship between the global recession and business opportunities, both for start-ups and for the development of already established business. From the table below one can conclude:

- Firstly, the majority of entrepreneurs were expecting fewer opportunities, especially within those economies which are factors and efficiency driven;
- Secondly, 1/4 of entrepreneurs in the early phase in innovation-driven economies expected more opportunities;
- Thirdly, entrepreneurs in more matured businesses are more pessimistic.

Table 4

Entrepreneurial Tendencies in selected countries 2008/09 compared to 2006/07

	GDP p.c. change		Attitudes A				Activity B				Aspiration C			
	2008	2009	1	2	3	4	1	2	3	4	1	2	3	4
Croatia	2,5	-5,2	-	+	-	-	-	-	-	-	-	-	-	-
Hungary	0,6	-6,7	-	+	+	-	+	+	+	-	+	+	-	+
Romania	7,1	-8,5	-	+	+	-	-	+	-	+	-	-	-	-
Slovenia	3,5	-4,7	-	+	-	-	+	+	-	-	-	-	-	-
Serbia	5,4	-4,0	-	-	-	-	-	-	-	-	-	+	-	-

*Note: A1 Perceived opportunities, A2 Fear of failure, A3 Intentions, A4 Good career choice
B1 Nascent entrepreneurship, B2 Owner manager new firm, B3 Discontinuation rate B4 Necessity
C1 Job expectation, C2 New product, C3 new market, C4 International orientation*

Until the first quart of 2009 the tendency continued of a slowing in the number of new establishments and, at the same time, the considerable increase in the number of closed companies and shops from the fourth quart of 2008²³, due to the negative expectations of entrepreneurs regarding expansion of the global economic crisis. It happened in spite of habit that companies and shops are usually established at the beginning of the year and closed in the second half of the year.

²² Baumol, W. J. (1990) - Entrepreneurship: Productive, Unproductive and Destructive, *Journal of Political Economy*, 98(5), 893-921

²³ Data from Republican Agency for economic registries RS

The number of SMEs and shops in Serbia in 2009 increased by 9,337 (45% less than in 2008) – 6,417 companies and 2,920 shops (21.6% and 66.8% fewer, respectively, in comparison to the year before). The total number of companies in Serbia in 2009 increased by 10,014 and shops by 39,365 (11% and 9.2% fewer, respectively, in comparison to the year earlier) and closed 3,597 companies and 36,445 shops (17.2% and 5.4% more, respectively, than the year earlier)²¹.

Table 5
SME Indicators selective EU countries and Serbia

	EU	Bulgaria	Czech	Hungary	Poland	Romania	Slovenia	Serbia	
	2008							2008	2009
Number of companies 000	20.727	303	899	532	1.563	440	102	303,4	314,8
Number of employees 000	90.006	940	2.505	1.767	5.880	2.633	424	940,2	872,5
Turnover bill €	14.284	58	245	163	421	268	51	58,3	46,6
GDP bill €	3.626	11	49	25	81	37	11	10,5	8,7
Profit bill €	977	4	9	1	19	19	1	4,0	3,2
SME/000 Citizens	41,6	41,4	86,6	53,0	41,0	20,4	50,7	41,4	43,0
Number empl./comp.	4,3	3,1	2,8	3,3	3,8	6,0	4,2	3,1	3,1
Turn./empl. 000 €	158,7	62,0	97,8	92,2	71,6	101,8	120,3	62,0	53,4
GDP/empl. 000 €	40,3	11,1	19,6	14,1	13,8	14,1	25,9	11,1	10,0
Pf/empl. 000€	10,9	4,2	3,6	0,6	3,2	7,2	2,4	4,2	3,6
Profit rate	27	38,1	19	2	23	52	9	38,1	36,2
SME share in non financial sector									
Number comp.	99,8	99,7	99,8	99,8	99,8	99,6	99,7	99,8	99,8
No empl.	67,4	74,1	67,6	71,1	68,9	63,6	67,0	67,2	66,7
Turnover	57,7	65,1	58,8	58,8	59,2	58,7	63,2	66,6	67,8
GDP	57,7	54,1	54,8	51,9	51,7	42,2	59,8	59,1	57,4
Profit	49,4	45,4	31,5		33,6	34,8	29,1	58,7	54,1

Source: DG Enterprise and Industry, Serbia Republican Development Bureau

An important fact, from the point of view of SME sector's contribution to the increase in employment, is that in the period 2004-08 every year SMEs created more work places than places which were closed at the same time in big companies. In the period 2004-08, the number of employees in SMEs increased by 187.4 thousand (from 752.7 to 940.2 thousand), while the number of working places in big companies decreased by 163.6 thousand (from 622.2 to 458.6 thousand).

SME distribution by industry is still very concentrated, namely: 73.9% by number of companies, 78.6% by employees, 85.3% by trade and 80.1% by GDP contribution was related in 2008 to four sectors only: trade, processing industry, real estate related activities and construction.

The TEA index (the measurement of the early phase of entrepreneurial activity) for Serbia in 2009 was 4.9²⁴, pointing to a worsening of the climate for starting business (8.6), which was the result of influences of the global economic crisis. The number of those who starting businesses was decreasing (indicator TEA beginners fell from 4.8 to 2.2) and new entrepreneurs, as well (indicator TEA new entrepreneurs fell from 4.0 to 2.8). Inevitably, GDP growth and new working places were limited.

The share of mature enterprises increased (the share of existing enterprises increased from 5.3 to 10.1), which points to the fact that new measures for improving the climate for fast growth companies and so-called gazelles is desirable, as well as are those measures for start-ups. The index of motivation increased (from 29% to 46% in 2009), which means that there were more entrepreneurs who saw their chance. However, at the same time, the number of potential entrepreneurs decreased absolutely, pointing to the worsening conditions for start-ups and continuing businesses.

The country lags behind the conflict period of development, but still a relatively small number of entrepreneurs legalized their activities. Weak financial and non-financial support show also that a supportive climate for entrepreneurship is far from fully satisfied. The global economic crisis has simply emphasized those drawbacks: weak and decreasing foreign and domestic demand, narrowing investment opportunities, increasing risks and costs and fear of failures. Although there is clear idea about the need for new working places and state activities toward SME support, those negative factors prevailed, which altogether produced a decreasing number of entrepreneurs and newcomers.

From Table 6, one can see that the TEA index – the measurement of early phase of entrepreneurial process – for Serbia in 2009 was 4,9 (almost 5 persons among 100 elder people were entrepreneurially active) – once again points to a worsening of overall entrepreneurial climate in 2009.

Table 6
Entrepreneurial Activity 2009

	TEA Beginners	TEA New entrep.	TEA Index	Index Existed entr.	Total rate of owners	Rate of Break	% TEA Index	
							TEA need	TEA avail.
BiH	3,1	1,3	4,4	3,9	8,3	3,1	39	20
Croatia	3,5	2,2	5,6	4,8	10,4	3,9	37	39
Hungary	5,4	3,7	9,1	6,7	15,8	3,2	24	45
Romania	2,8	2,3	5,0	3,4	8,4	3,6	34	31
Slovenia	3,2	2,1	5,4	5,6	11,0	1,3	10	69
Serbia								
2009	2,2	2,8	4,9	10,1	15,0	1,9	41	46
2008	4,0	3,6	7,6	9,3	16,9	3,7	-	-
2007	4,8	4,0	8,6	5,3	13,9	-	-	28

Source: Global Entrepreneurship Monitor

²⁴ Near to 5 persons was entrepreneurially active among 100 elder

Mutual relations of partial rate of early entrepreneurial activity (see Table 7) pointed to some important facts. A motivation Index of 1.12 showed that Serbian entrepreneurship is developing more on the basis of chances seen (2.25) than as an alternative to secure existence (2.01). This index is lower than in other European countries, except Romania and BiH. Death index 0.79 pointed that number of beginners was smaller than the number of new entrepreneurs who succeeded in running a business for more than 42 months. The sustainability index, at 3.61, is very unfavorable, as it means that for each 36 existing entrepreneurs there are 10 new entrepreneurs who run their business less than 4 years. The main reasons for this unfavorable rate are the global economic crisis and unfavorable overall economic climate. The stability index of 2.06 reveals that for each 20 existent entrepreneurs who run a business more than 4 years, there are 10 beginners and new entrepreneurs. This index also points to a stagnating trend in new company establishment, and more importantly, it is more unfavorable than in other countries under consideration.

Table 7
Motivation and sustainability of early entrepreneurial activity

	Motivation Index	Death Index	Sustainability Index	Stability Index
Croatia	1,05	1,59	2,18	0,86
Hungary	1,88	1,46	1,81	0,74
Romania	0,91	1,22	1,48	0,68
Slovenia	6,90	1,52	2,67	1,04
Serbia	1,12	0,79	3,61	2,06

Source: *Global Entrepreneurship Monitor*

Considering measurement of business demography in Serbia one can conclude that from 2008 the number of established companies and shops has been decreasing, while the number of companies and shops which stop activities has been increasing²⁵. As a result, the total number of new economic agents is decreasing. In 2009 in Serbia, 44 SMEs or shops were operating for each one thousand citizens (1 more than in 2008), but 7 subjects of new established was less than year before.

Table 8
Serbia Number of newly established and closed companies

	Number of companies		Number of shops		Net effect	
	established	closed	established	closed	Companies	Shops
2006	11.536	1.528	45.693	27.01	7,5	1,7
2007	11.902	2.027	47.951	31.619	5,9	1,5
2008	11.248	3.068	43.375	34.572	3,7	1,3
2009	10.014	3.597	39.365	36.445	2,8	1,1

Source: *Republican Agency for economic registries*

²⁵ Source: *Republican Agency for economic registries*

Table 9
Serbia - Rate of growth and close of companies and shops

	Companies		Shops		Total	
	Rate of Growth	Rate of close	Rate of growth	Rate of close	Rate of growth	Rate of close
2006	13,3	1,8	40,7	24,0	28,8	14,3
2007	12,3	2,1	23,0	15,1	19,6	11,0
2008	10,7	2,9	19,9	15,9	16,9	11,7
2009	9,0	3,2	17,8	16,5	14,9	12,1

Source: Republican Agency for economic registries

The SME Policy Index²⁶ puts Serbia into a group of countries which are fully established legal and institutional framework for supportive policy for SME development, with 3.3 as the average rate: education and training for entrepreneurship -2, cheap and fast start-up -3.8, legal framework - 3.2, availability of skill improvement 2.8, on line appraisal to sources 3.2, greater market appraisal 4, financial support 4, technological capacity strengthening 3.5, successful models of e-business -3.5. At the same time it means that it passed half obligations toward full EU membership requirements.

Financial support for SMEs in Serbia increased in 2009, but was too weak to prevent the recession. SME financial support from public sources in 2009 was in total 29.9 billion RSD (€318.8 million), of which from the national budget €113 million. From the national budget and the local network of SME agencies for consulting and expert support, €2.2 million was planned. The National Employment Service supported SMEs with non-financial services worth €37.2 million. The National Development Fund financed start-ups with a € 41 million credit line, SMEs in under-developed regions with €30.6 million, higher quality of restaurant supply with €1.8 million. Project of support investment in innovations was financed with €401 thousand and Program of development €248 thousand. The National Agency for export insurance (AOFI) subsidized credit lines for exporters with €28.3 million, €14.5 million for factoring financing and €10.7 million for export insurance and export guarantees. The National Export Promoting Agency (SIEPA) placed €439 thousand for export promotion of private enterprises. Additionally, The National Development Fund from its own funds financed SMEs with €151.6 million.

Financial SME support from foreign sources, such as Fund revolving credit, APEX Global credit II, and Italian Government credit, was in 2009 realized with €50.8 million (although non-realized sources are €201.4 million).

²⁶ SME Policy Index 2009 – Progress in the Implementation of the European Charter for Small Enterprises in the Western Balkans, EC DG for Enterprise and Industry, OECD, ETF, EBRD, 2010

4 Change Attitude to More Intensive SME Support

During the transition period, SME support policy in Serbia was oriented toward increasing the number of SMEs. Consequently, the policy could be labeled as a quantitative one and usually was seen as the first phase of SME development. In the future the need is to shift to a policy of the qualitative sort, e.g. the main subject of support would be fast growing SMEs, mainly. It must be defined precisely and, more importantly, it must be implemented.

A policy for the support of dynamic SMEs and gazelles is essentially a policy for entrepreneurial support. Entrepreneurship is the process in which talented persons transform their knowledge into assets through new economic establishments, which produce added value as the basis for the growth of the welfare of the society. Entrepreneurs recognize their business opportunities and make their own choices in order to use them. At the same time, newly established economic actors mature innovations using knowledge and other sources for new products and services. Whole economy introduces all institutions which play important role in economic development and increase in productivity.

It is important to bear in mind that supportive policies for innovative and fast-growing SMEs and gazelles is far from simple. The first issue is how to define and recognize those dynamic companies and gazelles. An especially important issue is how to help those enterprises when they are facing the period of a fall in growth, like they are facing now in circumstances of the global economic crisis. Those negative factors can be related also to un-sustained financial support or problems related to human sources. The aim of the state in modern market economies is to overcome those limits. Case studies have shown the room for supportive policy related to relatively small number of companies as a target (France, Quebec). As with other development or macroeconomic policies, the point is to adjust those policies to certain national circumstances related to specific historical, ecological and social factors. For economies in transition the basic problem is related to the establishment of legal and institutional frameworks for the market economy.

Considering the trend of deindustrialization and the huge and increasing foreign trade deficit for Serbia, in the future the target for SME support policy is to increase economic efficiency and competitive abilities through: a) the development of an economic structure comparable to the EU, which requires faster growth activities with higher-than-average added value, b) an increase in the competitive abilities of companies, primarily through an increase in productivity and c) more regionally-balanced development.

During the transition period, Serbia tended to be closer to the EU, and public opinion showed the prevailing wish of citizens to realize joining the EU. In order to speed up this process Serbia unilaterally started to introduce Agreement of Cooperation and Accession from the beginning of 2009, although it meant strengthening competition on its own market, and at the end of 2009 officially

applied for candidate status. One has to bear in mind that the positive pressure on Serbia to fulfill the requirements for joining the EU are even more important than EU membership itself.

In order to join the EU, Serbia in its future development must respect and implement EU development documents. During the transition Serbia implemented a neo-liberal concept of development, while countries from European family strengthened development cohesion and coordination. Over the last decade, the EU has created and started to implement several development documents in order to achieve sustainable development, such as ESDP, CEMAT, SDS and the Lisbon agenda. It has recently adopted a strategy for overcoming the current economic crisis, EU 2020, which at the same time shows the basis for EU economy in the next decade. The document is especially important for, among others, supportive policies for dynamic SMEs and gazelles, as it stipulates three future development cornerstones: clever growth, sustainable growth and comprehensive development.

Conclusion

Serbia started transition to a market economy in 2000, as the last among the East and Central European countries. During the transition years, a high rate of growth was achieved, macroeconomic stability was considerably improved and a much better business environment was created. It was important especially for the fast growth of SMEs. The business climate improved and a set of supportive measures were realized. The number of SMEs increasing each year, through which SMEs became an important agent of whole economy, with a considerable share in employment, turnover, profit and value added. However, in recent years market reforms have lost momentum and business climate has deteriorated in comparison to other transition economies. One has to bear in mind also that the Serbian “development model” during the period 2001-2009 was based on increasing public and personal consumption and was unsustainable even before world economic crisis started to influence its economy negatively. Unsurprisingly, the business climate deteriorated and SMEs suffered during the end of 2008 and in 2009, and like other companies had worse economic results. This was even in spite of higher financial support from different sources than before. In order to overcome the crisis, the government has to support SMEs as a vital agent of an economy. Considering that Serbia has almost finished the first phase of SME support, in which the main aim was to establish as many new companies as possible, a useful strategic approach in the future should be to change attitudes to more intensive one. It means to support those companies which are fast developing and the most dynamic ones especially, the so-called gazelles. An important fact is that Serbia has already created a strategy for the development of competitive and innovative small and medium size companies 2008-2013, but the point is to implement it. As several analyses have pointed out, Serbian SMEs are not competitive to EU companies if we consider economic ratios per employees. So it is the right time to strengthen their efficiency. It is also important to bear in mind that this shift in SME support policy should be in line with the EU 2020

Agenda, and especially important for Serbia as a future candidate for EU membership.

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Focus on the Impact of the Economic and Financial Crisis on the Human Resource Function – Four Eastern European Countries in the Light of Empirical Research in 2009

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Abstract: When the crisis broke out in October 2008, the economies of Bulgaria, Hungary, Romania and Slovakia were in different situations, but the governments of these countries took very similar action to eliminate the negative impacts. It is extremely important to know how their companies reacted to the crisis, and our study aims to uncover what actions companies from the selected four countries plan to take concerning the field of human resource management in the present financial and economic crisis. With a brief review of the literature we demonstrate the role of Human Resources in this critical period before presenting the findings of our empirical research conducted from November 2008 to February 2009.

Keywords: Human Resource Management; Crisis; Crisis theories; Bulgaria; Hungary; Romania; Slovakia

1 Introduction

The present crisis is very different from earlier ones in that it has spread very rapidly to all countries and has brought the world close to global collapse (Lámfalussy, 2008, Mellár 2009 and Szentes, 2009) Company markets are shrinking and sales are decreasing, and, for these reasons, different solutions are proposed at the international, national and company level. Many compare the present situation to the earlier Great Depression and the remedies then applied, but, in fact, serious changes have taken place since then (Hamvas, 1983). One of

the most important of these lies in the structure of national economies. Compared to the earlier (e.g. 1929-33) crisis, the significance of the service sector has grown remarkably, while that of the agricultural and industrial sectors has decreased (Kehl and Sipos, 2007). This means that substantial strengthening has occurred where “the connection with material processes is secondary” even though the employment factor remains significant. Here productive capital can be found embedded into work, in the head of the employees (Sveiby, 2001). We believe, therefore, that corporate methods of handling the crisis cannot follow previous patterns; the recession scenarios cannot work. This statement refers especially to those organisations where intangible assets play an important role and where production is connected to knowledge – as opposed to tangible assets – and this also includes the state sector (Vajkai-Fodor, 2008).

2 Crisis Theories

The credit crisis spreading from the US and UK economic sectors has almost destroyed the world economy. The IMF calculated that world growth has fallen from the 5% reached in 2007 to 1.4% to which the developed world contributed by 2.6% and the emerging countries by +1.0%.

The number of unemployed has risen by 5 million, the same figure regarding the OECD countries has reached 20 million (KSH; 2010). Generally as Bryan (2008) points out, we might summarise the problems by simply saying that the whole world economy is affected by the fact that the financial sector has ceased to function normally.

- Various governments have been making remarkable efforts to mitigate the consequences of the crisis. These actions were mainly cost-reducing and had a significant effect on the budgets of public institutions. LaRocco (2010) also declares that the role of bureaucrats and governments has increased.
- It is also obvious that the global financial market has significantly weakened and lacks efficient coordination and monitoring mechanisms.
- Due to the increase in the role played by governments, taxes will probably rise and the regulatory function of the state will be increased.
- The era of cheap credit is about to end and so the main structure of many plans will need to be reviewed – and previous concepts pruned where necessary. The former growth potential has decreased.

Due to the crisis, government budgets came under pressure both at state and regional levels. Deficits needed to be decreased and incomes increased. Therefore, most governments reduced their expenditure and laid an extra burden on organisations, on citizens and on economies in the form of taxes. The credit supply from banks has fallen dramatically, resulting in liquidity problems for credit-dependent industries (e.g. construction) and their suppliers. The slowdown has

reached almost every industry. Companies tend to reduce their expenditure as income falls short of that planned.

Before we enter into a detailed discussion of our empirical research, we should take an overview of what different authors propose to ensure recovery from economic and financial turmoil as soon as possible.

General Recommendations¹

Korten (2009) writes in his new book that the world will not be able to recover from the recent crisis as long as real wealth is not preferred. The author considers it important to abandon the phantom economy (e.g. inflated stock prices or overvalued real estate portfolios) that has pushed the world into crisis. The author envisages a world order based on local economies rather than alchemy. Similarly, Speth (2008) states that there is no way out of the crisis as long as world politicians concentrate only on growth.

An Eastern European expert, Csaba (2009, 186) thinks, after Lucas (1976), that “while countries have to adapt as well their conjunctural policies to the deterioration of the international environment, the way out is through regaining trust instead of pumping money into the economy”.

Hungarian-born Mihály Csikszentmihályi, developer of the flow theory, thinks that performing local tasks have to be in focus. First, small evolutionary cells have to be created that can be characterised by solidarity and supporting each other rather than by the fatal pursuit of money. He says that initiatives like this can be the basis for the development of a human society building a more humanitarian future (Székely, 2009).

Recommendations to Companies

Hugh Courtney (2001), the Dean of the Robert H. Smith Business School at the University of Maryland, published a book which attracted considerable attention post-9/11 (i.e., September 11th 2001): it was entitled “20/20 Foresight: Crafting Strategy in an Uncertain World”. The author thinks that companies should prepare to scrutinise their financial situation from several points of view. He suggests that they should continually examine their market opportunities and the steps taken by their competitors. According to the author, those companies with a number of so-called “cash cow” products and services will be in a less difficult situation in the present uncertainty. If we look at companies in the developing world (China, India, Russia, etc.), those with a sound financial base and which are relatively cheap to finance will be in the best position. In his opinion, the advantage of the Indian Tata company becomes obvious as its Western competitors will be forced to carry out significant company reconstruction or will even be forced to withdraw

¹ This article doesn't discuss the different cycle theories (e.g. Kondratiev, Kitchin and Keynes, etc.).

from certain areas. This company will probably be able to retain positions already gained and also to penetrate areas abandoned by its competitors.

Meyer (2009) makes the following strategic recommendations regarding recovery:

- 1 The quoted author considers it most important that companies have to stabilise their cash flow situations.
- 2 Market prospects are especially good in the low-cost industries but fierce competition is expected from companies in the emerging countries.
- 3 It is advisable in a number of industries to transform the product portfolios. This transformation should be realised by increasing the efficiency of production processes and rationalisation rather than by innovation.
- 4 A significant decline can be observed regarding the purchase of non-basic services in the business-to-business field. Consultants are concerned by the biggest decline.
- 5 It is advisable to prepare for the opportunities offered by the new economy, in particular, green energy, the health sector, nutrition, the entertainment sector and education in special knowledge industries.

The cost of labour is usually a significant part of a company's budget. Due to this, and as we will see later, a typical reaction of firms is to reduce this cost in different ways. As the GKI Research Institute (Bank, 2008) declares, there are different ways, such as by reducing working hours, holding back on temporary work, increasing the number of part-time employees, lay-offs, reducing wages and salaries and freezing recruitment. Almost all of these – especially lay-offs – can cause serious problems for long-term operations as we believe that employees are the most valuable asset of knowledge-focused companies (Dobrai and Farkas, 2009).

It seems that earlier strategies are inappropriate for the current circumstances. If a company is not able to keep a talented, hard-working, career-oriented workforce, one of the motivation factors which ensure a permanent stimulus at every level of the organisation will be missed and a time-bomb will be ticking within the organisation. Frozen recruitment and layoffs will also harm the corporate culture in that the basic beliefs, norms and rules will be damaged. The lack of junior staff that can be generously loaded means that even more routine tasks will remain for senior employees. There will not be enough subordinates to “carry the piano”. The fear of losing one's job will lead to less knowledge-transfer and delegation. The departure of colleagues also means a massive loss of partner-relationships (external knowledge capital) and an increase in the number of competitors. As we found in the literature and in interviews, to avoid the catastrophe, leaders have to play a key role. One of the most important steps is to revive a healthy and vibrant corporate culture. Managers or partners should lead by example. They must bring expectations into effect first. Clear and consistent communication should accompany actions and changes in the organisation. Leaders should invest in key

knowledge-workers, since they will be the source of recovery. In their cases creative or long term compensation is also possible. In addition to the current problems, companies need to focus on the future and to set clear new aims and goals. If employees understand the message and see their role in the new setting, their commitment and motivation will recover (CMA Management, 2009). Cappelli (2009) also adds, and respondents have confirmed, two other major factors for success in maintaining commitment: the first is related to communication. He points out that management should address perceptions about the downturn in the organisation's fortunes, since explanations can be worse – and more dangerous – than reality. In communication, managers should give clear reasons why the remaining employees have survived, and how they fit into the new perspectives (Cappelli, 2009). Haberleitner et al. also (2010) support the ideas of clear communication and gives impressions and suggestions about the characteristics of honest, thoughtful leadership in times of crisis.

In our research, we will, in various ways, touch on the practicalities of these recommendations in our research overview.

2.1 Methodology

At the very beginning of this article, we mentioned that the studied countries had reacted similarly to the crisis. The question is rightly asked: What do companies actually plan to do? How do they see the crisis? What influences their reactions? In the following part of our article we try to find the answers to these questions.

We were interested in the micro-level reaction, and so we undertook to research the organisations' responses. The selection of the research method was determined by the fact that data for the four countries in the survey could be collected most effectively by benchmarking. We applied the "sequential logic" of research planning (Hellriegel, et al., 1998: 623), and in preparing the questionnaire. After our review of the literature, we looked for empirical confirmation from the corporate sector. Do they think as the previously-cited authors (Courtney, 2008 and Meyer, 2009) suggest, or do they have other preferences? To answer these questions, we use the results of a questionnaire survey conducted in November 2008 and March 2009. Participation in the survey was voluntary and free. A web-survey technique was used to fill out the survey in Hungary and paper copies were used in Romania, Slovakia and Bulgaria. Filling in the questionnaire took some 20-30 minutes. The research was based on a survey including 8 question-groups, and the questionnaire is made up as follows.

- name of the company and the address to which the report should be sent,
- specific features of the company,
- the possible effects of the economic and financial events now spreading,
- planned measures to be taken for easing the effects of the crisis,
- planned salary increases for 2009 (%) – separately and for all fields,

- the effects of the economic and financial events as they spread in the countries over the next 12-24 months,
- planned changes in HR areas,
- further recommendations and comments.

We received answers from a total of 566 companies in the four countries – Bulgaria, Hungary, Romania and Slovakia. In the survey, we also examined the answers given by management and HR given in respect of the recession.

2.2 The Four Countries Examined

From the point of view of our topic, it is worth taking an overview of the socio-economic characteristics and crisis management actions in the countries examined. If we compare the four based on economic performance, we can conclude that:

- Of the four, Romania is the biggest in terms of both population and territory. Bulgaria and Hungary are roughly the same size. Bulgaria is larger in terms of territory, whilst Hungary has a larger population. Slovakia is the smallest in terms of both territory and population.
- With regard to GDP per capita – based on 2008 World Bank data – the ranking of the countries is: 33: Slovakia (\$17,565 per capita), 37: Hungary (\$15,408), 51: Romania (\$9,300) and 64: Bulgaria (\$6,546).
- In recent years, including 2008 (the basis of the comparison) the Bulgarian, Romanian and Slovakian GDPs increased significantly more than Hungary's.
- Inflation was lowest in Slovakia (4.6%). The Bulgarian, Hungarian and Romanian inflation data were approximately the same for 2008, around 6.2 and 7.8%.
- Probably due to the high number – 3-3.5 million, according to certain estimates – of Romanian guest workers, the unemployment rate there is 4.5%, well below the EU average. Bulgarian, Hungarian and Slovakian rates approximated to the EU average, at around 6.2 and 8.7%.
- With regard to culture, following the dimensions set up by Hofstede and Hofstede (2005), we can affirm that power distance is greatest in Slovakia (104) and Romania (90) and lowest in Hungary (19). Hungarians are the least collectivist (11), whilst this indicator in the other countries varies between 30 and 52. Hungarians are the least (17) and Slovaks the most masculine (110) while the same indicator in Romania and Bulgaria is 40 and 42. Slovaks have the lowest uncertainty avoidance index.

It can be seen that all four countries differ in territorial, economic, and cultural aspects. However, the crisis had reached all by the end of 2008 and governments were forced to respond to the challenges. Most responses were similar, although a few minor differences could be seen due to the above variations.

3 Hypotheses

For our research we proposed four hypotheses to evaluate the recommendations of the literature and to analyze the spatial, cultural and functional differences of the crisis.

H1: There are no country-specific reactions to the crisis; the organisations of the Central and Eastern European (CEE) countries react similarly to the challenges generated by the crisis.

In order to test the first hypothesis, the differences among company reactions were examined in respect of nationality. The current turmoil faces the companies and the economies with similar challenges. As discussed earlier, most governments use the same methods to eliminate the effects of the crisis. However, there are significant differences among national cultures. The typical business goals of companies can also be characterized by the national culture where the firm is operating (Hofstede and Hofstede, 2005). One of the most important messages of cultural differences is that a group of people react differently to the same challenges and problems. According to our assumption, answers should be sought not only from the cultural perspective, but in a more complex set of factors. We think that reactions are not only influenced by national culture, but by the sector, the size of company and also by ownership. To prove this, we tried to show that nationality is not the only influencing factor.

H2: Companies with few employees tend less to dismiss staff as a solution to the crisis.

The second hypothesis is an extension of the first, focusing on a special crisis-reaction. A rise in unemployment has been one of the symptoms of the downturn starting in 2008. We assume that small companies contribute less to the trend. This hypothesis was based on the logic that: the speciality of SMEs in Eastern Europe – especially of micro- and small enterprises – is the low level of capital, profitability and the return on investment. (Némethné et al., 2008 and Poór et al., 2007). Usually, management tasks and responsibilities are not defined clearly in the leadership, and, in our opinion, these companies would quickly reach their operating boundaries in respect of dismissals, and so they use this weapon last.

H3: Company reactions to the crisis are not uniform.

Our third hypothesis examines other independent variables that were not analyzed in the first hypothesis. We examine the power of influence of these characteristics on the reactions of the companies. The aim of this is to prove that companies' answers depend on a set of variables and not on one single factor.

H4: Reactive companies judge the crisis and the characteristics of the crisis differently than proactive companies.

Companies may be categorised in four groups according to their actions to eliminate the effect of the crisis. The first type is *passive*, when companies believe that nothing needs to be done. The second *reactive*, where companies tend to use more cost-reducing, belt-tightening arrangements. The third is *proactive*, focusing more on corporate reorganisation and renewal. The fourth is mixed *strategy*, where both reactive and proactive tools are used. Of these categories, the reactive and proactive firms differ sharply from each other. For this hypothesis, we used a different approach to that for the former. We assumed that economic players have other information regarding the crisis and judge the symptoms differently, and so we measured this assumption in our survey. Now we examine the connection between the perception of the crisis and answers given among the reactive and proactive companies (Balázs-Veress, 2009).

4 Characteristics of the Sample Analyzed

We received 566 valid answers from the four countries. The highest proportion of questionnaires was returned from Hungary and account for 45.2% of the sample. Companies from the other three countries contributed to the survey approximately equally at around 18%.

Table 1
Sectoral distribution of participating organizations

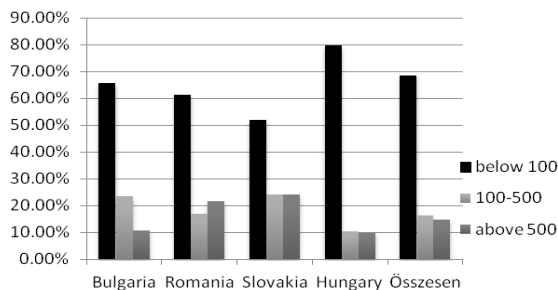
Sectors	Countries				In % of the whole sample
	Bulgaria	Romania	Slovakia	Hungary	
Industry	14.7%	9.6%	27.1%	28.9%	22.4%
Trade	14.7%	13.5%	22.4%	26.9%	21.4%
FMCG	3.9%	4.8%	.9%	1.6%	2.5%
Financial services	4.9%	11.5%	18.7%	4.3%	8.5%
Information technology (IT)	10.8%	8.7%	.9%	3.2%	5.1%
Telecommunication	4.9%	3.8%	1.9%	.8%	2.3%
Transport	3.9%	2.9%	8.4%	2.8%	4.1%
Energy	2.9%	1.9%	.9%	1.6%	1.8%
Business services and others	39.2%	43.3%	18.7%	30.0%	32.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: Primary research by the authors

Respondents are from different fields of business, although manufacturing, commerce and business services predominate within the whole sample. The incidence of manufacturing and commercial operators is low in Bulgarian and Romanian companies, as opposed to their levels of IT companies and organisations working with FMCG (Fast Moving Consumer Goods). The latter are usually every-day, low-priced and low-risk products which require very little thought when purchasing) and feature more significantly here than in the two other countries.

The number of transportation and financial services companies in Slovakia and the number of companies providing business services in Hungary are higher than in the other countries.

In respect of the number of employees, companies with fewer than 100 people account for nearly 70% of the sample. Organizations employing more than 500 people, therefore considered as large companies, amount to 15%. Outliers can be found in respect of Slovakia and Hungary in the “Below 100 people” category. The number of companies with the least employees is below average in Slovakia and higher in Hungary. Bulgarian and Slovakian companies employing 100-500 people are slightly over-represented.



Picture 1

Size of participating organisations

SOURCE: Primary research by the authors

With regard to the field of operation, private companies predominate. In the case of Slovakia, the proportion of public companies is significantly higher than the sample average.

In respect of the registered office, we noticed a unique factor in Slovakia, namely, that, while companies in the capital predominate in the other countries, the proportion of provincial companies in Slovakia in the sample is 78.3%.

5 Results

Country-related Differences

In this chapter, we focus on supporting and proving our hypotheses. **In the first hypothesis**, we examine differences in the reactions of the companies regarding their nationalities. In the survey there were three types of question related to this theme and indicating their reactions: (a) the planned measures to be taken for easing the effects of the crisis, (b) the planned salary increases for 2009 (as %) separately for all fields of work, and (c) the planned changes in HR areas. First by cross-tabulation (crosstabs hereafter) analysis, we looked for connections between the countries and the reactions of the respondents.

In the first group examined, we analyzed the strategic answers of the companies. Ten categories were offered, with answers on a scale from 1-5 (one to five) where 1 meant “no” and 5 meant “to a very large extent”). Univariate statistics are shown in Table 2.

Table 2
Average of strategic action to be taken to eliminate the effect of the crisis

	cost reduction	org. efficiency to be increased	adjusting strategies	postponing investment	wage freezing	entering new markets	other	dismissal	Incr. marketing costs	we need to do nothing
N	548	533	520	525	519	520	146	510	509	455
Mean	3.91	3.85	3.37	3.13	3.05	2.99	2.45	2.41	2.34	1.52
Median	4	4	3	3	3	3	3	2	2	1
Mode	5	5	3	3	1	3	1	1	1	1

SOURCE: Primary research by the authors

It seems that organisations see the way out in reducing costs, increasing efficiency and, of course, in adjusting their strategies. The ‘we do not need to do anything’ option reached the lowest mean and median values. Companies agreed least on using this method to eliminate the effect of the crisis. The ‘Cost reduction is needed’ category was the question where the highest mean, mode, and median were calculated. It is clear that cost-reduction has priority among companies. Nevertheless, there were different opinions about how this aim should be accomplished. ‘Postponement of investments’ was more appropriate for organisations than the ‘dismissal’ option. Firms were more cautious about reducing the number of employees. Barely one fifth of companies declared this possibility necessary ‘to a very large extent’ or ‘to a large extent’.

When we looked for *country-related differences* we found some weak but significant results in the crosstabs analysis. The most visible feature was that Hungarian companies tended to use or reject actions more radically than those in the other three countries.

In all categories *Hungarian* answers showed a higher number in the “very large extent” category, and usually in the “no” category. Interestingly, Hungarian organisations appeared to be quite passive in a ‘medium’, ‘large’ or ‘very large’ extent more than the average (to eliminate the effect of the crisis).

The other feature noticed was that *Bulgarian* companies differ least from overall averages. Regarding the categories ‘cost reduction’, ‘wage freezing’, ‘reform of strategies’, ‘doing nothing’ and ‘increasing organisational efficiency’, Bulgarians did not differ from the average. When we said that Hungarians tended to be more radical in the operations, we should note that Bulgarian, Romanian and Slovakian firms had more sophisticated and more varied answers. Fewer companies rejected postponing investment and increasing the marketing costs in Bulgaria, but they are willing to use this opportunity more moderately way than the average. The only category where Bulgarian organisations showed action stronger than the average was in ‘planning to enter new markets’ to eliminate the effect of the crisis. With *Romania*, we could not paint a general picture. We see that, as with Bulgarian

companies, Romanians agreed less with being passive than the average. They were more moderate or dismissive in ‘firing employees’, ‘freezing wages’ and in ‘adjusting strategies’ also. With ‘postponing investment’, ‘cost reduction’, and ‘entering new markets’ we found no trend in the Romanian answers. Companies from this country were the closest to the average in selecting the option increasing marketing costs.

In *Slovakian companies*, we saw two major tendencies. The first is that middle values (from “small extent” to “large extent” categories) suited them better; extremes were chosen less than average. This was the case in respect of ‘dismissal’, ‘postponing investment’, ‘adjusting strategies’ and ‘organisational efficiency’ actions. The other characteristic was the ‘weaker than average’ answers of Slovakian companies in some categories. ‘Cost reduction’, ‘wage freezing’, ‘increasing marketing costs’ and ‘entering new markets’ were in this category.

Regarding the first hypothesis, the *second group of questions analyzed was that of HR-related actions*. The survey contained 21 HR strategy-related questions where respondents could mark those options where they were planning to take action due to the crisis. They did not have the chance to choose from a scale; a simple dummy value was offered (0= no; 1= yes).

Most companies are not planning to carry out changes in HR areas. More answered ‘No’ to each question than ‘Yes’ on this issue. The highest value was the ‘Freeze in the number of staff’ (36%), which is certainly not surprising after the known earlier results. ‘Flexible working time’ was also an answer often given. The rate of people giving a positive answer to ‘workforce reduction’ was higher than of those who agreed “to a very large extent” with the former ‘dismissal’ question in the above analysis. ‘Flexible bonus system’, ‘workforce development’, ‘performance management’ and ‘communication’ were agreed by more than 30% of respondents.

Although we have seen the overall average values of the whole group, for our first hypothesis, *Country-related differences* are more important. Here we again used crosstabs analysis. The first and most important statement regarding HR actions was that, in some categories, we could not find significant differences between the countries. The ‘increase the number of staff’, ‘communication’ and ‘outsourcing HR activities’ answers were not significant (at a 5% significance level) when we used the crosstabs analysis with the country values. There were a couple of questions where the statistics showed significant results, but none of the countries had an interpretable pattern of answers. These were ‘change management’, ‘flexible working time’, ‘integration of the HR systems’, ‘talent management’, ‘restructuring and fusion’, ‘flexible bonus system’, ‘communication’, ‘performance management’ and ‘education of the management’ categories. In the remaining categories, we had significant but weak correlations between planned HR activities and the countries.

Table 3
Comparison of the Hungarian HR answers with the total sample

	Total	Hungary
Workforce development	27%	18%
Sphere of activities	25%	11%
Knowledge management	24%	16%
Changes in organisational culture	23%	15%
Competency management	20%	11%
Classification system	16%	2%
Career planning	12%	5%
Workforce reduction	34%	26%
Freeze in the number of staff	36%	37%
System of wages	30%	11%

SOURCE: Primary research by the authors

In the significant HR categories, Table 3 shows the difference between the Hungarian and the overall sample's accepted HR solutions. It seems that Hungarian companies wanted to make HR changes at the lowest rate. In the categories, all Hungarian positive answers were below average except the 'freeze in number of staff' category, where the result was almost the same (Table 3).

Romanian firms were very much in contrast and were the other extreme group of respondents. Here we found more 'yes' answers than expected in all significant and interpretable categories, except for the 'freeze in the number of staff' category (Table 4). In respect of 7 "tools", Romanian companies showed double the rate of the other countries.

Table 4
Comparison of the Romanian HR answers with the Total sample

	Total	Romania
Workforce development	27%	51%
Sphere of activities	25%	61%
Knowledge management	24%	55%
Changes in organisational culture	23%	45%
Competency management	20%	40%
Classification system	16%	55%
Career planning	12%	25%
Workforce reduction	34%	50%
Freeze in the number of staff	36%	26%
System of wages	30%	46%

SOURCE: Primary research by the authors

The other two countries were Bulgaria and Slovakia. Although Bulgarian companies were willing to change the 'organisational culture', use 'competency management', 'freeze staff numbers' and change the 'wages system' more than the overall average, Slovakian firms see the way out of the crisis less in 'knowledge management', in the 'change of organisational culture', in 'competency management', and in 'changing the classification systems' than the average (Table 5).

Table 5
Comparison of the Bulgarian and Slovakian companies' HR answers with the total sample

	Total	Bulgaria	Slovakia
Workforce development	27%	27%	25%
Sphere of activities	25%	23%	25%
Knowledge management	24%	25%	12%
Changes in organisational culture	23%	33%	9%
Competency management	20%	40%	5%
Classification system	16%	18%	8%
Career planning	12%	20%	9%
Workforce reduction	34%	30%	41%
Freeze in the number of staff	36%	49%	30%
System of wages	30%	47%	41%

SOURCE: Primary research by the authors

Regarding the *first hypothesis*, the last analyzed group of questions was the 'planned wage rise in the different levels of the organisations' questions. The crosstabs analysis showed weak, but significant correlations in all categories. In the survey, we separated seven organisational levels from the top management to the blue-collar workers. In all categories, respondents could set the percentage of the increase in wages that they planned to give to that specific group of colleagues. We were also interested to learn the general rate of increase for the whole organisation. The whole sample showed quite similar means and modes in almost all categories (Table 6).

Table 6
Planned wage rise for the different level of employees in 2009, in %

	All employees	C.E.O.	middle-level managers	sales employees	technical experts	administrative employees	blue-collar-workers
Valid N	516	454	435	424	426	443	422
Mean	2.8	2.8	3.0	3.1	2.9	2.5	2.6
Median	2.0	0.0	1.0	2.0	1.5	0.0	1.0
Mode	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOURCE: Primary research by the authors

We have already mentioned in previous headings that companies prefer a wage-freeze to, for example, dismissing colleagues. The most common item, the mode was 0%. That means wage-freezing is the most frequent choice of the respondents. 46.9% of the companies questioned had decided to freeze the wages of all employees. There is also a high rate of 0% wage-increase in other organisational levels. Regarding the median of the categories, chief executive officers and administrative employees will suffer most, whilst sales staff will have the highest (but still quite low) wage-increases. (This is, nevertheless, still lower than expected inflation figures.) It is important to mention in connection with top management that, except in a few countries, top managers tended to receive higher salary increases (Mercer, 2005). The present survey has also confirmed that this organizational level should also take a higher share of the consequences of the recession caused by the crisis.

In order to support the first hypothesis we analyzed the differences between wage increases by country. First, we categorized the different answers into three new categories (0%; from 1% to 4 %; and above 4%). Regarding the crosstabs analysis, we found significant but mainly weak country-related signs in each category. The first statement is that Bulgarian companies seemed to be the most gentle towards their employees (except the administrative workers category). Here the above 4% category was reached by a significantly higher value than expected. Fewer Bulgarian firms had chosen the '0% wage-rise' category than the average, and Romanian companies selected more extreme values. They used '0%' and 'above 4%' categories significantly more often than average in each related question (except for the administrative workers category). In contrast, Slovakian organisations took the middle road. The number of respondents choosing the '1-4%' category was significantly higher than the average. Hungarian organisations did not show as clear a picture as seen in the former three cases, and it seems that Hungarians would tend to give a lower-than-average wage rise, but it is not true in all categories. We can confirm this in respect of 'C.E.O.', 'middle managers', 'technical workers' and 'administrative workers'. The 'sales employee' category was around average for Hungarian companies. In the 'blue-collar' category the '1-4%' value was stronger than expected.

We were searching for country-specific differences in the crisis-related, planned and already undertaken actions of the companies. Analyzing the answers on the strategic actions question-category we have found several weak, but significant distinctions between the countries. However, in respect of planned HR action, crosstabs analysis became less significant, and in many cases we could not identify differences, although we still found some areas where organisations from different nations have other solutions. The 'planned wage-rise' values showed remarkable results in terms of differences. *To sum up, we say that the national origin of the companies influenced many of the answers. We do not say that this is the only factor determining the result, as all significant results had weak correlations, but the origin of the firms had a visible effect on their behaviour in times of crisis. The hypothesis is partly agreed.*

Organisation Size – Number of Employees

The second hypothesis involved examining another factor that might have an influence on the responses to the crisis. This is the number of employees in an organisation. From the literature, we know the different characteristics of complexity of the SMEs and MNCs (Hiltrop, 1991 and Wimmer and Zalayné, 2009). We assume that these characteristics play a significant role in the process of adaptation to the challenges. Here, we do not focus on such a wide number of questions as in the first hypothesis; we concentrate only on the correlation between dismissals and the number of employees. For this purpose we will again use crosstabs analysis as a statistical tool.

As seen in Table 7, the count rows differ from the expected values. However, in Table 5 only 34% of the companies said that workforce reduction is an appropriate way out of the crisis; even fewer (26% or 104 respondents) voted for this solution among companies with under 100 employees. This is more than 51% of the companies employing more than 500 people.

Table 7
The willingness to dismiss of companies by employee numbers

			Workforce reduction	
			No	Yes
Number of employees	below 100 employees	Count	291	104
		Expected Count	262.0	133.0
	100-500 employees	Count	49	46
		Expected Count	63.0	32.0
	above 500 employees	Count	42	44
		Expected Count	57.0	29.0
Total		Count	382	194
		Expected Count	382.0	194.0

SOURCE: Primary research by the authors

In the first part of the survey, respondents could indicate (on a 1-5 scale) how willing they were to use this tool. The crosstabs analysis of this question and the number of employees also supported the former statements. Companies with under 100 employees answered 'no' in higher-than-average numbers, and fewer said that dismissal is needed 'to a medium extent' or 'to a large extent'. The opposite trend is seen in companies with more than 500 employees.

Table 8
The strength of a company's willingness to dismiss by employee numbers

			Not at all	Small extent	Medium extent	Large extent	Very large extent	Total
Recorded number of employees	below 100 employees	Count	126	86	65	28	36	341
		Expected Count	107	86.3	77.6	38.8	31.4	341
	100-500 employees	Count	19	29	24	13	6	91
		Expected Count	28.5	23	20.7	10.3	8.4	91
	above 500 employees	Count	15	14	27	17	5	78
		Expected Count	24.5	19.7	17.7	8.9	7.2	78
Total		Count	160	129	116	58	47	510
		Expected Count	160	129	116	58	47	510

SOURCE: Primary research by the authors

To sum up, we can say that both analyses proved our second hypothesis. In our sample, companies with fewer employees tend to dismiss people less often than do larger companies.

Reactions to the Crisis – Behavioural Distinctions

After the first two hypotheses we searched for behavioural distinctions of the companies in a more sophisticated way. **Our third hypothesis** assumed that reactions of the companies to the crisis are not uniform. During the former crosstabs analyses, and the frequency analyses it seemed that some strategic actions by the companies tend in the same direction. To discover the connections we decided to use factor analysis. And we did, in fact, use principal component analysis and (for the rotation method) the varimax rotation with Kaiser normalization. As shown in Table 9, three factors were selected.

Table 9
Factor analysis of the strategic answers

Rotated Component Matrix				
		Factor		
		1	2	3
1	We do not need to do anything			-.837
2	Dismissals are needed	.792		
3	Postponement of the investment is needed	.720		
4	Cost reduction is needed	.717		
5	A wage-freeze is needed	.786		
6	increased marketing costs are needed		.750	
7	Entering new markets is needed		.801	
8	Adjustment of strategies is needed	.498	.427	
9	Organisational efficiency should be increased		.428	.503

SOURCE: Primary research by the authors

The most obvious interpretation was found at the first factor which consists of Questions 2-5 in Table 9. These were the typical belt-tightening questions, such as dismissal or cost reduction. *Therefore, we called this factor the “reactive responses”*. We had more trouble with grouping the questions into the remaining two factors. The first identified factor, the “reactive responses” factor led to the thought *that a proactive category should also exist*. The first two questions (6 and 7) of the second factor met this assumption perfectly, but we had some interpretation problems with question 8 and 9. Due to our logic, we pre-classified the ‘increase organisational efficiency’ and ‘adjustment of the strategies’ into the proactive category, but factor analysis showed that they do not have this obvious correlation. In our interpretation the ‘adjustment of strategies’ might have a dual meaning, depending on the direction of the change in strategy. It could belong to both the reactive and proactive categories, but from the literature review we felt this category relates more to the proactive. Based on factor analysis, ‘organisational efficiency’ has a stronger relationship with the third factor than with the second. Some researchers say that company reorganisation belongs more to the non-active phase of the life cycle of the organisations. It is more a reshaping

of the company in order to fulfil the requirements of earlier growth. Opinions such as these hold that this restructuring is not a true market activity. On the contrary, we think that increasing organisational efficiency is more proactive than non-active, as both internal and external actions should be seen as activities. Therefore, we included this question in the second factor. The name of this second factor became the “proactive responses” factor. This left only one question for the third factor, and it seemed that the “*we do not need to do anything*” question belongs to the third, so-called “passive” factor.

After establishing these new factors, we recoded the strategic type of question and answer into one new value (‘type of crisis-related organisational strategy’). First, we calculate averages from the answers to the question groups belonging to the ‘reactive’ and ‘proactive’ types of question. Next, we excluded those few respondents who had accepted the passive strategy to a ‘large’ or ‘very large extent’ and who, in the meantime, had had a larger average than 2.5 in certain cases, since staying passive and taking action at the same time is a logical misinterpretation of the survey. The respondents who only had a higher average than 2.5 in one of the groups of questions became reactive or proactive companies. There were companies where both groups reached a average higher than 2.5 and these respondents became the companies with mixed crisis-strategy. This type, the ‘mixed responses’, contained those companies willing to take both reactive and proactive actions.



Picture 2

Incidence of the chosen strategies in the sample

SOURCE: Primary research by the authors

Picture 2 already supports our 3rd hypothesis. Most companies followed a mixed strategy, and both reactive and proactive solutions were selected. In only 16% and 13% respectively were clear reactive or proactive actions in operation. It is interesting that 25% of respondents chose to stay passive.

To find new explanations for the different forms of behaviour, we continued searching the correlations with other factors. A cluster analysis did not suggest any relevant result, and we cannot identify a specific group of respondents based on their different characteristics. From the crosstabs analysis, we conclude that that field of activity, the ownership of the company, and the region of the operations has no correlation with the crisis-related action. Significant, but weak relations were found regarding the country of the company, the number of employees and the operating sector of the firm.

Table 10
Different strategies by the nationality of the company

			Country				Total
			Bulgaria	Romania	Slovakia	Hungary	
The strategy that the companies will use to reduce the effect of the crisis	Passive strategy	Count	18	11	14	101	144
		Expected Count	25.5	26.5	27.0	65.1	144.0
	Reactive strategy	Count	21		8		75
		Expected Count	13.3		14.0		75.0
	Proactive strategy	Count		23	9		95
		Expected Count		17.5	17.8		95.0
	Mixed strategy	Count		58	77	79	263
		Expected Count		48.3	49.2	119.0	263.0
	Total	Count	102	106	108	261	577
		Expected Count	102.0	106.0	108.0	261.0	577.0

SOURCE: Primary research by the authors

In Table 10 we have only reported the data where relevant differences from the average results were found. We conclude that fewer Bulgarian companies found the passive strategy to be appropriate in crisis times, but more found reactive actions to be better suited to circumstances than did the average. Romanian organisations agreed with the ‘passive’ solution less than the average, and indulged in stronger engagement with the ‘proactive’ and ‘mixed’ categories. There were significantly more companies in Slovakia where ‘mixed’ responses were agreed. In all of the mentioned three countries, the ‘passive’ category was a weaker-than-expected choice, but in Hungary, 101 companies – 55% more than expected – said that this was the right method to survive the current turmoil. In the same country the number of companies following the ‘mixed’ strategy was below average.

The nexus between strategy and company size is shown in Table 11. Companies with fewer than 100 employees tended to be ‘passive’ or ‘reactive’ and agreed less with the ‘mixed’ actions. The values of ‘passive’ strategy were lower than expected in the two remaining categories. The higher the number of employees, the more did firms tend to be ‘proactive’ or to agree with ‘mixed’ strategy more than the average.

The relation of the sector and the companies’ used strategy suggested some interesting results. Companies in the ‘manufacturing’ and ‘business service’ sectors were more oriented towards ‘passive’ behaviour than the average. On the other hand, the ‘energy’, ‘financial’ and ‘transport’ sectors selected ‘passive’ strategy more than expected. In the ‘finance’ and the ‘manufacturing’ sectors, we found fewer companies in the ‘reactive’ line. Companies working in the ‘commercial’ sector tend to be more ‘reactive’ than the average. The ‘proactive’ strategy and the working fields showed no differences of any note. ‘Finance’, ‘transport’, ‘energy’ and ‘business services’ were the activities where ‘mixed strategy’ occurred more than had been expected.

Table 11
Crisis-related strategies by the employee numbers

			Number of employees			Total
			below 100 employees	100-500 employees	above 500 employees	
The strategy that the companies will use to reduce the effect of the crisis	Passive strategy	Count	111	14	19	144
		Expected Count	98.8	23.7	21.5	144.0
	Reactive strategy	Count	59	9	7	75
		Expected Count	51.5	12.3	11.2	75.0
	Proactive strategy	Count	59	17	19	95
		Expected Count	65.2	15.6	14.2	95.0
	Mixed strategy	Count	167	55	41	263
		Expected Count	180.5	43.3	39.2	263.0
	Total	Count	396	95	86	577
		Expected Count	396.0	95.0	86.0	577.0

SOURCE: Primary research by the authors

To summarise, we conclude that crisis-related actions could be grouped into new value or factors. Although passive, reactive and proactive types of action occurred in the factor analysis, the frequency table showed that the largest group of companies mix their reactions. 45.6% of these used both proactive and reactive tools to reduce the effect of the crisis. Since mixed strategy does not have such clear and unique characteristics as do the other three, we found our third hypothesis acceptable. With the characteristics of the companies and the strategies, clear clusters could not be created. This statement also suggests the uniqueness of the responses. The crosstabs analysis identified weak, but significant, relations between the chosen strategy and the size of the company, the country and the industry of the operations. It means that these are the factors that influence the different strategies.

The Value Judgement of Reactive and Proactive Respondents

The third hypothesis identified three clear and one mixed type of strategy that companies might follow to reduce the impact of the current economic crisis. Two of them, the 'reactive' and the only 'proactive' strategies have quite different characteristics. Thus, 'reactive' and 'proactive' companies could be separated easily and include a possibility to analyze the attitudes and forecasts in connection with the turmoil.

The assumption of the fourth hypothesis is that reactive firms judge the crisis and the characteristics of the crisis differently than do proactive companies. To prove this, we compared the means of the 'reactive' and the 'proactive' companies' answers in the question groups:

- 'the possible effects of the spread of the economic and financial events,'
- 'the effects of these over the next 12-24 months.'

We used the statistical method t-test to find significant differences. From the 19 possible questions, we could identify six where significant differences could be

found regarding the perception of the crisis. ‘Proactive’ companies were more pessimistic regarding the effect of the crisis on growth than reactive ones. In this question respondents could mark three different answers; decrease (value 0); not remarkable (value 1); and increase (value 2). As can be seen in Table 12 the means of ‘reactive’ companies were higher by almost 0.5 than ‘proactive’ company answers. The next significant category was the ‘company’s expected rate of growth in 2009’. The range of possible answers was: ‘0%’ (value 0); ‘1-3%’ (value 1); ‘3-5%’ (value 2); ‘5-10%’ value 3); ‘10-15%’ (value 4) and ‘above 15%’ (value 5). We see that both ‘reactive’ and ‘proactive’ companies have a relatively low mean, but ‘reactive’ firms expected more in the way of increase, - or a smaller decrease - than ‘proactive’ forms. The survey offered an opportunity for companies to forecast the duration of the recession (higher values meaning a longer period). In this question the former statement was encouraged. Organisations with a more ‘proactive’ attitude predict a longer recession than do their ‘reactive’ counterparts. Domestic consumption is one of the major markets for most of the SMEs analyzed in our research. The other source of income could be foreign purchases. With regard to markets, we asked the companies to estimate the increase in these two types. The tendency continued: ‘Proactive’ companies had higher values – which meant that they expect the effect to a greater extent than do reactive companies.

Table 12
Differences in perception of the crisis between reactive and proactive companies

		Mean	t-value	Sig.
The effect of the crisis on growth	Reactive strategy	.6515	4.399	0.00
	Proactive strategy	.1889		
Expected rate of growth in return of a company in 2009	Reactive strategy	1.2568	2.838	0.00
	Proactive strategy	.6404		
Expected period of recession	Reactive strategy	1.5797	-3.122	0.00
	Proactive strategy	2.2151		
Decrease in domestic demand	Reactive strategy	3.3514	-3.506	0.00
	Proactive strategy	4.0745		
Decrease in foreign demand	Reactive strategy	2.2857	-2.863	0.00
	Proactive strategy	2.9659		
Weakening exchange rate	Reactive strategy	3.1370	-2.296	0.00
	Proactive strategy	3.6374		

SOURCE: Primary research by the authors

To summarise, we would say that only 1/3 of the potential crisis indicator answers showed significant differences between the proactive and the reactive tools-oriented companies. This means that the fourth hypothesis could be at least in part agreed. In those questions where significant differences were found, proactive firms were always more pessimistic. On the other hand, it also means that the companies in the sample forecasting lower growth, lower income, a longer recession and a stronger decrease in demand were planning in a more future-oriented way and have seen their strategy for survival in changing the former structures and breaking the mould.

Conclusions

The literature contains different statements regarding the characteristics and the formation of the crisis. It assumes differences between reactions to the crisis, based on sector, size and country (culture). We examined these observations in our empirical research based on answers from 566 Eastern European organisations.

Table 13
Summary of conclusions on hypotheses (H1, H2, H4 and H3)

	Hypotheses	Result
H1:	There are no country-specific reactions to the crisis; organisations in EE countries react similarly to the challenges set by the crisis.	Partly true
H2:	Companies with a small number of employees tend to use dismissal as a solution to the crisis less.	True
H3:	Reactions of companies to the crisis are not uniform.	True
H4:	Reactive companies judge the crisis and the parameters of the crisis than the proactive companies.	Partly true

In almost all cases the first hypothesis was partly true, suggesting that the country concerned was influencing many of the answers. As the answers did not show a correlation with the country factor in every case and also since the significant results had only weak correlations, we can say that the country is not the only factor that determines the result, although the origin of the companies had a remarkable effect on their behaviour in times of crisis. The hypothesis is partly agreed.

In the majority of cases, we found that our second hypothesis was true. Here the main factor examined was the size of the company, the number of employees in the organisations. Companies with fewer employees tend to dismiss people less readily than do the larger ones in our sample.

In almost all cases our third hypothesis was true, suggesting that reactions of companies to crises are not uniform.

In our fourth hypothesis we concluded that the companies forecasting lower growth, lower income, a longer recession and a stronger decrease in demand were planning more future oriented, have seen the survival strategy in changing the former structures and breaking the mould.

The results of our research may be useful for Hungary and for other Eastern European countries in identifying problems arising in HR practice as well as in drawing inspiration from the best practice of company management to the solution of their problems in times of crisis.

Limitations and Further Research

Our research results are based on web-survey-based empirical research in four Eastern European countries. Any efforts to draw general conclusions on this region or on any other globalizing region characterised by a great majority of respondents from the SME sector are premature.

Our research has a benchmarking profile. Benchmarking is a constant and systematic process for measuring competitiveness, and also those best practices in which an organization is most interested. This measurement – as described by Evans – analyzes, "how the company analyzed is doing (e.g., reward, employee satisfaction) what others are also doing" (Evans, 1977:14).

From the statistical aspect, the sample is big enough, although the sample stratification is disproportionate. This means that the numbers of respondents from the given countries in the whole sample are not equal to the proportions of the population of these countries. All things considered, however, we must concede that the sample is not totally representative of the four countries concerning its composition and the number of elements. Nevertheless, if we examine the list of companies participating in the survey, we can also understand that the companies taking part in the survey were so significant, that prospective changes will be relevant.

As for subsequent research, we have standardised our research approach for conducting a similar survey in several countries of the region, and a similar project is now underway. Data collection using a similar questionnaire has been initiated in Hungary, Slovakia and Romania also.

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Informal and Formal Institutional Measures of Business Ethics Implementation at Different Stages of Enterprise Life Cycle

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Abstract: During its activity, an enterprise passes through different life cycle stages, which differ in terms of management systems, formal structures, control systems, documentation of transactions, and number of procedural hurdles. Therefore, our main research problem focused on the differences in informal and formal institutional measures of business ethics implementation. We used the case study research methodology to explore the differences of informal and formal institutional measures of business ethics implementation at different stages of the enterprise life cycle. The pre-designed questionnaire was used to conduct face-to-face interviews with 40 managers who were in most cases also owners of the studied enterprises.

Keywords: enterprise life cycle; informal and formal measures of business ethics implementation

1 Introduction

In economic science, the biological life cycle is used for describing and explaining the developmental and growth changes of enterprises. Several authors refer to various life cycle stages of enterprises within which they then describe the different enterprise characteristics and problems. Pümpin and Prange [35], as well as other authors, argue that no uniform management model exists as an answer to problems of enterprises in different life cycle stages.

While opinions on the number and nature of specific stages in a life cycle differ, it is clear that organizational challenges and managerial approaches vary as the enterprise evolves [29]. These developments would also seem to have ethical implications, although little research has been done to address the relationship between life cycle stages and enterprise ethics.

Since science recognizes the fact that an enterprise passes through different life cycle stages, and that life cycle stages differ in terms of management systems,

formal structures, control systems, documentation of transactions, and number of procedural hurdles [29], our main research problem is focused on the differences in informal and formal institutional measures of business ethics implementation. Our research is also based research on the differences in ethical climate (as one of the important elements of business ethics implementation) over the enterprise life cycle stages [6], as well as on the results of research on business ethics implementation at different stages of the enterprise life cycle [5].

The first part of this contribution therefore deals with the argumentation of the enterprise life cycle phenomena. In the second part, the importance of the informal as well as formal institutional measures of business ethics implementation is argued, and in the third part, the empirical research and the research results are presented. Following the introductory chapter, the second chapter briefly discusses the underlying theories and concepts, reviewing and discussing the existing research on enterprise life cycle, as well as developing hypotheses. The third, fourth, and fifth chapter present the methodology, sample and data collection, and the results of empirical testing of the hypotheses on differences considering the stage of enterprise life cycle. The last chapter outlines the most significant conclusions and suggests direction for future research.

2 Theoretical Background and Hypothesis Development

Implementing business ethics ought to be part of a change in enterprise policies and embedded in workplace routines. In implementing enterprise ethics, [31] distinguishes between: *formal* and *informal* organizations. Other academics and acknowledged researchers, as well as scientists (e.g., [25, 40, 41, 42, 43]), have developed methods for implementing enterprise ethics and divided them into three categories: *the formal method* (or control) that includes training and courses on the subject of ethics, means of enforcement, conferences and ethics officers; *the informal method* that includes an example, set by the manager, and social norms of the organization; and *the personal method* which encompasses controls that lie within the individual rather than those determined by the organization (e.g. the personal ethical standards of an individual).

Informal methods play an important role in the socialization process, in which “other employees” or people, co-workers, etc. play a major role as “sources of, or references for ways of thinking, feeling, perceiving, and evaluating, and as an audience which may be physically present or absent in any interaction, but towards which an actor orientates their conduct” [12]. Mechanisms of informal control may include a social dimension through which superiors regulate the behaviour of subordinates, or employees regulate the behaviour of their peers through daily interaction in compliance with the enterprise’s norms or values.

According to Adam and Moore [1], the enterprise can employ diverse mechanisms of control, ranging from documents that specify the ethical code of conduct, which are used in the course of training, through the evaluation of employees' performance, and up to enforcement procedures. Some controls (e.g. those used in selection and recruitment routines) appear early in the process of evaluating candidate's actions and attitudes. The three routines of *formal methods* (recruitment, selection, and training) are very important in the process of employee socialization, which takes place in the first year of their membership in the organization [1]. Sims and Keon [36], who argue that such measures are important forms of communicating an enterprise's expectations for employee decision-making, support the importance of formal measures of business ethics implementation. Such high importance is given to the formal measures of business ethics implementation especially due to the research on the correlation between formal measures and performance [21, 28, 44, 47, 48], which revealed that enterprises with well-developed formal measures of business ethics implementation recorded better performance. The enterprises that stress ethics have better images and reputation and yield higher long-term interests. Researchers have shown that employees' ethical awareness and decision-making intent are influential on company performance, where in the absence of ethics, the individuals tend to promote their self-interests at the expense of others in the enterprise when resources are unevenly distributed.

In accordance with these findings, Morris [29] developed the framework of ethical structures, which defines informal ethical structures as structures that affect the atmosphere in a business, where formal ethical structures are considered as concrete and direct measures that establish ethical behaviour: a mission statement, a code of conduct, policy manuals for ethical issues, anonymous hotlines, ethical standards, managers responsible for ethical issues, training programs on ethics, and sanctions for transgressions.

According to Thommen [39], measures of business ethics implementation can be divided into two groups: *institutional* and *structural* measures. Under the term institutional measures, Thommen [39] understands measures and instruments that support enterprise credibility strategy implementation, such as: code of ethics, enterprise culture, SA8000, and human resource measures. In general, he divides institutional measures into preventive and support measures. The first group of measures gives all enterprise stakeholders direction for behaviour: it supports the proper way of behaviour on one side, and imposes sanctions for improper behaviour on the other. The purpose of preventive measures is obviously to prevent non-credible behaviour. The second group of measures, the support measures, helps and supports the credible behaviour. This group of measures enables the maximum credible functioning of the enterprise, and creates an optimal environment for obtaining credible functioning.

Belak's [5] framework of business ethics implementation examines the informal and formal measures of business ethics implementation, containing Thommen's

[39] institutional as well as structural measures of business ethics implementation, measures and instruments as defined by Morris *et al.* [29], as well as measures as defined by other relevant literature on business ethics implementation [25, 30, 31, 40, 41, 42, 43]. The formal measures of business ethics implementation define several criteria for an effective compliance program [24, 29, 39]: a statement of the enterprise's core values, a compliance manual, a code of conduct, a mission statement, anonymous hotlines, job descriptions, selection of employees, training in ethics, evaluation of ethical behaviour, an ethics committee, an ethics audit, sanctions for ethics abuse, ethics standards and indexes, policy manuals for ethical issues, an ethics consulting service, an ombudsman and ethic advocate, and a manager responsible for ethical issues. Maister [26] supports the importance of consistency between mission, vision, enterprise values, and culture. In our research framework, we determined ethical core values that enterprises follow, ethical climate as the atmosphere needed for ethical behaviour, and an enterprise culture that also defines the rules of ethical behaviour as the sole basis and starting point of the emergence of formal as well as informal measures of business ethics implementation.

The theoretical framework of our research was made based on Thommen's model of credibility strategy implementation [39], on Morris's [29] developmental framework of ethical structures, on the framework of business ethics implementation developed by Belak [5] and on some other measures as defined by other relevant literature on business ethics implementation [25, 30, 40, 41, 42, 43].

2.1 Informal Measures of Business Ethics Implementation

Based on the research results discussed previously in the text, the informal measures of business ethics implementation examined in the empirical part of our research are: manager concern/role-modelling, candid ethical communication, ethics as a topic of employee conversation, reward and penalty systems, and the communication of stories.

Manager concern / role-modelling

The importance of a manager's clear commitment to ethical values has been subject to much research showing that it is especially important for top management/leaders to demonstrate ethical behaviour. Trevino, Hartman and Brown [43] distinguish two pillars of ethical leadership. The first pillar is a moral person with traits (e.g. integrity), proper behaviour (e.g. does things in the right way) and decision-making (incorporates values). The second pillar is a moral manager with several supportive characteristics, one of which is being a visible and positive role model in the firm. Other established researchers have noted the importance of top management being good role models as well [13, 29]. Managers who engage in immoral behaviour encourage subordinates to do the same. Their words about ethics and morality will therefore not be taken seriously.

Candid ethical communication

Trevino's research [43] establishes that another supportive characteristic of a moral manager is the ability to communicate about ethics and values with other members of the enterprise. The author argues that the message that values should guide all decisions must begin at the top. Furthermore, communication of management on all levels is necessary to close the gap between what is said and what is actually done in the firm. Candid communication is the only way to inspire employees and build their trust.

Ethics as a topic of employee conversation

Informal conversations among employees play an important role in the ethical life of the firm [42]. This role can be viewed as positive, resulting in support for formal ethics activities, or negative, resulting in indifference or active resistance among employees.

Reward and penalty systems

A reward system is an important tool in rewarding the employees on specific occasions when they positively resolve conflicts or dilemmas by implementing ethical behaviour. Trevino and Nelson [42] argue that this ethics implementation tool should be used to only a limited extent – but is important in influencing the preferred types of behaviour in the future. One such type is exemplary behaviour, a specific individual act that goes beyond management expectations and reflects the core values of the enterprise. On the other hand, such a system must assign punishment for misbehaviour. Sanctions for code violations are necessary and must be enforced to the letter of the code [39]. Managers who avoid disciplinary situations may be sending a powerful signal to their subordinates that misbehaviour is acceptable.

Communication of stories about ethical employees

Employees who go out of their way to exemplify the core values are heroic figures, worthy of recognition in the enterprise. The mechanism for doing this is telling stories [10]. By transmitting what is proper behaviour throughout the enterprise, they serve as an important resource for ethical purposes. Stories may be told about ethical leaders or by leaders to provide appropriate examples for others to emulate.

2.2 Formal Institutional Measures of Business Ethics Implementation

Based on the research results discussed previously in the text, the formal institutional measures of business ethics implementation examined in the empirical part of our research are: the core value statement, the mission statement, the code of ethics, compliance manuals, and ethics standards and indexes.

Core value statement

Effective enterprises identify and develop a clear, concise and shared meaning of values/beliefs, priorities, and direction so that everyone understands and can contribute. Once defined, values influence every aspect of an enterprise, which must support and nurture this impact or identifying the values will have been a wasted exercise.

Mission statement

A mission statement is a management tool that usually includes the enterprise's values and philosophy [4, 14, 29]. According to Dalla Costa [15], this tool is appropriate for enterprises that have a history of integrating values into their decisions, and not suitable for enterprises where such a history does not exist. Wheelen and Hunger [46] argue that an enterprise's mission statement may also include a business's philosophy about how it does its business and treats its employees. This puts into words not only what the enterprise is now, but also what it wants to become – management's strategic vision of the enterprise in the future. In the authors' opinion [46], a mission statement promotes a sense of shared expectations in employees, and communicates a public image to important stakeholder groups in the enterprise's task environment.

Code of ethics

A code of ethics as one business ethics implementation tool has been subject to much research in the past [27, 29, 30, 40]. The research conclusions show that more than 90% of enterprises have a code of ethics or some type of ethics statement [29]. Another important research insight is that the mere presence of an ethics code has a positive impact on enterprise ethics [2]. The code of ethics is an instrument for implementing business ethics within the enterprise, as well as in the enterprise's environment. According to Thommen [39], the code of ethics is the best-known instrument for improving and achieving the enterprise's ethical behaviour. It contains ethical principles that should be followed by certain enterprise behaviour. Also in Staffelbach's [37] opinion, the code of ethics is one of the most important instruments for business ethics implementation.

Compliance manuals

Researchers in the field of enterprise ethics have realized that many enterprises use compliance manuals to communicate relevant rules, to emphasize important policies, or to make these policies understandable [29, 42]. Some researches show that such manuals are widely distributed in large firms ([45] research on a sample of Fortune 500 Industrial and Service firms).

Business ethics standards and indexes

Over the past decade, many varied initiatives and standards regarding enterprise ethical behaviour and corporate social responsibility have occurred. It is important to emphasize that shared and internationally accepted standards on enterprise

ethics do not yet exist. However, there are several standards and initiatives in this field which should be considered when examining the enterprise's ethical behaviour. From the notion of corporate social responsibility (CSR), it is possible to derive the complementary concept of accountability, which means that the enterprise is held accountable for its actions. If enterprises want to manage CSR and sustainability issues and obtain the trust of their social stakeholders, they must not only communicate, but also give concrete evidence that they are committed to continual, long-term improvement. It becomes crucial to measure the enterprise's capacity to meet the stakeholders' needs, and to create a balance between what the enterprise offers and what it receives from the social system [33]. The many different approaches to CSR and the fact that it is generally a voluntary tool that measures the social impact of enterprises – and thus subject to the influence of specific variables of a cultural, political, and economic nature – have made it impossible for a generally accepted model of social reporting to develop. To measure the performance of enterprises in matters of business ethics, several ethical indexes have been introduced in North America and Europe: the Domini 400 Social Index (DSI), the Citizens Index, the Dow Jones Sustainability World, the Jantzi Social Index (JSI), the Triodos Sustainable Investment Index, the Ethical Index Euro, the Ethibel Sustainability System, ASPI Eurozone, the CSR Rank of Slovenian Enterprises, etc.

2.3 Enterprise Life Cycle and Business Ethics

Pümpin and Prange's concepts of the enterprise life cycle described in their latest work [45] have been used by various Slovenian scientists and researchers. Pučko [34] and Duh [16] in particular derived from it important discussions and research. With the application of ideas from these enterprise developmental models, Duh [17] developed her own Developmental Model of Family Enterprise.

Cathomen [in: 22] differentiates between *organizational and technology* life cycles. He categorizes the organizational life cycle into: life cycle of products, organizations, branches and industries, as well as resource potentials. His concepts focus on the establishment/beginning and aging of enterprises and organizations, which in time change from entrepreneurial to bureaucratic organizations. In technology life cycles, the author [Cathomen in: 20] differentiates between: the life cycles of technologies, systems, costs and processes. In his classification, the author proposes a combination of economic and managerial ideas, as well as ideas about the enterprise life cycle (the enterprise's part systems, and its environment).

With the life cycle concept, the life of an enterprise is presented, alluding to its growth and development – a business changes qualitatively and quantitatively. Most authors explain both terms in combination with an enterprise life cycle and combine these phenomena in their models of the enterprise developmental cycle.

In his model of enterprise development, Bleicher [8, 9] distinguishes six developmental stages. Each stage has its own context, at the end of every stage, the enterprise faces specific problems. If the crisis at the stage transition is not managed correctly, the enterprise can regress to a previous stage or even reach the stage of decline – and, consequently, bankruptcy. During the first three developmental stages, the enterprise is capable of developing from its own strengths – these are called the stages of internal development [8]. In the author's opinion, further enterprise development is possible only by the acquisition of and cooperation with other enterprises, and by common exploitation of business opportunities; hence, we can speak of external enterprise development. In the last developmental stage, the enterprise shrinks and consolidates after unsuccessful external development, or it divides into specific parts. At every developmental stage, its management faces specific problems that are reflected at the normative, strategic, and operative management levels.

Thommen supplemented Bleicher's developmental model with the components of the strategy, the structure, and the culture of an enterprise at a certain developmental stage. In Thommen's opinion, it is not only strategic decisions that develop the business life cycle. An enterprise witnesses changes in its structure and culture when passing through various developmental stages. For example, in small enterprises where the founder (pioneer) has a strong impact on management, stakeholders, and business strategy, the enterprise can act in a very flexible manner [39].

Pümpin and Prange [35] developed their model of business development within the framework of the St. Gallen concept of integral management. They distinguish four enterprise configurations which are suitable for describing an enterprise's developmental stages. Pümpin, Prange [35] named these stages pioneer, growing, mature, and enterprise in turnover. In the authors' opinion [35], enterprise development is defined by its use of business opportunities. The enterprise should always exploit environmental and internal change, from which new business opportunities occur. Because business opportunities follow their own life cycle, which in the end leads to the stage of decline, it is essential for an enterprise to search for and discover new business opportunities [16].

As regards the above theory and scientific studies on enterprise life cycle, some research on issues of business ethics has been undertaken. Considering the characteristics of the different enterprise life cycle stages, Belak [5] argues that business ethics implementation also differs in term of life cycle stage. The research results [5] show differences in enterprises' core values, climate, and culture, as well as in informal and formal measures of business ethics implementation at different stages of life cycle. Further, Belak and Mulej [6] also argue that there are differences in ethical climate at different stages in the enterprise life cycle. In a study of family enterprises, Duh and Belak [7, 18, 20] show differences in enterprise core values, ethical climate and enterprise culture between family and non-family enterprises. Further research on Slovene family

enterprises shows [18] that enterprises in the first generation are the most prevalent; therefore, we can argue that the majority of Slovene family enterprises are enterprises in the pioneer stage of their life cycle stage and that differences should occur concerning the life cycle category.

Considering the theory and research results stated above, we propose the following hypotheses and sub hypotheses:

H1: The existence and use of informal institutional measures of business ethics implementation differ according to the enterprise's life cycle stage.

H1a: Manager concern / role-modelling presence differs according to the enterprise life cycle stage.

H1b: Candid ethical communication presence differs according to the enterprise life cycle stage.

H1c: Ethics as a topic of employee conversation differs according to the enterprise life cycle stage.

H1d: Reward and penalty systems differ according to the enterprise life cycle stage.

H1e: The communication of stories about ethical employees differs according to the enterprise life cycle stage.

H2: The existence and use of formal institutional measures of business ethics implementation differ according to the enterprise's life cycle stage.

H2a: Mission statement presence differs according to the enterprise life cycle stage.

H2b: Code of ethics presence differs according to the enterprise life cycle stage.

H2c: Compliance manuals presence differs according to the enterprise life cycle stage.

H2d: Business ethics standards and indexes presence differs according to the enterprise life cycle stage.

H2e: Core value statements are present to a greater extent in non-family businesses than in family businesses.

3 Research Methodology

For our research on the differences in informal and formal institutional measures of business ethics implementation in enterprises in four different life cycle stages, we decide on a mixed methods inclusion that proves to be a useful approach (e.g. [10]). The use of case studies is recommended in combination with quantitative methods since the undertaking of case studies adds qualitative evidence to help understand the research results (e.g., [15]). Therefore, we combine a multiple case study approach (as proposed by [49]), when replication logic was possible, with quantitative methods. Chi-square analysis was used to test independent samples for differences between enterprises in the four life cycle stages. In addition, one-

way ANOVA was used to establish the differences between businesses in different stages of a life cycle.

The questionnaire which was used for conducting interviews was divided into four parts. In the first part, the following demographic data of enterprises in the sample were collected: legal form, main activity, number of owners, percentage of family ownership, perception of enterprise as a family one, and data on size. In the second part of the questionnaire, the enterprise life cycle stage was determined using Puempin and Prange [35]. Using the proposed methodology, we were able to confirm specific findings in a frame of different enterprise life cycle stages, where we examined quantitative (the age of enterprise, size, etc.) as well as qualitative (management behaviour, and its attitudes towards problems, characteristics) characteristics of the examined enterprises (see also Belak and Mulej [6]).

In the third part, we examined the presence of the informal measures of business ethics implementation: managerial concern about ethics, candid communication on ethical issues between management and employees, ethics as a topic of conversation between employees, the existence and importance of a reward and penalty system, as well as communication of “ethical” stories. The questions were closed-ended where the respondent defined the presence of the informal measure of business ethics implementation with a YES or NO answer.

The next part of the questionnaire was designed to determine the presence and the use of the formal institutional measures of business ethics implementation: core value statement, written mission statement, code of ethics, compliance manuals, business ethics standards and indexes. The questions were closed-ended as well as open, and the respondent defined the presence of the listed formal measure of business ethics implementation with a YES or NO answer. Open questions were inserted to explain the YES or NO answers.

Since various authors (e.g. 2, 32]) emphasize the firm size as an important source of variation in organizational behaviour, we took the firm size as the controlling variable in our research. By controlling for organization size (measured by the number of employees), we were able to determine that the similarities and differences in informal and formal institutional measures of business ethics implementation between our four sub-samples were due to life cycle stage (pioneer, growing, mature, turn over), and not due to organization size.

4 Sampling and Data Collection

For the purpose of this study, judgmental sampling was used, in which population elements were selected based on the expertise of the researchers. We believe that, by using such a procedure, the representative enterprises of the population were

included. Data were collected through in-depth case studies, including face-to-face structured interviews with 40 managers (in many cases, the respondents were also owners) of Slovenian enterprises. The basis for conducting interviews was the pre-designed questionnaire previously discussed herein.

Table 1
Distribution of research sample by status (life cycle stage) and size

Life cycle stage (LCS)		Size				Total
		Large	Medium	Micro	Small	
Pioneer	Count	0	1	6	3	10
	% within LCS	,0%	10,0%	60,0%	30,0%	100,0%
	% within size	,0%	11,1%	60,0%	18,8%	25,0%
Growing	Count	4	6	2	10	22
	% within LCS	18,2%	27,3%	9,1%	45,5%	100,0%
	% within size	80,0%	66,7%	20,0%	62,5%	55,0%
Mature	Count	1	1	2	2	6
	% within LCS	16,7%	16,7%	33,3%	33,3%	100,0%
	% within size	20,0%	11,1%	20,0%	12,5%	15,0%
Turn over	Count	0	1	0	1	2
	% within LCS	,0%	50,0%	,0%	50,0%	100,0%
	% within size	,0%	11,1%	,0%	6,3%	5,0%
Total	Count	5	9	10	16	40
	% within LCS	12,5%	22,5%	25,0%	40,0%	100,0%
	% within size	100,0%	100,0%	100,0%	100,0%	100,0%

Out of 40 enterprises, 10 (25.0%) were defined as being in the pioneer life cycle stage, 22 (55.0%) in growing life cycle stage, 6 (15.0%) in mature life cycle stage and 2 (5%) in turn-over life cycle stage. The number of employees was the measure of the size of the examined enterprises, where micro enterprises were enterprises with 0 to 9 employees, small enterprises had 10 to 49 employees, medium-sized enterprises had 50 to 249 employees, and large enterprises had more than 250 employees. The distribution of the sample by size is presented in Table 1.

The main business activities of the enterprises examined were manufacturing (5 enterprises), construction (7 enterprises), wholesale/retail (4 enterprises), financial intermediation (7 enterprises), hotels and restaurants (2 enterprises), and "other" (15 enterprises). However, the structure of the sample regarding the activity did not allow for an analysis of the differences in informal and formal measures of business ethics implementation due to the businesses' primary activities.

5 Research Results

Concerning hypotheses H1, 100 % of companies in the pioneer life cycle stage and 95.5 % of companies in the growing life cycle stage claimed that manager role-modelling is present in their businesses. Contrary to this, 83.3 % and only

50 % of respondents in mature and turn-over life cycle businesses have manager role-modelling present. χ^2 analysis performed shows that the difference is statistically significant at $p < 0.10$ ($\chi^2=7.022$), which means that we can claim support for H1a.

The frequency of candid ethical communication was measured on a scale from 1 (infrequently) to 3 (very frequently). Results show that this type of communication is to a small extent more frequent in growing businesses. One-way ANOVA indicates that this difference between the mean values (pioneer life cycle stage mean value: 1.30, growing life cycle stage mean value: 1.50, mature life cycle stage mean value: 1.17, and turn-over life cycle stage mean value: 1.00) is not statistically significant. Therefore, hypothesis H1b was rejected.

Ethics is a topic of employee conversation in only 10.0 % of pioneer life cycle businesses and in 22.7 % of growing life cycle stage businesses. In companies in mature life stage this percentage is 16.7 % and none of the companies in the turn-over life cycle claimed that in their company ethics is a topic of employee conversation. The difference between the businesses is not statistically significant ($\chi^2=1.222$; $p>0.01$). Therefore, hypothesis H1c was rejected.

As regards reward systems based on ethical standards, 20.0 % of pioneer businesses, 40.9 % of growing businesses, 16.7 % of mature businesses and none of the turn-over businesses reward their employees according to ethical standards. The chi-square (3.088) value is not statistically significant. In pioneer (in 50.0 % of cases) and in growing businesses (in 68.2 % of cases) non-ethical behaviour of employees is, however, punished, more frequently than in mature businesses (in 33.3 % of cases) and in turn-over businesses (who do not punish unethical behaviour). Chi square statistics once again is not statistically significant ($\chi^2=5.228$; $p>0.01$) and in accordance to that, hypotheses H1d was rejected.

The communication of stories about ethical employees differs between companies concerning the company life cycle. According to respondents, this behaviour can be observed in 40.0 % and 63.6 % of the pioneer and growing businesses, respectively, and in 66.7 % and 0 % of the mature and turn-over businesses, respectively. However, the chi square test of differences between the businesses is not statistically significant ($\chi^2=4.346$; $p>0.01$). Hypothesis H1e was therefore rejected.

In the case of formal measures of business ethics implementation, a mission statement is present in 30.0 % of the pioneer businesses, in 60.0 % of the growing businesses, in 50.0 % of the mature businesses and in none of the turn-over businesses. The chi square test shows that the difference between the businesses in the four life cycle stages is not statistically significant ($\chi^2=4.307$; $p>0.01$). Therefore, hypothesis H2a was rejected.

20.0 % of the pioneer businesses, 18.2 % of the growing businesses, 16.7 % of the mature businesses, and none of the turn-over businesses have a code of ethics. The

difference is not statistically significant ($\chi^2=0.478$; $p>0.01$). Therefore, hypothesis H2b was rejected.

Compliance manual development can more often be found in growing (mean value 1.64) and in mature businesses (mean value 1.67) in comparison to pioneer (mean value 1.50) and turn over (mean value 1.00) businesses; however according to one-way ANOVA, the difference between the businesses as regards the life cycle stage is not statistically significant ($F=0.488$; $p>0.05$). Hypothesis H2c was therefore rejected.

None of the businesses in the four categories has acquired any ethical standard. Concerning the familiarity of standards, the results are as follows:

- 30.0 % of respondents in the pioneer businesses, 9.1 % of respondents in the growing businesses, 16.7 % of respondents in the mature businesses and none of the respondents in the turn-over business know Ethical Index Euro (there are no statistically significant differences between any of the types of businesses),
- only 10 % of respondents in the pioneer businesses and none of respondents in the businesses in the other life cycle stage categories know the Ethibel Sustainability Index (ESI) (there are also no statistically significant differences between any of the types of businesses),
- only one respondent in the mature businesses and none of the respondents in the other categories know the Aspi Eurozone (Advanced Sustainable Performance Indices), and therefore also in this case there are no statistically significant differences,
- 50.0 % of respondents in the pioneer and growing businesses, 33.3 % of respondents in the mature businesses and none of the respondents in the turn-over businesses know the Slovenian corporate social responsibility index. Chi-square statistics shows that also this difference is not statistically significant.
- only a small number of respondents in the sample (10.0 % in the pioneer businesses, 9.1 % in the growing business, 33.3 % in the mature businesses and none in the turn-over businesses) know the Social Accountability 8000 (SA8000) index.

A core value statement is present to a greater extent in the growing businesses (in 31.8 %) and the mature businesses (in 50.0 %). Only 10.0 % of the businesses in the pioneer life cycle stage and none of the businesses in the turn-over life cycle stage have a core value statement. A chi-square test shows that the difference is not statistically significant at $p<0.05$ ($\chi^2=4.024$). Hypothesis H2e can therefore not be supported.

Our research concerning firm size showed that in two cases statistically significant differences between micro, small, medium and large enterprises are present. A mission statement is present in all the large companies, in 63.3 % of the medium-

sized companies, in 33.3 % of the small companies and in 33.3 % of the micro companies. Results of a chi square test ($\chi^2=10.135$) suggest that the difference between large companies and medium, small, and micro sized companies is statistically significant at $p<0.05$. 85.7 % of the large companies have a core value statement, while only 9.1 % of the medium-sized, 22.7 % of the small-sized, and 22.2 % of the micro companies have mission statements. The difference between large and medium, small and micro companies is statistically significant ($\chi^2=13.791$; $p<0.01$).

Conclusions, limitations and directions for future research

The presence/non-presence of studied measures enable us to make some conclusions regarding the efforts undertaken in the studied enterprises in order to behave ethically. Our research revealed only one statistically significant difference regarding informal and formal measures of business ethics implementation, which is manager concern/role-modeling. The role-modeling is present more greatly in the pioneer and growing enterprises than in the mature enterprises and enterprises in turn over.

The research results show no statistically significant differences in the other examined measures between family and non-family enterprises. However, research results revealed that certain informal as well as formal measures of business ethics implementation are used to a greater extent to encourage and control ethical behaviour than others.

Despite this fact, as regards the informal institutional measures of business ethics implementation, the research has shown that manager role-modeling and reward systems based on ethical standards are to some extent more present in enterprises in early (pioneer and growing) life cycle stages than in enterprises in late (mature and turn over) life cycle stages. As regards the role-modeling, the results are understandable since the demonstration of ethical behaviour by the management is above all important in early phases of organizational culture creation. In that phase, family enterprises are usually smaller and the contacts between employees and management are more frequent. In addition, we can assume that there is a general lack of material for stories about ethical or unethical behaviours of employees. Higher revenues in the growing phase of the life cycle enable management to develop adequate reward systems to stimulate the desired ethical behaviour.

Candid ethical communication on the other hand is most frequent in enterprises in the mature life cycle stage. Such enterprises more often use communication of stories about ethical or unethical employees in order to foster ethical behaviour. The last two measures are very important since they can both be placed under the concept of corporate culture.

Concerning the formal institutional measures of business ethics implementation, a mission statement is mostly present in growing and mature enterprises and only

quite rarely in pioneer enterprises. This finding is to some extent surprising, since one would expect that smaller enterprises in pioneer life cycle would also have a clear vision and mission, which would enable them to clarify and develop proper objectives. Concerning compliance manual development, research results also showed that the vast majority of companies in Slovenia, especially those in late life cycle stages, are not well acquainted with ethical standards. This is above all true for European ethical standards.

The results of our research are based on self-assessments, which were the only possible alternative, and these unfortunately could not be questioned or tested by outsiders' evaluation, especially in the case of informal measures of business ethics implementation.

The research presented herein serves as the first step toward an in-depth study of the differences in informal and formal institutional measures of business ethics implementation as it relates to the enterprise life cycle stages. We see our findings (with all limitations taken into account) as preliminary in nature, with further empirical work needed.

Future research should be oriented towards the examination of the effectiveness of formal and informal measures of business ethics implementation. These measures should not be studied in isolation; Kaptein and Schwartz [23] call attention to the studies of the Ethics Resource Centre, which found that when the implementation of a code of ethics is not supported by other measures, it had a negative effect on employee perception of ethical behaviour in the workplace. When ethics training and an ethics office supported the ethics code, the code had a positive effect on employee perception. To achieve the optimal performance with ethical behavior support, businesses should never implement measures of business ethics as isolated tools, but rather only in the frame of a full and complete ethics program. The initiated business ethics measures must be correctly adjusted and coordinated, as well as integrated, in a common business ethics concept, program or plan. An enterprise's top management can be considered as the "agent" responsible for the harmonization of stakeholders' interests (as well as different cultures); therefore, we argue that the formulation and implementation of an ethics program strongly depend on the top management. In our opinion, the top management can also be considered as the executor of the enterprise's culture (values and norms initiated by the enterprise owners), which represents one of the most important elements in the context of an enterprise's ethical behaviour. Our research results therefore give managers and owners an overview and the knowledge of how to manage their business ethics in relation to the enterprise's characteristics in different enterprise life cycle stages.

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The Effect of FDI, Exports and GDP on Income Inequality in 15 Eastern European Countries

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Abstract: In this paper I explore the relationship between FDI, exports, GDP and income inequality in Eastern European countries. The empirical test shows positive and significant relations between increasing income inequality and increasing level of FDI stock in Eastern-European states. In general, supporting previous publications in this area, I found that export intensity acts to decrease wage dispersion, while the local effects could be different from the regional effects. Higher levels of GDP has only a slight effect on the GINI index. Besides between FDI inflow and GINI index, the relation was not demonstrable. In common with previous empirical analysis, I found evidence of the higher level of high-technology export's diverting effect on income inequality.

Keywords: FDI; income inequality; Eastern Europe

1 Introduction

The ceaseless globalization process is having far-reaching implications on the welfare status of the citizens of the countries of the world. As a result of this process, since 1990 alternative development indicators have come to the front. Numerous publications have espoused that the development of a country cannot be described satisfactorily with classic economic growth indicators. Factors like inequalities in wages, working conditions, freedom and low levels of discrimination become more and more important in measuring development and are the subject of public debate.

In this discussion, the impact of globalization on inequality has been widely examined, both across countries, comparing developed and developing countries, and within countries, comparing the returns to skilled and unskilled workers.

The promoters of anti-globalization argue that the increasing integration of the world economy widens the gap between the poor and rich. Although globalization may improve overall incomes, the benefits are not shared equally among the citizens of a country, with clear losers in relative and possibly even absolute terms.

According to the anti-globalization opinion, the main enemies are multinational companies, foreign capital and foreign direct investment. The threat that the borders are no longer obstacles for the capital leads to a decrease in the bargaining power of labor. Moreover, widening income disparities may not only raise welfare and social concerns, but may also limit the drivers of growth because the opportunities created by the process of globalization may not be fully exploited. The sustainability of globalization will also depend on maintaining broad support across the population, which could be adversely affected by rising inequality. [1]

The supporters of globalization claim that globalization leads to a rising tide of income, which raises all boats. Hence, even low-income groups come out as winners from globalization in absolute terms. Through foreign direct investment countries and regions can get the chance to reach the standard of living levels of the developed countries. International trade contributes to the optimal usage of the natural and human resources, which leads to a higher level of growth. This optimistic view has parallels with Kuznets's hypothesis from the development literature, which proposed that even though inequality might rise in the initial phases of industrial development, it eventually declined as the country's transition to industrialization was completed.

The statistical figures prove that increased trade and capital movements have led to grater specialization in production and the elements of a modern supply chain are usually established in geographically distant locations.

The following table summarizes the empirical results:

Table 1
Summary of the empirical results

Positive impact	Negative impact
<p>FDI helps to reduce income inequality when implemented to utilize abundant low-income unskilled labor. [2]</p> <p>FDI stimulates economic growth and its benefits eventually spread throughout the whole economy. [3]</p> <p>New investments create new workplaces for low-skilled labor. [4]</p> <p>A non linear effect is identifiable in developing countries, wage inequality increases with FDI inward stock but this effect diminishes with further increases in FDI. [5]</p>	<p>Inward FDI deteriorates income distribution by raising wages in the corresponding sectors in comparison with traditional sectors. [6]</p> <p>Raising foreign capital inflows results in rising wage inequality. [7]</p> <p>Foreign trade and FDI are important factors contributing to the widening regional inequality in China. [8]</p> <p>Empirical study of Mah [9] showed that foreign trade and FDI inflow had significant deteriorating impact on the income distribution.</p> <p>By analyzing the United Kingdom's manufacturing sector Taylor and Driffield [10] found that the FDI inflow had significant effect on the wage inequality.</p> <p>For developed countries, wage inequality decreases with FDI inward stock and there is no robust evidence to show that this effect is non-linear.</p>

2 Analyzed Factors

In this study I analyzed the effect of foreign direct investment and the foreign trade on income equality in the case of 15 Central and Eastern European countries [11]. In the analysis I verified the validity of the following hypotheses:

Hypothesis 1: Increasing economic openness decreases the level of inequality.

After 1990 the analyzed countries opened their economies to FDI, and through different forms of privatization the level of the private ownership also increased significantly. The relationship between FDI, foreign trade and the local economies were widely analyzed [12]. In theory, if we assume a simple two-factor model (capital and labor), free trade and free capital flows have clear consequences. In developed countries that have large endowments of capital, free trade will increase the returns to capital (profits), while decreasing the returns to labor (wages) [13]. Conversely, in developing countries with large endowments of labor relative to capital, free trade will increase wages and decrease profits [14]. This leads to clear predictions on how trade affects income inequality according to a country's factor endowments. But opposed to this clear theoretical approach, the empirical results are often contradictory.

Hypothesis 2: Up to a certain level, higher levels of FDI stock in a country's economy increases inequality.

In the case of FDI, the picture is a bit more shaded and the effect is more permanent, because intangible assets are not as easily transferable between countries as liquid assets [15]. Additionally, FDI is driven more by market imperfections than differences in factor endowments [16]. Numerous parallel and reverse processes are observable. First, the foreign investor transfers capital into the recipient country; the more nominal supply from capital results in a lower return to capital and increases the return to labor. Thus foreign capital competes with domestic capital for domestic workers, driving up wages and decreasing the profitability of firms. This effect would speed up the convergence of the incomes of labor relative to capital, decreasing income inequality [17]. Second, the multinational companies usually use more advanced technologies, employ more skilled workers and, most importantly, pay a wage premium over the local firms, consequently increasing inequality. Third, if the MNC employs low skilled workers, who are usually in the poorest and most hopeless living conditions, and pays a wage premium for them, then it leads to lower levels of income inequality. As the data quality is in the top 5 and last 5 percentile includes the highest uncertainty measuring, this effect is one of the most problematic points in the analysis. In addition, if we accept that the multinational companies pay a wage premium [18] over the wage average in a country [19], then the increasing FDI stock / GDP ratio will result in higher differences in wages and cause higher levels of inequality.

These processes have different effects if the capital flow is between developed countries or between differently developed countries. While in the first case the investments are chiefly mergers or acquisitions, the FDI flow is between companies with equal levels of technology, so if no reorganization plans or lay-offs are executed, then the flow has no significant effect on inequality. But in the latter case the technology gap is often huge; the increasing demand for skilled or unskilled workers should have a stronger effect on the income inequality.

Hypothesis 3: A greater volume of FDI inflow in a given year increases inequality.

The countries involved in this analysis are middle and low income countries. According to a general empirical analysis for a comparable 69 countries [20] by Reuveny and Li, FDI flow increases income inequality but an expanding level of foreign trade decreases the inequality. Contrary to this result, if a new investment absorbs the skilled workforce, to their place a less-skilled workforce will be employed; hence in the short term, the employment rate increases, and the inequality situation depends on the difference between the wage increase of the returning workforce and the “overpayment” level of the staff of the foreign-owned company.

Hypothesis 4: A higher high-tech export / GDP ratio means higher levels of inequality.

The argumentation is similar to hypothesis 2. If more capital and technologically intensive FDI flows into an economy, then a larger part of the population will work in a better paid sector. Furthermore, if the high-technology manufacturing multinational companies are not integrated into the home economy, then the effect of the general technology spillovers cannot have effect on the process of narrowing the income gap; thus only a part of the population receive a share of the advantages.

Hypotheses 5: Higher levels of shadow economy in proportion to GDP results in higher inequality.

The main components of the shadow economy are typically low value-added, low income fields of the economy. If such a part of the income distribution is missing it results in higher inequality. Moreover, the value produced by the shadow economy is not included into the GDP calculation, which distorts the result of the estimation.

3 The Data Used

For measuring the income inequality I used the GINI coefficient, which is a summary statistic of the Lorenz curve. The Gini coefficient is most easily calculated from unordered size data as the "relative mean difference," i.e., the mean of the difference between every possible pair of individuals, divided by the mean size. The value of 0 represents absolute equality, the value of 100 absolute inequality. Using the Gini index we have to consider numerous disadvantages and problems; for example, if a country is large with unequal regions, the Gini index is misleading, or the Gini coefficient is a point estimate of equality at a certain time, and hence it ignores life-span changes in income. Typically, increases in the proportion of young or older members of a society will drive apparent changes in equality. Exploring and summarizing all the awkwardness of the Gini index is beyond the scope of this paper (a good summary can be found in Blomquist's article [21]), but, being aware of the problem, the Gini index is still the most commonly used measure for income inequality.

Unlike national accounts data - which are in principle comparable across countries - there is no agreed basis of definition for the construction of income distribution data. Sources and methods might vary, especially across but also within countries. This may be the case even if the data come from the same source. Avoiding as many discrepancies as possible, I used the UNU/WIDER World Income Inequality Database (WIID) [22] as a source of the GINI figures, the results calculated based on income data. Besides the WIID figures, for correction purposes the statistics of the Human Development Report of United Nations were used.

The FDI flow and stock data comes from the most commonly used and accepted UNCTAD FDI database. This database also contains some mistakes, but the data is essentially reliable, and I made some corrections based on data from the countries' statistics agencies. The GDP figures are from the World Bank World Development Indicators Database. The source of the other data is EUROSTAT and the statistic agencies of the analyzed countries.

When analyzing the data, it is not advisable to ignore the consideration that in these countries the level of the shadow economy is remarkable. [23] In this instance the estimated level of the grey economy is high, but on the basis of the same principle (only in Romania, Bulgaria and Latvia is it significantly higher). For the calculation I used the estimations of Friedrich Schneider [24]. In his article he used currency demand and DYMIMIC models to determine the level of the shadow economy in the given countries.

4 The Research Design

To test whether the increase in the analyzed factors leads to income inequality I set up the following equation:

Equation 1:

$$\text{GINI}_{ct} = \beta_0 + \beta_1 \text{FDI_ST_PG}_{ct} + \beta_2 \text{FDI_FL_PG}_{ct} + \beta_3 \text{GDP_PC}_{ct} + \beta_4 \text{EXP_PG}_{ct} + \beta_5 \text{HT_EXP_PG}_{ct} + \beta_6 \text{CTRYSIZE}_{ct} + \beta_6 \text{SHADOWEC_PG}_{ct} + \gamma_{ct}$$

where subscript c represents a country and subscript t represents year t (Years: 1991 ... 2006). GINI represents the Gini coefficient of a country. FDI_ST_PG is the value of the share of their capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprises as a percentage of GDP. FDI_FL_PG stands for FDI inflows and comprises capital provided (either directly or through other related enterprises) by a foreign direct investor to a FDI enterprise, or capital received by a foreign direct investor from a FDI enterprise as a percentage of GDP. FDI includes the three following components: equity capital, reinvested earnings and intra-company loans. GDP_PC stands for country c 's per capita GDP. EXP_PG is the countries' exports as a percentage of GDP. CTRYSIZE means the size of a country in square km, and SHADOWEC_PG is the estimated value of the shadow economy as a percentage of GDP.

5 Descriptive Statistics of the Analyzed Factors

The data from 1991 to 2006 shows that from the level of zero the FDI became a significant part of the analyzed economies, while on average GDP figures and GINI index increased. Parallel with the robust FDI inflow, the contribution of the high-technology export to the entire export became more significant. This means that not only labor-intensive, but also more export-oriented technology-intensive production capacities were transferred to the region.

Table 2
Descriptive statistics

Factor	min	max	avg	stdev
GINI	20,4	45,8	31,2	5,7
FDI_ST_PG (%)	0,2	83,9	20,7	18,2
FDI_FL_PG (%)	0,1	23,7	4,1	3,7
GDP_PC	279	19383	4110	3366
EXP_PG (%)	16,7	85,4	51,5	15,5
HT_EXP_PG (%)	0,4	36,5	7,9	7,4
SHADOWEC_PG (%)	18,2	60,1	35,2	10,4

Source: own calculations

At a country level, high GINI values are observable in Romania, Moldavia, Serbia and Poland. The lowest income inequality is demonstrable in Slovakia, Slovenia, the Czech Republic and Hungary. Having a look on the descriptive statistics we could conclude that countries with higher GDP figures face lower levels of income inequality. The export openness is the highest in Estonia, the Czech Republic and Slovakia. At the same time, the high-tech exports to GDP ratio is the highest in Estonia, the Czech Republic and Hungary; moreover, in these countries the FDI stock per capita is on salient level. In Estonia the GINI-index steadily increased during the entire analyzed period, and the country received remarkable levels of technology-intensive FDI, and rocketed the high-technology export level to the peak. After analyzing the pooled data verifying the second hypotheses I will analyze the individual data for Estonia.

6 Results of the Pooled Data

First I tested the pooled data using ordinary least square method with Equation 1.

Equation 1: OLS

Number of observations: 101

Dependent variable: GINI

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	27,7585	3,41829	8,1206	<0,00001	***
FDI_ST_PG	0,101789	0,050185	2,0283	0,04539	**
FDI_FL_PG	-0,0320188	0,172829	-0,1853	0,85343	
GDP_PC	-0,000303494	0,000180118	-1,6850	0,09535	*
EXP_PG	-0,136957	0,0438661	-3,1222	0,00239	***
HT_EXP_PG	0,11848	0,0795597	1,4892	0,13982	
CTRYSIZE	4,44074e-06	4,13615e-06	1,0736	0,28576	
SHADOWEC_PG	0,249369	0,061509	4,0542	0,00010	***
Mean dependent var	31,98433	S.D. dependent var		5,946399	
Sum squared resid	2068,075	S.E. of regression		4,715651	
R-squared	0,415132	Adjusted R-squared		0,371109	
F(7, 93)	9,430015	P-value(F)		8,57e-09	

Source: own calculations

In the last column the stars are showing the significance level of the specific variable. * means the variable is significant at a significance level of 90%; ** means significant at a level of 95%, *** means significant at a level of 99%. Since the highest p values were observable in the case of FDI inflow figures, and since the correlation coefficient is low between GINI and FDI_FL_PG, hypotheses 3 is not provable based on this sample.

The CTRYSIZE variable was also insignificant, the conception whereas in a larger country simply because it constitutes from differently developed subunits is not justifiable.

Using Akaike, Schwarz and Hannan-Quinn model selection criteria, I omitted the FDI_FL_PG and CTRYSIZE variables from the calculation.

After omitting the variables, all model selection criteria improved; every variable become significant at at least the level of 90%. The results are the following:

Equation 2: OLS

Number of observations: 101

Dependent variable: GINI

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	27,5712	3,28781	8,3859	<0,00001	***
FDI_ST_PG	0,0752016	0,0371289	2,0254	0,04563	**
GDP_PC	-0,000325912	0,000168322	-1,9362	0,05581	*
EXP_PG	-0,130087	0,042928	-3,0303	0,00315	***
HT_EXP_PG	0,151751	0,0717012	2,1164	0,03692	**
SHADOWEC_PG	0,273368	0,0557372	4,9046	<0,00001	***
Mean dependent var	31,98433	S.D. dependent var	5,946399		
Sum squared resid	2094,242	S.E. of regression	4,695174		
R-squared	0,407731	Adjusted R-squared	0,376559		
F(5, 95)	13,08003	P-value(F)	1,09e-09		

Source: own calculations

The markup used in the last column is the same as in the previous OLS test. The R square figures shows that the variables explain 40.7% of the changes of the variance of the dependent variable. This figure is not high, but it corresponds to the R square figures of the similar empirical analyses based on cross sectional data.

In accordance with the expectation formulated in hypotheses 2, β_1 coefficient shows positive and on 95% level significant (p-value is 0.045) relation between GINI and FDI stock. The more nominal supply from capital has a slighter effect on inequality than the phenomena that the multinational companies pay a wage premium over the national average. Moreover, this is a confirmation of the premise that the multinational companies have not integrated sufficiently into these economies yet.

In the case of the GDP_PC variable, the β_3 coefficient is close to zero and the p value is higher (0,055). The relation between GDP and the GINI index is significant, at a 95% level.

The most unambiguous conclusion is the verification of the first hypotheses. The EXP_PG moves inversely to the GINI figures on a high level of significance (p value 0,003). The increasing level of foreign trade increases competition; it equalizes price levels and helps to reduce income inequality. In contrast, tallying with hypotheses 4, β_5 coefficient is positive and significant on 95% level (p value: 0,036), which confirms the premise that the high-technology manufacturing multinational companies are not sufficiently integrated into the home economy. Thus, the effect of the general technology spillovers cannot have an effect on the closing up process, and thus only a part of the population receive a share of the advantages, which results in greater inequality.

In interpreting the results, the effect of the shadow economy should not be left out of consideration. The result shows that the effect of the shadow economy on the GINI figures is strongly positive and highly significant (p value is close to 0). In the case of the analyzed countries, the shadow economy / GDP ratios differ notably from each other; therefore, the source data is biased in a diverse level. But the differences between countries (and by this means the bias) are not as high as in the case of a global survey as in Reuveny and Li's article.

7 Results for Estonia using Equation 2

On the basis of the descriptive statistics, I analyzed the validity of the hypotheses for the case of Estonia:

Equation 2 (Estonia): OLS

Number of observations: 16

Dependent variable: EST_GINI

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	30,4876	3,60908	8,4475	<0,00001	***
EST_FDI_ST_PC	0,00505216	0,000780015	6,4770	0,00007	***
EST_FDI_FL_PC	-0,00249795	0,000899508	-2,7770	0,01955	**
EST_GDP_PC	-0,00513664	0,000776464	-6,6154	0,00006	***
EST_EXPGDP	0,305111	0,0550565	5,5418	0,00025	***
EST_HIGHTECH_EX	-0,192218	0,0475304	-4,0441	0,00235	***

Mean dependent var	35,70487	S.D. dependent var	2,105301
Sum squared resid	7,974004	S.E. of regression	0,892973
R-squared	0,880062	Adjusted R-squared	0,820093
F(5, 10)	14,67529	P-value(F)	0,000249

Source: own calculations

In pursuance of the presupposition the results presents stronger connections between the analyzed factors and the GINI index. The value of R square is 82%, which reflects stronger explanatory power than the pooled data's 40.7%. The connection between FDI stock and GINI index is much more significant than in the previous case. The negative sign and direction in the case of GDP is the same as in the first case, but the relation between exports and the GINI index is the opposite. It could be a consequence of the very high endowment in FDI. The multinational companies are producing goods for their supply chain, not for the internal market, and Estonia is just a manufacturing step for the goods, with a very weak internal market. That could be a reason for the reverse effect in the case of high-tech exports, but in addition it could be a mark that the home economy has integrated the FDI in a better way; the spillovers have their effects. Collaterally, we have to consider that in Estonia the effect of the shadow economy was not included in the calculation because of missing data. The available shadow economy data shows the highest between the analyzed countries, and if we conclude the effect of the shadow economy from the results of the pooled data, then a strong biasing effect would be observable, which was not included.

Conclusion

This paper has highlighted several hitherto unexplored findings with respect to income inequality, FDI, export openness, high-tech exports and the shadow economy. Firstly, the analysis showed positive and significant relations between increasing income inequality and increasing levels of FDI stock in the middle income of the Eastern-European states. In general, supporting previous publications in this area, I found that export intensity acts to decrease wage dispersion, while the local effects could be different from the regional effects; in the case of Estonia the result was contradictory. Higher GDP has also a significant effect on the GINI index. In common with previous works, I found evidence that higher levels of high-technology exports have an effect on income inequality. The introduction of new technology by inward investors acts to increase the returns on skilled labor, and increase inequality. This effect of high tech export and FDI will result in increasing demand for education and skills being met with improved supply. The appropriate policy response is therefore not to suppress FDI or technological change, but to make increased access to education a priority. This would allow less-skilled and low-income groups to capitalize on the opportunities from both technological progress and the ongoing process of globalization. The results raise the question of how the equalizing impact of the education could have effect on the upward moving part of Kuznets reversed "U" shape curve. Would it be demonstrable that promoting education could shorten the length of time over which FDI has an impact of making income unequal?

Another important point is the role of the shadow economy. As in the analysed countries, the level of shadow economy is significant; it has distorting effect on the results. This bias could be reduced using expenditure data, but currently it is not available for calculating the GINI index based on expenditure basis for these countries.

As an additional indirect implication of the analysis, it points out that the economic policy should pay attention to the integration of the FDI into the home economy. If the local companies become a part of the global supply chain, with the increasing competitiveness, the salary gap between multinational and local companies can be reduced significantly. This will lead to decreasing inequality even in a relatively short term.

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Annex

Country level descriptive statistics

Country	Factor	min	max	avg	stdev	2005
HUN	EXPORT / GDP (%)	26,4	77,1	54,2	16,6	66
POL	EXPORT / GDP (%)	26,4	77,1	54,2	16,6	66
CZE	EXPORT / GDP (%)	48,9	76,6	59,0	8,4	72
HRV	EXPORT / GDP (%)	38,6	77,7	47,9	9,5	47
BGR	EXPORT / GDP (%)	38,2	64,5	51,4	7,3	60
EST	EXPORT / GDP (%)	60,3	85,4	72,5	7,0	80
LVA	EXPORT / GDP (%)	35,2	79,9	47,6	11,8	48
LTU	EXPORT / GDP (%)	23,4	82,5	50,0	13,1	58
MDA	EXPORT / GDP (%)	21,1	55,3	46,5	9,3	51
ROM	EXPORT / GDP (%)	17,6	35,9	29,2	5,3	33
SRB	EXPORT / GDP (%)	16,7	28,7	21,7	3,7	25
SVK	EXPORT / GDP (%)	46,3	84,4	65,3	10,5	76
SLV	EXPORT / GDP (%)	47,6	83,5	57,5	8,7	62
UKR	EXPORT / GDP (%)	24,0	62,4	45,6	12,5	51
BLR	EXPORT / GDP (%)	36,9	71,3	60,1	9,1	60
POL	FDI INFLOW PER CAP.	9,4	503,4	159,3	129,5	271
CZE	FDI INFLOW PER CAP.	63,4	1143,9	424,4	312,8	1144
HRV	FDI INFLOW PER CAP.	2,8	751,4	233,9	202,9	393
BGR	FDI INFLOW PER CAP.	4,7	975,9	176,0	263,2	507
EST	FDI INFLOW PER CAP.	53,7	2141,4	471,0	561,1	2141
LVA	FDI INFLOW PER CAP.	12,1	727,0	175,2	174,7	310
LTU	FDI INFLOW PER CAP.	2,7	540,0	143,0	146,5	301
MDA	FDI INFLOW PER CAP.	2,7	63,1	21,6	17,9	51
ROM	FDI INFLOW PER CAP.	1,7	527,9	101,4	146,9	300
SRB	FDI INFLOW PER CAP.	0,0	489,7	74,1	128,9	199
SVK	FDI INFLOW PER CAP.	33,6	773,0	316,7	261,8	391
SLV	FDI INFLOW PER CAP.	53,8	833,5	195,9	208,6	289
UKR	FDI INFLOW PER CAP.	3,1	166,4	30,6	47,5	166
BLR	FDI INFLOW PER CAP.	0,7	43,9	17,4	14,1	31
HUN	FDI INFLOW PER CAP.	110,6	764,3	346,6	182,3	764
HUN	FDI STOCK PER CAP.	203,7	8111,2	2742,6	2383,5	6144
POL	FDI STOCK PER CAP.	11,1	3265,1	936,6	976,4	2375
CZE	FDI STOCK PER CAP.	331,9	7836,0	2767,2	2386,0	5952
HRV	FDI STOCK PER CAP.	28,2	6006,1	1239,2	1648,0	3206
BGR	FDI STOCK PER CAP.	19,2	2972,6	557,9	818,7	1788
EST	FDI STOCK PER CAP.	62,8	9450,6	2892,3	3184,6	8398
LVA	FDI STOCK PER CAP.	67,5	3265,9	978,4	898,9	2141
LTU	FDI STOCK PER CAP.	28,9	3226,5	885,1	962,2	2397
MDA	FDI STOCK PER CAP.	3,6	339,2	110,6	105,2	273
ROM	FDI STOCK PER CAP.	1,9	2110,9	408,8	571,6	1194
SRB	FDI STOCK PER CAP.	67,9	1097,2	299,5	329,7	596
SVK	FDI STOCK PER CAP.	120,5	7114,7	1716,4	2083,8	4391
SLV	FDI STOCK PER CAP.	936,1	4460,1	1963,5	1180,1	3631
UKR	FDI STOCK PER CAP.	5,5	496,7	117,4	142,2	367
BLR	FDI STOCK PER CAP.	0,7	280,7	108,0	95,6	243
HUN	GINI INDEX (%)	24,3	32,1	27,3	2,5	28
POL	GINI INDEX (%)	25,0	36,3	32,3	3,0	36
CZE	GINI INDEX (%)	21,5	26,3	24,6	1,1	26
HRV	GINI INDEX (%)	24,6	31,9	28,4	2,4	29
BGR	GINI INDEX (%)	3,0	35,8	30,1	7,7	34

EST	GINI INDEX (%)	29,8	37,8	35,7	2,1	34
LVA	GINI INDEX (%)	24,7	39,0	32,8	3,3	36
LTU	GINI INDEX (%)	31,0	37,2	35,0	1,6	36
MDA	GINI INDEX (%)	32,2	44,1	39,8	3,0	40
ROM	GINI INDEX (%)	23,3	38,3	32,2	4,8	38
SRB	GINI INDEX (%)	31,1	36,8	35,1	2,3	35
SVK	GINI INDEX (%)	20,4	26,2	24,1	2,0	26
SLV	GINI INDEX (%)	24,7	30,3	26,4	1,5	25
UKR	GINI INDEX (%)	21,6	45,8	36,6	6,7	28
BLR	GINI INDEX (%)	28,2	39,9	30,6	3,1	28
HUN	HIGHTECH. EXP / GDP (%)	4,0	28,9	17,0	9,8	26
POL	HIGHTECH. EXP / GDP (%)	4,0	28,9	17,0	9,8	26
CZE	HIGHTECH. EXP / GDP (%)	3,3	14,1	9,0	3,7	13
HRV	HIGHTECH. EXP / GDP (%)	4,8	13,0	8,7	2,8	11
BGR	HIGHTECH. EXP / GDP (%)	2,7	6,0	3,8	1,0	5
EST	HIGHTECH. EXP / GDP (%)	6,2	36,5	19,1	9,5	27
LVA	HIGHTECH. EXP / GDP (%)	3,7	6,9	4,9	1,0	5
LTU	HIGHTECH. EXP / GDP (%)	0,4	8,0	4,2	1,7	6
MDA	HIGHTECH. EXP / GDP (%)	2,5	28,2	5,5	6,9	4
ROM	HIGHTECH. EXP / GDP (%)	0,9	5,8	2,8	1,6	3
SRB	HIGHTECH. EXP / GDP (%)	2,3	5,5	4,1	1,1	4
SVK	HIGHTECH. EXP / GDP (%)	3,1	7,3	4,5	1,2	7
SLV	HIGHTECH. EXP / GDP (%)	3,2	6,3	4,5	0,9	5
UKR	HIGHTECH. EXP / GDP (%)	3,4	6,9	4,8	1,1	4
BLR	HIGHTECH. EXP / GDP (%)	2,6	4,2	3,5	0,6	3
HUN	SHADOW ECON./GDP (%)	24,3	26,2	25,4	0,7	24
POL	SHADOW ECON./GDP (%)	27,3	28,9	27,9	0,6	27
CZE	SHADOW ECON./GDP (%)	18,3	20,1	19,2	0,5	18
HRV	SHADOW ECON./GDP (%)	33,4	35,4	34,3	0,6	34
BGR	SHADOW ECON./GDP (%)	36,5	38,3	37,1	0,6	37
EST	SHADOW ECON./GDP (%)	38,2	60,1	41,7	8,1	38
LVA	SHADOW ECON./GDP (%)	39,4	41,3	40,3	0,7	39
LTU	SHADOW ECON./GDP (%)	30,2	32,6	30,9	0,9	30
MDA	SHADOW ECON./GDP (%)	45,1	49,5	47,8	2,0	49
ROM	SHADOW ECON./GDP (%)	34,4	37,4	35,6	1,1	35
SRB	SHADOW ECON./GDP (%)	36,4	39,1	37,4	1,0	37
SVK	SHADOW ECON./GDP (%)	18,2	20,2	19,0	0,7	18
SLV	SHADOW ECON./GDP (%)	27,1	29,4	27,8	0,9	27
UKR	SHADOW ECON./GDP (%)	52,2	55,3	54,0	1,4	55
BLR	SHADOW ECON./GDP (%)	48,1	50,8	49,7	1,2	51

Medical Tourism - A Case Study for the USA and India, Germany and Hungary

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Abstract: The objective of this paper is to demonstrate a simple Ricardian model of international trade for health care industries of different countries. Our motivation is to illustrate that specialization and free trade result in gains from international trade. We will shed some light on the economics of outbound as well as inbound medical tourism. By adopting the model of comparative advantage to the costs of medical surgeries, we will show that trade between our two model countries – India and the USA – is beneficial to both of them. We focused on these two countries due to their prominence in worldwide medical tourism flows, as well as due to their significant difference in per capita income. By specializing on the type of surgery they are most efficient in producing, it will enhance the well being of both nations. Numerical examples and graphical presentations help to support our arguments. Beside the global aspect of medical tourism, we also want to shed some light into regional patient flows with a focus on Germany and Hungary. In addition, we will lift some of the more restrictive assumptions. By including transportation costs as well as a larger variety of surgical services, the central message of the beneficial effect of specialization still remains, even though the general picture becomes slightly blurred. There is evidence for support of a more multi-polar international system of trade in medical services the moment one extends the economic analysis with additional countries.

Keywords: Regional and global scope of medical tourism; Ricardian trade model; comparative advantage; economic gains from international trade

Introduction¹

With general tourism on the rise (UNWTO 2010), it is estimated that the volume of medical tourists could reach 4 million per annum by 2012 (Deloitte 2008a). Medical tourism has become a major force for the growth of service exports worldwide, while concentrating on a selective number of recipient countries – with India and Thailand as major global markets. At the same time, medical tourism offers a financial valve for the growing burden of health care costs in mature markets like the USA. In addition, it provides an alternative for the almost 50 million uninsured adults of the USA to receive affordable and accessible medical services.² Even though the 2010 health care reform will cover 34 million uninsured Americans by 2019,³ the driving force of the outbound medical tourism will continue to be costs. For surgical services in South Asia these costs are between 10 and 20 percent of the corresponding ones in the USA (Unti 2009). At the same time, hospitals in developed countries like Belgium, Germany and the USA are trying to attract inbound medical tourists by offering special and high quality services (Vequist / Valdez 2009). General trends in global medical tourism are briefly discussed in Section 1.

With the help of the traditional Ricardian model of international trade⁴, we will shed some light on the economics of outbound as well as inbound medical tourism in Section 2. By adopting the basic model of comparative advantage to the costs of medical surgeries, we will show that trade between our two model countries – India and the USA – is beneficial to both of them. We focused on these two countries due to their prominence in worldwide medical tourism flows, as well as due to their significant difference in per capita income. By specializing in the type of surgery they are most efficient in producing, it will enhance the well being of both nations. Numerical examples and graphical presentations on dental services and medical operations help to support our arguments. In Section 3, we will lift some of the more restrictive assumptions. By including transportation costs as well as a variation in medical expenditure patterns, the central message of the beneficial effect of specialization still remains, even though the general picture becomes slightly blurred. With an additional focus on Germany and Hungary in Section 4, we want to shed some light onto regional patient flows as a substantial part of medical tourism is more of regional than of global nature. In the final section, we show that there is evidence for support of a more multi-polar international system of trade in medical services.

¹ This article is a substantial extension of work that we presented at the 8th International Conference on Management, Enterprise and Benchmarking in Budapest (Piazzolo / Zanca 2010). We incorporated some of the valuable comments of the conference participants.

² CBO 2010; Senate 2006 and Collins et. al 2008. In 2008, 46.3 million Americans representing 15.5% of the population were uninsured (DeNavas-Walt et al. 2009 Tabl. 7).

³ Joint estimates of the Congressional Budget Office and the Joint Committee on Taxation on the effects of the US health reform bill (CBO 2010 Table 4).

⁴ e.g. in Krugman / Wells 2009 or Mankiw 2009

1 General Trends in Medical Tourism

Historically, patients of developing countries often journeyed from less developed countries to medical centres in more developed countries, where they received services that were not available in their countries of origin - as medical know-how and technology were missing.⁵ As technology and medical know-how dissolved to emerging market countries, a new model of medical tourism – from rich to poor countries – evolved over the last two decades. Rich country tourists started to exploit the possibility of combining tourist aspects with medical ones. Today, one finds modern hospital facilities close to major tourist attractions in countries like India, Hungary, South Africa, Thailand and Turkey. Hospitals – and even dental clinics - look more like first class hotels, and they actively promote tourist packages with their medical services.⁶ Therefore, medical tourism is increasing in part with the growth trend of general tourism: worldwide international tourist arrivals grew annually at an average of 4% between 1996 and 2008. Due to the recent recession as well as uncertainties brought about by the influenza outbreak, tourism took a dip in 2009 by -4.2%. During the first six months of 2010, world tourism flows picked up again (+6.9% vs. a year before).⁷ Should the economic recovery dampen in 2011, then the revival of tourism flows might not be that substantial. Nevertheless, the worldwide recession may have led USA insurance companies and employers to re-evaluate how to lower ever rising healthcare costs.⁸ Not only is the US health-care system by far the most expensive in the world – USA health spending runs at 16.2% of GDP, far above the OECD average of 9% (2007), its quality does not compare well with other OECD countries.⁹ Medical tourism might be one way to improve services while at the same time help to dampen the rise in overall spending on health care. Unfortunately, data on

⁵ See Unti (2009) 18. e.g. wealthy individuals travelled abroad to seek spas, mineral baths, innovative therapies in fairer climates in Europe.

⁶ E.g. Thailand: Bumrungrad (www.bumrungrad.com); India: Apollo Hospital in Kolkata (www.apollologleneagles.in); Hungary: Diamant-Dent Dental Medical Institute (www.diamantdent.hu); South Africa: individual doctors (www.surgeon-and-safari.co.za).

⁷ UNWTO (2010) p. 3. While tourism inflows to Central/Eastern Europe declined by more than 10% in 2009, Hungary experienced a growth of almost 3%. Only in the 1st quarter of 2010 has there been a decrease in the number of inbound visitors to Hungary (KSH 2010 p. 1).

⁸ Edelheit (2009) p. 2. From 1960-2006, only in six years – four of them during the Clinton boom - did GDP growth actually exceed health care spending growth. In addition, health care cost inflation exceeded core inflation in each and every year over the last 50 years (McKinsey 2008 p. 37).

⁹ e.g. infant mortality or death rate after haemorrhagic strokes (Economist 2008). Also, the USA spends \$7, 300 per person (in Purchasing-Power Parity), more than twice as much as the average of the OECD countries (*OECD Health Data 2009* in: Economist 2009 p. 27). Even when adjusting for its relative wealth, the USA spends a lot more on health care than can be expected (OECD in: McKinsey 2008 p. 36).

medical tourist flows are poor. Therefore, one has to rely on surveys to estimate the flows as well as the economic might of the medical tourism industry. In 2006, worldwide business in medical tourism grossed about \$60 bn. It is expected to rise to \$100 bn by 2012.¹⁰ India, Malaysia, Singapore and Thailand are some of the most attractive medical tourist destinations, and medical tourism is already making a significant impact on their economies. In 2005, approximately 500,000 Americans travelled abroad for medical treatment; by 2007 this number rose to 750,000 and it is expected to increase to more than 15 million Americans annually by 2017.¹¹ Nevertheless, there are others that are much more cautious about the actual size of the medical tourism market: focusing on the market segment of international *inpatients*, three McKinsey analysts estimated a world market for the 20 most important medical-travel destinations of up to 85,000 patients annually for 2007 only. In addition to their focus on patients that were actually staying in a hospital, they also subtracted substantial numbers for emergency cases and expatriates. The latter they did not consider core medical tourists.¹² Even these conservative estimates are still worth looked at, as the growth potential is immense, especially if certain barriers for medical travel – like non-coverage from the country of origin market’s payers – would be lifted.

Let us briefly take a closer look at the major characteristics of international or cross-border medical tourism. When looking at the broader health care tourism industry, we differentiate between *wellness tourism* and *medical tourism*.¹³ The latter can then be further broken down into *cosmetic surgery* and *elective surgery*. Our focus will be on the non-cosmetic surgeries and medical treatments. In the near past patients from less developed countries travelled to major medical centres in industrial countries. There, they looked for sophisticated, often technologically advanced services that were typically not available in their home countries. These patients were usually wealthy individuals. On the reverse you had individuals from rich countries seeking services that were either not covered by their health insurance, there were long waiting periods for specific treatments in their home country or the services were simply not available – often due to legal restrictions like organ transplants or reproductive treatments. The majority of those services were of limited medical complexity.¹⁴

¹⁰ McKinsey & Confederation of Indian Industries 2005 in: Herrick (2007) pp. 1-2. The \$60 bn (2006) of estimated medical tourism business world wide is less than 8% of total world exports in travel (Hussain / Gori 2009 p. 1).

¹¹ Deloitte Centre for Health Solutions in: Economist (December 22, 2008). Though, these forecasts have to be taken cautiously; they seem to be inflated (authors).

¹² Based on their survey data and interviews, Ehrbeck et al. (2008 pp. 2-3) actually filtered core medical travellers down to 35%-45% of all international *inpatients*.

¹³ Caballero-Danell / Mugomba (2006) p. 11

¹⁴ Unti (2009) pp. 18-19

Table 1
Unit cost for different types of medical procedures (in USD)

Type of Procedure	USA Hospital [†]	Indian Hospital [†]	Thai Hospital ^{***}
Hip Replacement	\$50,000	\$7,000-\$9,000	\$12,000-\$17,300
Knee Replacement	\$45,000	\$6,000-\$8,000	\$10,700-\$13,200
Heart Bypass	\$100,000	\$6,000-\$9,000	\$22,800-\$34,300
PTCA (Angioplasty)	\$70,000	\$4,000-\$7,500	\$12,200-\$19,800
Spinal Fusion	\$75,000	\$5,000-\$8,000	\$5,500-\$7,000
Breast Augmentation (Cosmetic)	\$9,000	\$3,500-\$5,000 ^{**}	\$2,750
Face & Neck Lift (Cosmetic)	\$11,500	\$2,500-\$4,000 ^{**}	\$3,700

PTCA – Percutaneous Transluminal Coronary Angioplasty

(*) Median costs. Data retrieved from www.indushealth.com (September 14, 2010).

(**) www.medretreat.com (September 14, 2010).

(***) Bumrungrad Hospital, www.bumrungrad.com (December 16, 2009); range of real costs between July 2008 – June 2009; package prices are usually substantially lower.

Today, the focus is more on tourists (patients) from developed countries who travel to hospitals in emerging market countries seeking sophisticated - state of the art - medical treatments at substantially lower cost. *Table 1* presents typical types of procedures and their US-costs compared to the costs in attractive medical tourist destinations. Treatments in India and Thailand refer to high quality, full service and internationally accredited hospitals with physicians that were predominantly educated at respectable universities in developed countries. These hospitals often seek affiliation with a well-known USA or UK teaching hospitals to lift standards as well as reputation.¹⁵ The potential cost savings per medical treatment is up to 90% of US-costs.¹⁶ Their cost advantage is based on significantly lower fixed costs, employee wages as well as liability insurance premiums.¹⁷ To offer internationally marketable and competitive services, the hospitals must be accredited by a third party like the Joint Commission International or must comply to ISO 9000.¹⁸ Also, hospitals offer package deals for standard procedures, thereby trying to limit the risk of exploding costs for the

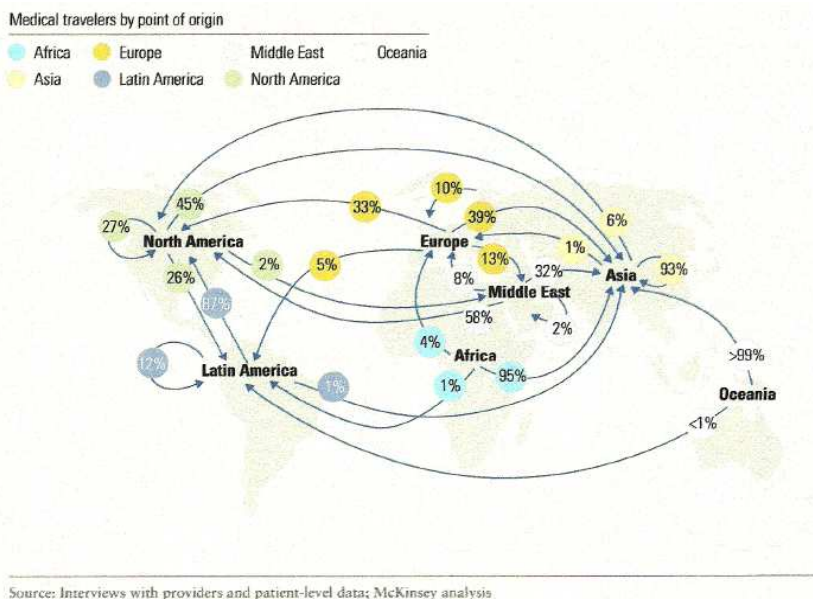
¹⁵ Deloitte (2008a) p. 3

¹⁶ Examples on individual patients can be found on the websites of medical tourism agencies, or e.g. in the Senate Hearing (2006) p. 2-8; Bey (2007) pp. 176-177

¹⁷ Unti (2009) p. 20; see Herrick (2007) pp. 9-12 for examples: Indian doctors earn 40% less than USA physicians.

¹⁸ The hospitals mention the accreditation on their own websites. But one can also check the Joint Commission International for a list of their accredited hospitals (www.jointcommissioninternational.org), or the ISO International Standards Organization as well as Health Care Tourism certified hospitals (www.healthcaretrip.org).

patient.¹⁹ Since it has become a major industry, several websites of medical tourism agencies and even non-profit organizations inform potential clients and promote international travels by linking the patients to hospitals or individual physicians.²⁰



Ehrbeck *et al.* (2008) p. 5

Figure 1

Globalization of medical tourism flows

Figure 1 shows that the world has become a flatter place – we see an influx and outflow of medical tourists from every continent except for Africa and Oceania. Though the recent focus in medical tourism has been on *outbound* patient flows from the developed countries to hospitals in the emerging markets in Asia, Europe and Latin America. The main driving force is the cost advantage, which is regularly mentioned in the recent US health reform debate as being one of the means to keep US health spending from getting out of hand. In 2006, there was

¹⁹ Medearis (2010) p. 9 mentions the significance of the proliferation of medical lawsuits driving up the cost of medical liability insurance.

²⁰ The following are major websites of medical tourism agencies: MedRetreat in USA (www.medretreat.com) including two case studies; Healthcare Tourism International (www.healthcaretrip.org) – non-profit organization; Plant Hospitals (www.planethospital.com); IndUSHealth Inc. (www.indushealth.com) – specializing on India and USA patients (also Senate 2006 37-4); Health Tourism (www.health-tourism.com) and Treatment Abroad in the UK (www.treatmentabroad.net); Hospital Scout (www.hospitalscout.com).

already a hearing in the US Senate discussing the question “Can Medical Tourism Reduce Health Care Costs?” The answer sounded like “Yes, but we just don’t know by how much” (Senate 2006). Also, *Figure 1* reveals that except for Asia the dominant part of international patient flows are inter-regional. In the following chapter we will introduce a simple model on dental tourism. Later on, we can show that this section of medical tourism – for dental services – is more likely to be of regional than of global nature.²¹

At the same time, USA and European hospitals – especially in the UK as well as in Germany – are able to attract foreign patients for high quality and specialized care.²² These *inbound* medical tourists are usually private patients and therefore often provide a financially advantageous source of income; USA hospitals with dedicated international centres generate up to 10 percent of total revenue from international patients.²³ So, from a USA or developed country perspective, there are *inbound* as well as *outbound* medical tourism flows. In the next section, we will present a traditional model of international trade – this time in medical services – to shed some light on the economics behind the observed tourism flows.

2 Medical Services and a Traditional Ricardian Model of International Trade

The concept of comparative advantage and gains from trade are one of the oldest ideas in economics (Buchholz 1989). The principle of comparative advantage was introduced by David Ricardo in his 1817 book ‘On the Principles of Political Economy and Taxation’, and the theory showed how nations benefit from free trade. Within the economics literature the improvement in national welfare is known as gains from trade. Ricardo (1817) argued that access to foreign markets is crucial in specialization and wealth creation. Ricardo used a simple model to show how nations maximize their material welfare by specializing in goods and services that they have the lowest relative costs of production. In this section we will demonstrate some empirical evidence for principle of comparative advantage, specialization and wealth creation concepts for medical tourism sectors in India and the USA.

²¹ See Turner (2008) for arguments supporting the regional nature of dental tourism.

²² Gerl et al. (2009) list some of the specialized medical clusters in Europe – either on different fields of medicine or focused on special groups of medical tourists (e.g. for Arab customers in Bonn, Germany). Also, hospitals in Southern Germany have significant cost advantages compared to their Swiss or UK competitors, thereby attracting approximately 74,000 foreign patients to Germany in 2006 (Juszczak 2007 p. 1, 4, 12)

²³ App. 400,000 international patients contribute \$5 bn annually to the USA economy (Deloitte Center for Health Solutions in: Quesada 2009).

Table 2 summarizes the data on costs of production for dental services in India and the USA. The USA has *absolute disadvantages* in both Dental Implants (DI) and Dental Crowns (DC), measured by larger costs of production. Assuming that the dental services are homogenous in quality, can trade bring net national gains to both countries? In addition, we assume that there are only two countries, no economies of scale, only two kinds of medical services, no transportation costs and no barriers to trade. Also, it is assumed that there is perfect knowledge, so that all buyers and sellers (patients and hospital management) know where the cheapest goods or the potential patients can be found internationally.

Table 2
Unit costs for dental services in India and the USA

Unit Costs	India (Capacity: 32,000) [*]	USA (Capacity: 50,000) [*]
Dental Implants	\$1,780	\$2,780
Dental Crowns	\$400	\$1,000

(*) Number of hospitals in India (3,200) and the USA (5,000 community hospitals) in 2007 - assuming ten medical treatments per hospital and day. Data was retrieved from www.medretreat.com (September 15, 2010).

Based on the number of hospitals in each country, *Table 3* summarises the maximum production capacities in medical treatments per hospital and day for India and the USA. For example, India can produce 18 units of DI if it produces no DC, or 80 units of DC if it produces no DI. Similarly, the USA can produce 18 units of DI if it produces no DC, or 50 units of DC if it produces no DI.

Table 3
Maximum Output per Day for India and the USA

Maximum Output per day	India (Capacity: 32,000) [*]	USA (Capacity: 50,000) [*]
Dental Implants	32,000 / \$1,780 = 18	50,000 / \$2,780 = 18
Dental Crowns	32,000 / \$400 = 80	50,000 / \$1,000 = 50

(*) Number of hospitals in India (3,200) and the USA (5,000) in 2007 - assuming ten medical treatments per hospital and day. Data was retrieved from www.medretreat.com (September 15, 2010).

Figure 2 illustrates the production possibility frontiers (PPF) for India and the USA. It presents the potential production of DC both India and the USA must forgo to produce DI. The PPF shows the trade-offs a country faces when it chooses its combination of DI and DC. It is a straight line because the Ricardian model assumes that opportunity costs are constant. In other words, we state that the trade-off between DI and DC does not change.

Slope of the PPF = Δ DI output / Δ DC output = opportunity cost of DC

Slope of PPF in (USA) = -0.36 (opportunity cost of DC in the USA)

Slope of PPF in (India) = -0.225 (opportunity cost of DC in India)

If the USA does not trade, it gives up 0.36 units of DC for an additional unit of DI. This trade-off is called the relative price of DC or the opportunity cost of DC. The term relative price follows from the fact that it is not in monetary units, but rather in units of the other good, that is DI. By the same reasoning, 0.225 units of DC is the relative cost (opportunity cost) of one unit of DI in India. David Ricardo (1817) argued that one country has a comparative advantage in producing a good or a service if the opportunity cost of producing that good or service is less for the one country than for the other country (or countries). The data of *Table 3* indicates that India has a *comparative advantage* in producing DC. At same instance, it means that the USA has a comparative advantage in the production of DI.²⁴

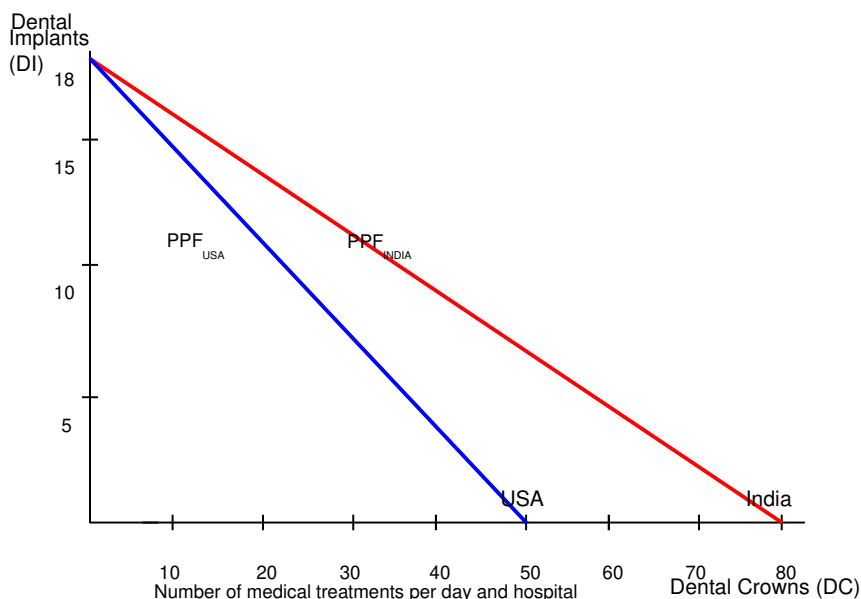


Figure 2

Production possibilities frontier for India and the USA

PPF – Production Possibility Frontier

The complete absence of trade is called *autarky*, and in this situation, both India and the USA are limited in their consumption to the goods that they produce at home. Suppose autarky prevails, we have assumed both countries divide their respective production capacities equally between DI and DC production. The autarky production and consumption points for India and the USA are shown in *Figure 3*.

²⁴ Similar graphical analysis for other commodities like shrimp & computers (Vietnam & USA) or meat & potatoes (Farmer & Rancher) can be found in Krugman / Wells (2009) pp. 198-200 or Mankiw (2009) pp. 51-53

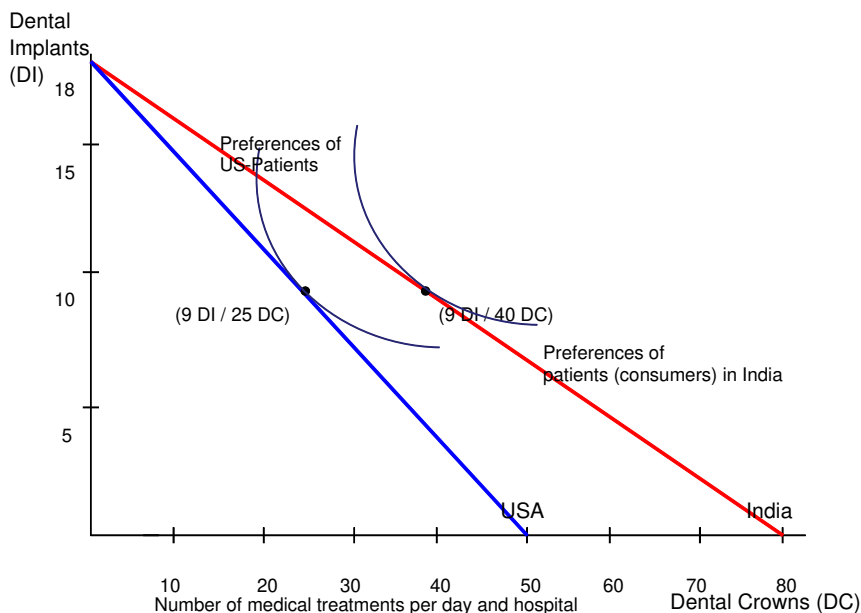


Figure 3

Optimal production and consumption under Autarky

We assume that in autarky, India would choose to produce and consume nine units of DI and 40 units of DC. *Table 4* summarises total output of DI and DC for India and the USA under autarky. The total outcome in autarky is summarized in *Table 4*, where the world production and consumption is the sum of India and the USA production and consumption, 18 DI and 65 DC, respectively.

Table 4

Optimal Production and Consumption under Autarky for India and the USA

	India (Capacity: 32,000)	USA (Capacity: 50,000)	Total Medical Treatments
Dental Implants	16,000 / \$1,780 = 9	25,000 / \$2,780 = 9	18
Dental Crowns	16,000 / \$400 = 40	25,000 / \$1,000 = 25	65

Table 5 illustrates how both countries gain from specialization and *free trade*. As a result of comparative advantage and international trade, the USA produces 18 units of DI, but no DC, and India produces 80 units of DC, but no DI. By comparing *Table 5* with *Table 4*, it is evident that specialization promotes wealth creation measured by increase in total world production. In the absence of specialization and trade (*Table 4*), total world production consists of 18 units of DI and 65 units of DC. After specialization and trade, total world production stands at 18 units of DI and 80 units of DC.

Table 5
Gain from Specialization and Free Trade for India and the USA

	India (Capacity: 32,000)	USA (Capacity: 50,000)	Total Medical Treatments
Dental Implants	0	50,000 / \$2,780 = 18	18
Dental Crowns	32,000 / \$400 = 80	0	80

Figure 4 summarizes the graphical representation of comparative advantage, specialization, free trade and wealth creation concepts for selected dental services (DI and DC) for India as well as for the USA. Consumers in both countries are strictly better off under *free trade* than under *autarky*. As hospitals in both countries specialize, a number of Indian medical tourist (nine per day) go to the USA for Dental Implants (*inbound tourism*), at the same time 32 American patients seek Dental Crown treatments in Indian hospitals (*outbound tourism*).

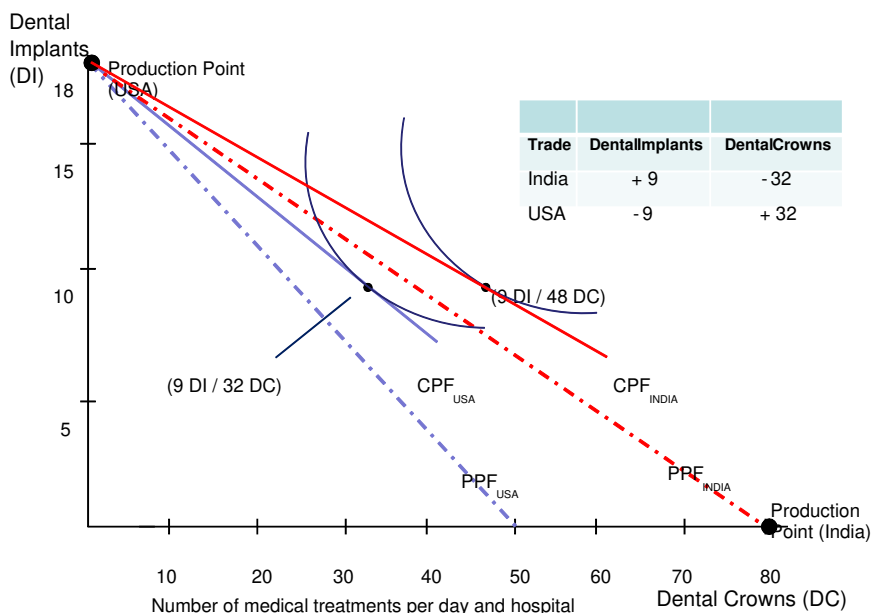


Figure 4
Optimal production and consumption under free trade

CPF – Consumption Possibility Frontier; PPF – Production Possibility Frontier

In the second part of our basic model section, we focus on two common, but more expensive medical services or elective surgeries – Hip Replacement (HIP) and Heart Valve Replacement (HVR). American patients can save up to 80%-90% of the respective US-costs when undertaking these procedures in an internationally accredited hospital in India. Instead of looking at the hospital capacities of the United States and India as the determinant for the production possibilities of medical services, we assume an arbitrary fixed amount of \$750,000/week &

hospital to be spent in both countries on these two types of procedures. All other assumptions of our first model on dental services still hold, e.g. no transportation costs and homogeneous services.

Table 6
Typical Costs and Output per Week & Hospital in India and the USA

	Typical Cost (per surgery)		Maximum Output (per week & hospital)	
	India [*]	USA [*]	India ^{**}	USA ^{**}
Hip Replacement	\$7,500	\$46,875	100	16
Heart Valve Replacement	\$9,870	\$125,000	76	6

(*) Typical Indian hospital cost and app. median USA cost.

(**) Total spending on surgeries is assumed to be \$750,000 per week & hospital.

Data was retrieved from www.indushealth.com (September 14, 2010).

In *Table 6*, the maximum output levels (per week & hospital) are presented. Due to the substantially higher US-costs the output levels of US-hospitals are far below the ones in India. This is also reflected in the different production possibility frontiers (PPF) of the two countries in *Figure 5*. Hospitals in India have got *absolute advantages* in the production of hip as well as of Heart Valve Replacements. While the US-hospitals hold on to a *comparative advantage* in the production of Hip Replacements as the USA ratio of HIP / HVR is 2.7. This is higher than the one for the hospitals in India (HIP / HVR of 1.3). At the same time India has a *comparative advantage* in the production of Heart Valve Replacements.

Under *autarky*, we assume that due to the respective preferences of patients in both countries, the same amount of financial resources is allocated to each of the two types of procedures. Therefore, the American consumers will purchase and the US-hospitals will produce three Heart Valve & eight Hip Replacements per week. In India this stands at 38 HVR and 50 HIP per week (*Fig. 5*). The moment we allow for medical tourism flows between India and the USA, the points of production move towards the production of services that each country has a comparative advantage in. Under *free trade*, the US-hospitals will fully specialize in the production of Hip replacements. While the hospitals in India shift their production only slightly towards Heart Valve Replacement – instead of producing 38 HVR under autarky, they now service 42 patients per week (*Fig. 6*).

Why do we not see full specialization in India like we did in our previous example on dental services? Well, we want to show strict gains from international trade in services. Based on the preferences of patients in both countries, this means that the joint free trade output has to exceed the total aggregate output for both medical procedures under autarky. Due to the vast difference in the production possibility frontiers of the USA and India, full specialization is not feasible for hospitals in India. At the same time, this also implicates a substantially smaller gain from trade – the fruits of specialization are not fully in reach.

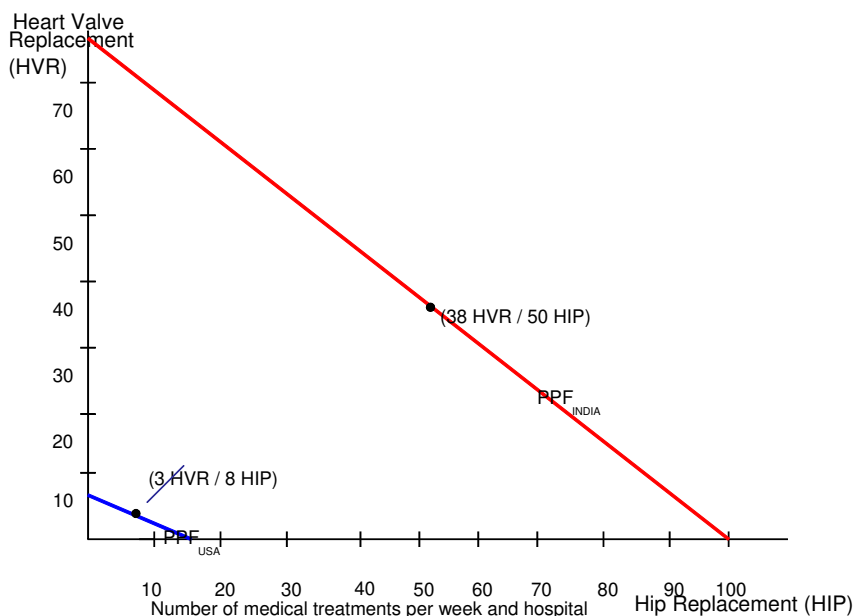


Figure 5

Production possibilities frontier for major surgeries optimal production and consumption under Autarky

However, free trade is still worthwhile pursuing as joint weekly output per hospital increases by two Hip replacements and one Heart Valve Replacement (Table 7). In Figure 6, the consumption possibility frontier (CPF) for both countries shifts outward slightly.

Table 7
Gains from Specialization and Free Trade for India and the USA

	India*	USA*	Joint Free Trade Output (Total Autarky Output)	
			India	USA
Hip Replacement	\$335,460 / \$7,500 44	\$750,000 / \$46,875 16	+6 (58)	-6
Heart Valve Replacement	\$414,540 / \$9,870 42	0	-3 (41)	+3

(*) Total spending on surgeries is assumed to be \$750,000 per week & hospital. Data was retrieved from www.indushealth.com (September 14, 2010).

Our numerical model indicates that three Americans will travel for HVR to India, while six Indian patients will fly the opposite direction to be treated in US hospitals for HIP. This outcome results in *outbound* as well as *inbound* medical tourism, just like Figure 1 based on the empirical McKinsey survey shows.²⁵ The

²⁵ Ehrbeck et al. (2008) p. 5

number of medical tourists is moderate, less than 9% of all patients treated in both countries, but not insignificant. In the following section, we will apply some extension to this basic HIP-HVR model of international trade.

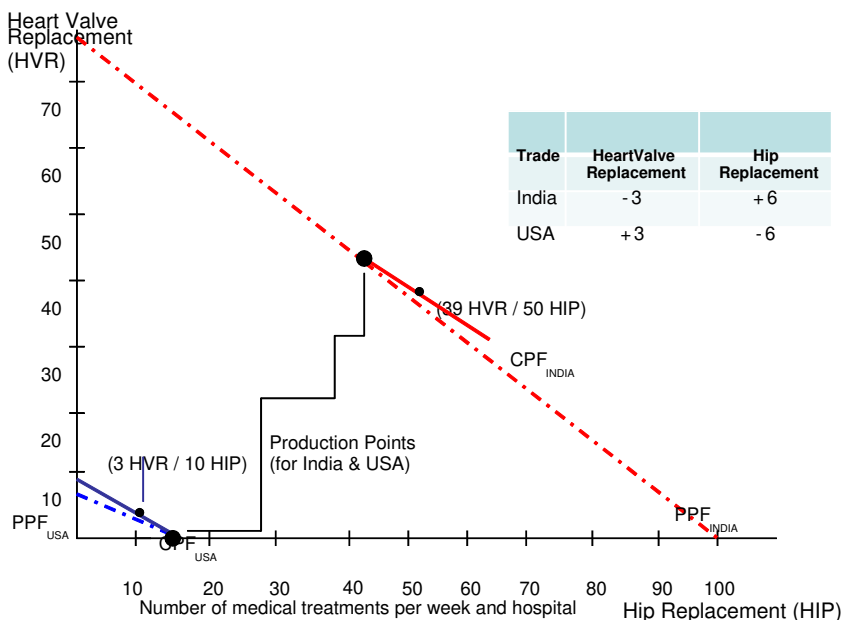


Figure 6

Optimal Production and Consumption under Free Trade No Full Specialization for India

CPF – Consumption Possibility Frontier; PPF – Production Possibility Frontier

3 Extensions to the International Trade Model by Introducing Transportation Costs and Variation in Spending Patterns

Up until now, we have applied the traditional Ricardian-type trade model on the trade of specific medical services (elective surgeries). The flaws of our basic HIP-HVR model are its relatively rigorous assumptions: a two-country world, only two homogeneous services, no barriers of trade, no transportation costs, only one factor of production and the way we determined the production capacity of hospitals as well as the preferences of patients (consumers) for each country. What effect does the lifting of some of those assumptions have on the implications of our model? Due to the limited amount of room in this paper, we will concentrate on transportation costs, which are quite substantial. For Americans seeking

treatment in India, one has to add another \$2,000-\$6,000 in travel costs.²⁶ Table 8 shows the combined travel & treatment costs for Hip and Heart Valve Replacement. Compared to our basic model, treatment costs in India have increased by 44% for HIP and 36% for HVR, while for HIP in the USA travel expenses are a minor component of total costs (7%).²⁷ In addition, for major surgeries, patients might need an assistant or family member to accompany them; these costs are still not accounted for.²⁸

Table 8
Gains from specialization and free trade for India and the USA – including travel costs?

	India*	USA*	Joint Free Trade Output		
	(Autarky)	(Autarky)	(Total Autarky Output)		
Hip Replacement	\$343,280 / \$10,750	\$750,000 / \$50,000	India	USA	
	32	15	+5	44	-5
	(35)	(8)		(43)	
Heart Valve Replacement	\$406,720 / \$13,120		India	USA	
	31	0	-3	33	+3
	(28)	(3)		(31)	

(*)Total spending on surgeries is assumed to be \$750,000 per week & hospital.

Data was retrieved from www.indushealth.com (September 14, 2010).

Due to the rise in production costs in India, graphically its PPF shifts inward as the number of medical services hospitals in India can offer internationally drop substantially for both HIP (70 vs. 100) and HVR (56 vs. 76). The comparative advantage for each of the country's hospitals remains the same. For the USA, the maximum number of Hip Replacements per week & hospital decreases by just one procedure. The gain from specialization under *free trade* still prevails. Though, national consumption levels are likely to fall as well as the number of international medical tourists.²⁹ Therefore, if travel costs and other additional costs – like special insurance premiums – are substantial, taking them into account will reduce *inbound* as well as *outbound* tourism, as the gains from specialization decrease.

On the other hand, our assumptions for determining the production capacities in India and the USA were most probably too strict. As the USA per capita income (\$46,000 in 2009) by far exceeds the one of India (\$3,100),³⁰ USA consumers are likely to spend more on medical services than their Indian counterparts. So, one

²⁶ Data for travel costs for major types of procedures were retrieved from IndUSHealth (www.indushealth.com/pricing September 14, 2010)

²⁷ As transportation costs to India, we chose \$3,250; travel expenses to the USA were set at \$3,125.

²⁸ Also, risks due to postoperative complications, which might be enhanced by immobility and long flight travel, have to be taken into account on an individual patients' base (Unti 2009 p. 24).

²⁹ In our numerical example the number of medical tourists dropped only slightly from 9 to 8 per week & hospital.

³⁰ In PPP-U.S.-Dollar, estimates by the US Central Intelligence Agency (CIA 2010).

would have to adjust the financial budgets set aside for the types of procedures of interest. In addition, the demand for Hip and Heart Valve Replacement is likely to differ for each country. Making these suggested changes in our assumptions leads to the revival of the gains of trade in medical services.³¹

Table 9
Gains from specialization and free trade – including travel costs and different spending patterns on surgeries for India and the USA

	India* (Autarky)	USA* (Autarky)	Joint Free Trade Output (Total Autarky Output)
Hip Replacement	\$193,500 / \$10,750	\$3,000,000 / \$50,000	<u>India</u> <u>USA</u>
	18 (35)	60 (40)	+18 78 -18 (75)
Heart Valve Replacement	\$556,500 / \$13,120	\$750,000 / \$125,000	<u>India</u> <u>USA</u>
	42 (28)	6 (15)	-11 48 +11 (43)

^(*)Total spending on surgeries is assumed to be \$750,000 for India and \$3,750,000 for the USA per week & hospital.

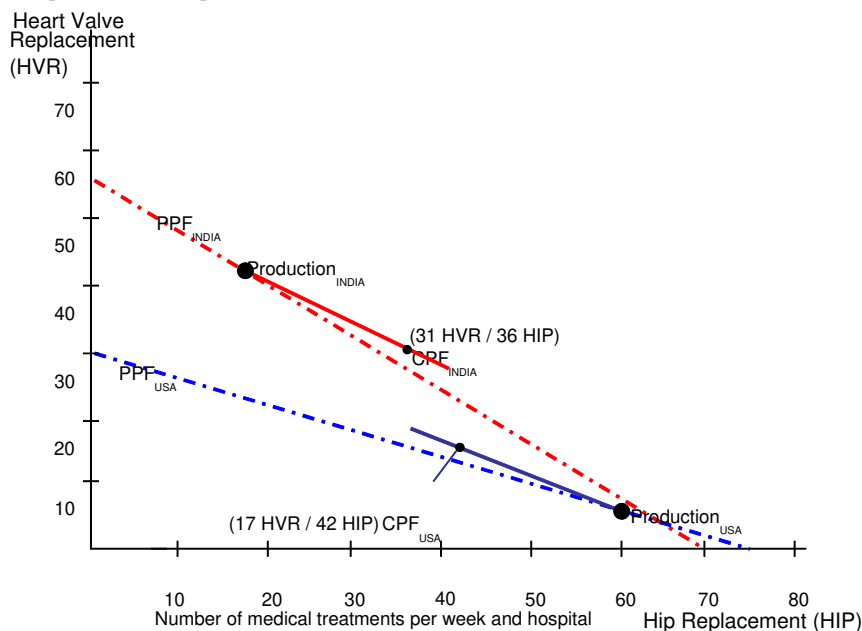


Figure 7
Optimal Production and Consumption under Free Trade with Travel Costs and Higher US Expenditures

³¹ When relaxing some of the restrictive assumptions, a weaker Ricardian model of trade will still show the beneficial sides of free trade (Deardorff 2005 p. 23).

In *Table 9* we demonstrate the effects of higher consumer spending on medical services in the USA. We assume that US-spending is five times the amount of Indian spending – \$3,750,000 vs. \$750,000 – per week & hospital. Under autarky, the demand for surgeries in the USA has increased fivefold. Due to transportation costs Hip Replacements are slightly more expensive in the USA under *free trade*, resulting in a reduction in the maximum number of HIP surgeries (75 instead of 80). Thus, full specialization of US hospitals on hip replacements is not feasible. The same is true for Indian hospitals and Heart Valve Replacements. Our variation in international spending patterns results in regaining economic wealth through *free trade*. Compared to autarky, India will gain one HR and three HIP surgeries, while for the USA HR and HIP will increase by two treatments each. Both countries specialize incompletely, and there is an increase in medical tourism flows. *Figure 7* presents the graphical depiction of our numerical example.

4 Regional Aspects of Medical Tourism by Introducing Germany and Hungary

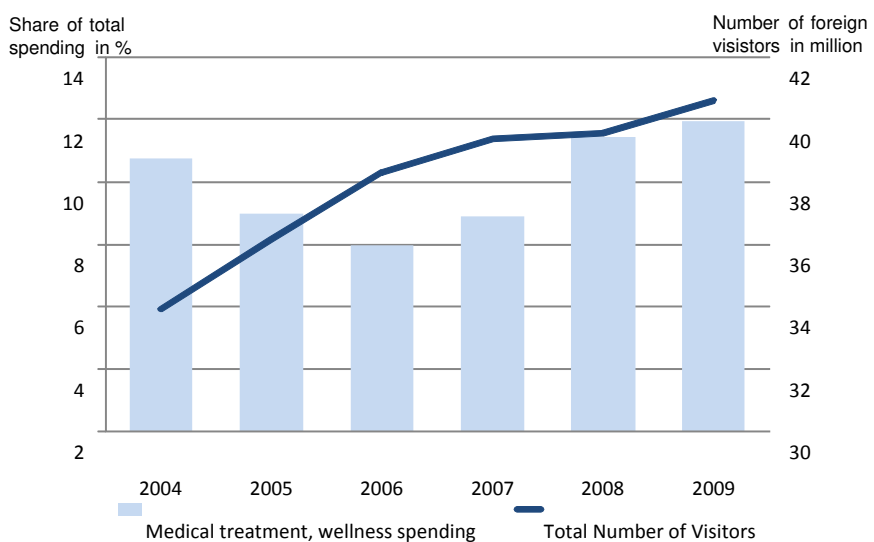
In *Figure 1* we have already seen that parts of international medical tourism flows are intra-regional (within the same geographical region). Especially, dental tourism seems to be predominantly of regional nature.³² Picking up the threads of the first part of Section 2, where we introduced a restrictive Ricardian model of international trade in dental services between the USA and India, we will now extend the model by including moderate transportation costs of \$1,500. As cost differentials for Dental Implants as well as for Dental Crowns are less than the cost of travel, international tourism between the North-American and Asian nation is economically not worthwhile anymore – trade falters altogether.³³ Transportation costs decline as the proximity between countries increases. So, dental tourism might very well be of economic value for German and Hungarian individuals as well as on a macroeconomic level for Germany and Hungary. Their difference in income level is substantially less than for the USA and India. Though, Germany's per capita income of \$34,100 in 2009 still exceeds the one of Hungary (\$18,800).³⁴ In 2009, more than 3.1 million Germans visited Hungary

³² Both, Turner (2008) and Gerl et al. (2009) emphasize or mention the regional nature of dental tourism in Europe, especially for Hungary.

³³ Trade in dental services might be revived, the moment a patient either has to undertake several treatments at the same time or she/he is travelling to India in any case. In the latter instance, the medical treatment is just a complementary service the (business) tourist takes advantage of.

³⁴ In PPP-U.S.-Dollar, estimates by the US Central Intelligence Agency (CIA 2010).

representing almost 8% of all foreign visitors to the country.³⁵ During the first quarter of 2010, 31% of all foreign arrivals for long term visits were of German nationality, while Austrians were dominant in the section of same day tourist (43% of total).³⁶ *Figure 8* not only shows the influx of foreign visitors to Hungary in recent years, but also the motivation for their stay in Hungary. In 2009, more than 1.8 million visitors (an increase of 5.4% p.a.) had medical treatments, spa or wellness trips in mind. The majority of them were same-day visitors (51%). Even though these foreigners represent only 4.5% of all visitors, they are responsible for almost 12% of total spending - \$710 million - by all tourists. Over the period of 2004-2009, the number of visitors motivated by medical treatment and wellness increased by 13%; their total spending in US-Dollar terms even rose by 63%. Overall spending by all foreign visitors is substantial for the Hungarian economy as it amounted to almost \$6 billion, or 4.6% of Hungary's GDP in 2009. Out of 16.9 million Hungarians that travel abroad for tourism, only 412,000 do so for medical treatment and wellness (2.4% of total in 2009). Therefore, the balance of international tourism services has been highly positive for years for the Hungarian side.³⁷



Source: Hungarian Central Statistical Office (2010 b)

Figure 8
Number and spending of foreign visitors in Hungary (2004-2009)

³⁵ In 2009, Germans were the fourth largest nation for foreign visitors to Hungary – after the neighbouring countries of Slovakia, Romania and Austria (Hungarian Central Statistical Office 2010a p. 56).

³⁶ KSH (2010) pp. 1-2

³⁷ Data was retrieved from the Hungarian Central Statistical Service (2010 b, c, d) and KSH (2010) p. 1

Many dental clinics in Hungary are focusing on international clients; their web pages are often in English and German, and they offer transportation and lodging logistics as well as advice regarding Austrian, British and German medical insurance policies.³⁸ Some of them are even certified by the German TÜV (association for technical inspection) and provide long-term guarantees for their medical services.³⁹ Table 10 presents unit costs for Dental Implants and Dental Crowns for both countries. Hungarian dentists have a comparative advantage in the production of Dental Crowns, while German dentists should specialize in providing Dental Implants. Assuming a higher amount of spending for dental services in Germany, we also show maximum output per day and clinic for this numerical example. The general assumption of identical consumer (patient) preferences remains; thus *under autarky* patients in both countries would demand half of maximum production levels each.

Table 10
Unit Costs (in EUR) & Maximum Output per day for Dental Services

Unit Costs & Maximum Output per day	Germany*		Hungary*	
Dental Implants	€ 1,600	20	€ 820	24
Dental Crowns	€ 1,800	18	€ 250	80

(*) Spending for dental services per day and clinic: Germany (€ 32,000) and Hungary (€ 20,000). Data was retrieved from www.allmedicaltourism.com (September 17, 2010).

Both countries are members of the European Union, and therefore no trade restrictions prevail. Since January 1, 2004 German medical insurance companies cover the same amount of dental expenses of its members, no matter where the provider of his/her medical service is located.⁴⁰ This full-blown international competition in dental services is dampened, as we have seen before for India and the USA, by the costs of transportation. Travel expenses are assumed to be €300 per patient, which makes international trade in services between Germany and Hungary economically feasible. As German dental clinics fully specialize in Dental Implants, German patients travel to Hungary for Dental Crowns *under free trade*. These transportation costs are to be deducted from total daily expenditures for dental services: e.g. if eleven Germans travel to Hungarian dental clinics, transport costs amount to €3,300 – thus reducing maximum output to 18 (instead of 20) Dental Implants.⁴¹ The Hungarian side cannot fully specialize on Dental Crowns. Let us reduce their production level for Dental Implants from 12 to 6 DI.

³⁸ E.g. VitalCenter Zahnkliniken (www.zahnklinik-ungarn.de), Denis & Focus Zahnklinik (www.denisdental.com)

³⁹ The Bavarian association for technical inspection (TÜV Bayern) certified Gelencesér Dental Zahnklinik & Dental Labor on ISO 9001:2009 (www.gelenceserdental.hu)

⁴⁰ Example by www.zahnklinik-ungarn.de „Kostenerstattung Krankenkasse“ for reimbursements by German state insurance agencies.

⁴¹ The math being $[\text{€}32,000 - (11 \times \text{€}300) = \text{€}28,7000] / \text{€}1,600 = 18$ Dental Implants per day and clinic.

To bilaterally gain from trade in international tourism services, Hungary will import seven DI per day – which amounts to €2,100 less to be spent for dental treatments. Hungarian dentists therefore will (only) produce 52 Dental Crowns – eleven of them for German tourists.⁴² *Figure 9* graphically depicts the bilateral gains in trade for Hungary as well as Germany. Even though the points of production lie to the left of the Production Possibility Frontier for both countries (due to additional travel expenses), specialization and trade in tourism services lead to consumption levels that could not be attained under autarky. The gains of regional international dental tourism are one DI and two DC procedures for Germany as well as one procedure each in the case of Hungary.

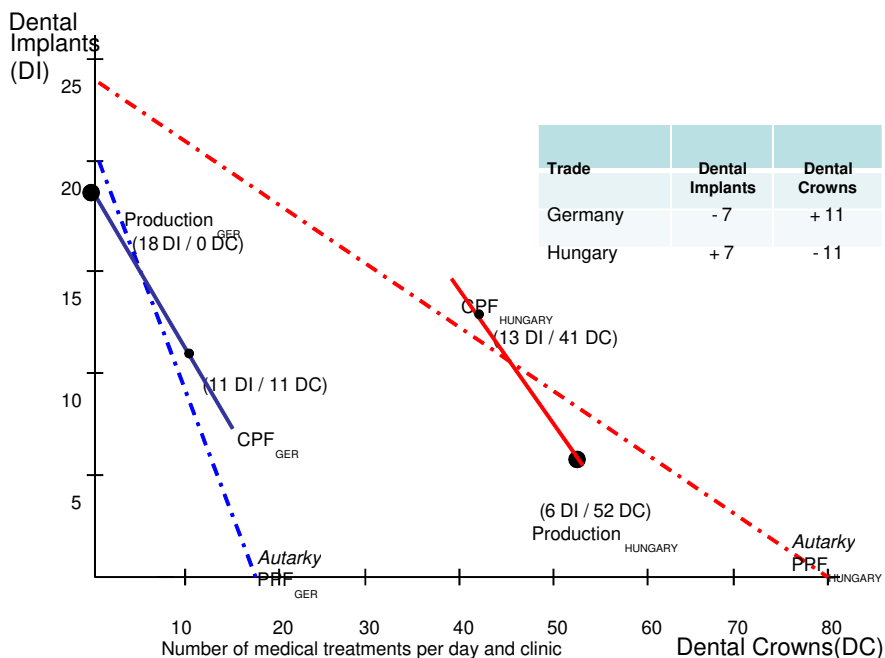


Figure 9

Optimal Production and Consumption for Dental Services Germany vs. Hungary - Including Travel Costs

Hungary has a population of 10 million, while Germany has more than 82 million inhabitants. Due to this large difference in market size, the approximately 41,000 German dental clinics are not going to specialize fully. Therefore, in reality the gains of trade in dental services between Germany and Hungary will be less than

⁴² Here, the math is as follows: $\{[\text{€}20,000 - (7 \times \text{€}300) = \text{€}17,900] - [6 \times \text{€}820]\} / \text{€}250 = 52$ Dental Crowns.

we foresaw.⁴³ If, on the other hand, dental services are just a by-product of leisure or business tourism, then specialization will be even more accentuated, as travel expenses are not taken into consideration by the tourist. This is also true for Hungarian dental clinics that operate in the border region to Austria. For Viennese, transportation costs to Hungary are negligible.

5 Implications of International Trade in Medical Services

By adapting the traditional Ricardian model of international trade to different kinds of medical services, we were able to show some of the theoretical backgrounds for the rise in worldwide medical tourism. The basic numerical and graphical presentations supported the drive for *inbound* as well as *outbound* patient flows – as is currently reflected in reality (see *Figure 1*). In addition, free trade in services enhances the economic wealth of open societies or countries. However, when one takes into account substantial transportation (travel) costs, the problem of liability insurance as well as the reluctance of US insurance companies to cover these lower medical costs of hospitals in foreign countries, the drive towards specialization in medical services slows down. In addition, potential savings should amount to more than \$10,000 or procedures in the USA should be above \$6,000 before it is financially advantageous to travel overseas for treatment.⁴⁴ It should be noted that due to mounting financial pressure on US companies and the 50 million uninsured Americans (2010), the growth prospect for future *outbound* medical tourism looks promising, even when taking the 2010 health reform into account. A large part of USA consumers seem to be willing to travel abroad. Their willingness increases with the rise of financial savings through foreign versus domestic medical services.⁴⁵ Several US health plans have begun to cover surgeries in Thailand and Mexico⁴⁶ – banking on reducing health costs – thereby further supporting *outbound* tourism. For less expensive medical treatments – like dental services – international trade in services becomes regional, as travel expenses drop significantly. Mexican dental clinics serve US-Americans, or Hungarian clinics offer their services to Germans, British and Austrians.

⁴³ In 2007, Germany had exactly 40,964 dental clinics or „Zahnarztpraxen“ (Statistisches Bundesamt 2009).

⁴⁴ www.medretreat.com/procedures/pricing.html (September 14, 2010). The \$10,000 threshold is especially important for USA uninsured (Ehrlich et al. 2007 pp. 6-7).

⁴⁵ While 3% of all USA consumers have already travelled abroad for medical services, 40% of all surveyed would consider an “elective procedure performed in a foreign country if they could save 50% or more and be assured that the quality was equal to or better than what they can have in the U.S.” (Deloitte 2008 b, p. 13)

⁴⁶ AMA (2007) p. 7

Increasing the variety of medical services will lead to a multi-polar and more complex world – with various countries specializing on the medical treatments they have a comparative advantage in. By focusing in *Table 11* on the bilateral comparative advantages in producing different treatments in our four countries of consideration, one finds the following results: Germany as well as Hungary should specialize on Hip Resurfacing compared to the USA, while Hungarian dental clinics should offer Dental Crowns compared to Germany and the USA (Dental Implants). For some medical services, there is no beneficial trade in services feasible at all, e.g. between Hungary and India in dental tourism. Intriguing questions such as - What about specialization in Hip Resurfacing or Heart Valve Replacement for German and Hungarian hospitals, when both countries hospitals should jointly specialize in Hip Resurfacing vs. their American counterparts? – have to be addressed in a future research project.

Table 11
Unit Costs (in USD) for Various Medical Services in Four Countries

	USA	Germany	Hungary	India
Hip Resurfacing	\$ 49,830	\$ 14,900	\$ 6,960	\$ 8,070
Heart Valve Replacement	\$ 60,000*	\$ 39,000	\$ 16,900	\$ 11,800
Dental Implants	\$ 5,470*	\$ 2,100	\$ 1,060	\$ 500*
Dental Crowns	\$ 2,000	\$ 2,350	\$ 330	\$ 150*

Data was retrieved through www.allmedicaltourism.com (September 13, 2010)

(*) some of these costs vary significantly from www.medretreat.com (September 14, 2010)

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Performance Measurement for Maintenance Management of Real Estate

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Abstract: The benchmarking of real estate performance is a commonly used tool in the efficient and sustainable maintenance management of existing facilities. Performance needs to be measured and monitored to support stakeholders' core business and maintenance strategies. Many of the performance indicators used to measure real estate are based on the area of the maintained property. The aim of this paper is to demonstrate the appropriate methodology of facility management benchmarking and to show the use of benchmarking on the Hungarian real estate market. The results are based on a questionnaire survey with corporate real estate executives as well as facility management service providers.

Keywords: performance; benchmarking; maintenance; facility management; sustainability

1 Introduction

Benchmarking is a multiple step process that allows an organization to compare the aspects of performance, identify the differences, seek out alternative approaches, assess opportunities for improvement, implement the change, and monitor outcomes. It should all begin with an internal evaluation, comparing performance matrices of your own organization over time. Many sources are available for analyzing facility benchmarks. Of the facility management data published by trade and professional associations for comparing efficiency in the use of facilities, nearly all rely on comparing factors on a per-square-meter of occupied space or gross area basis. Australian examples of this benchmark data include the Facilities Management Association's Benchmarking Studies, (FMA 1999 and 2002), and the Property Council Operating Cost Benchmark Series. In the UK examples include the Office Density Study (RICS 2001) which measures the amount of space used by various business activities. BCIS is the Building Cost

Information Service of the Royal Institution of Chartered Surveyors (RICS). BCIS Maintenance & Operating Costs benchmarking data - covering maintenance and operation costs such as cleaning, energy consumption and administrative costs - has long been relied on by property professionals. It provides a sound basis for early life cycle cost advice and the development of life cycle cost plans. Increasingly, this data is taking on a new importance as the industry places more emphasis on sustainability and whole life costs. The Investment Property Databank (IPD), Occupiers Property Databank, a benchmarking database in the UK, provides corporate occupiers with a comprehensive range of metrics against which to measure their facility's performance and upon which to base strategic property decisions. Many of these metrics relate costs and business performance to the area of building occupied. (Gibson, V. 2000) The International Facility Management Association (IFMA), one of the most widely recognized professional associations for facilities management, regularly published its Benchmarks Research. The survey includes data from a sampling of organizations throughout North America representing a spectrum of industry types and facility uses. The creation of large databases, like those of the IFMA in the USA and the RICS in the UK, are resources for national and international best practice comparisons.

2 The Importance of Performance Measurements in Field of Facilities Maintenance Management

Maintenance costs are usually the second largest single expense component for facilities operation costs. Having a quantitative understanding of facilities operations lends itself to comparing the organisation to others. One common mistake people make when developing a benchmarking strategy is selecting only organisations within their own industry to benchmark against. It should also compare the facilities to the operation of other facility types. Comparisons across industries allows for estimating the potential that may exist for improvement. Analysis of more descriptive case studies and networking must take place in order to raise the bar. Benchmarking can be an excellent measurement tool when comparing one facility to others in the portfolio. This type of benchmarking can help set company standards for performance and raise expectations through shared best practices. The majority of the metrics used to measure property performance are cost-centred, although some quality rating systems exist. Douglas, J. (1996) concludes that facilities performance measures allow managers to evaluate performance:

- *for property portfolio review, acquisition or disposal purposes,*
- *to highlight where a building is lacking in performance,*
- *to help prioritise maintenance or remodelling works,*

- to provide identification or early warning of obsolescence in buildings and
- to assist in achieving value-for-money from building assets by aiding identification of,
- performance achievements as well as failures.

2.1 Benchmarking in the Facility Management Business Cycle

In the 1st edition of The Strategic Role of Facilities Management in Business Performance (RICS 2009) guidance note separates the Facilities Management cycle into five areas: Strategy, Sourcing, Operational, Review, and Continuous development and change management as they are shown in the Facilities Management cycle diagram Figure 1. Through this cycle, the facilities management function can effectively support an organisation's business strategy, which will derive value from the function rather than focus on cost. Benchmark metrics are important in any area of the cycle; the highest importance of the benchmarking is in the Strategy phase of the cycle. Benchmark data is a key tool in the facility manager's toolkit, enabling decision making by developing facility management strategy. Facility managers have a major role to play in the benchmarking process and in the financial control and reporting processes.

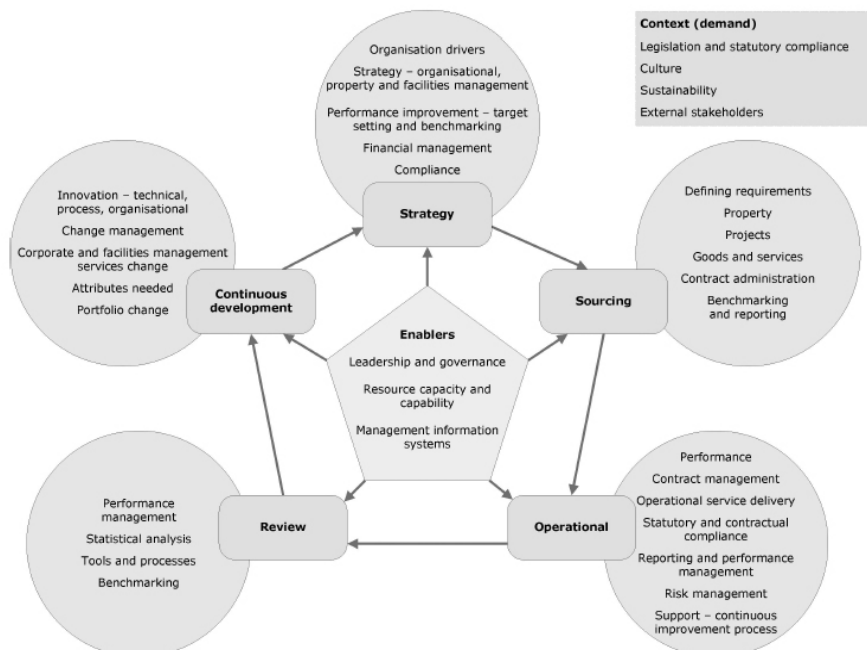


Figure: 1
Facility Management business flows

2.2 Benchmarking for Sustainable Maintenance Management of a Nation's Building Stock

The growth in the significance of building maintenance has occurred due to new-build activity, as well as to a growing awareness of the need to manage the condition and the operation of the nation's building stock more effectively. The whole subject of maintenance management is the issue of Facility Management, which is a rapidly developing discipline.

Facility Management is important as regards the construction of buildings, their health and safety requirements, or their sustainability, whether they the buildings are viewed alone as an investment and/or a service. Buildings and their facilities should therefore be maintained and managed in ways that minimise their environmental impact but still meet the occupier's and owner's requirements. In this context, sustainability goes beyond the issue of environmental protection and resource conservation. Increasingly it is the drive to ensure delivery of this wider agenda which presents us with some of the biggest challenges, as legislative changes impact on building usability and increasing emphasis is placed on occupier requirements.

The opportunity should be taken at the time of replacement and/or refurbishment to introduce more sustainable components and materials. This can also provide the opportunity for extending life expectancy together with reducing environmental impact.

Architects and building engineers should accept that there is more to sustainability than just the energy-efficient design of buildings and that appropriate management and refurbishment of existing building stock is vital to meeting any form of sustainability targets. A combination of maintenance and life cycle replacement of materials, equipment and building components should therefore be designed with this in mind.

Within the real estate industry there have been different efforts to develop a method to measure environmental performance. In the United Kingdom, the most significant method defining and assessing environmental building performance is BREEAM, the BRE Environmental Assessment Method. BREEAM uses a consensus based weighting system to aggregate performance into one overall score for a building, which is then rated on a scale ranging from pass, good, very good to excellent. The main methodology used in the United States is LEED, the Leadership in Energy and Environmental Design Scheme by the US Green Building Council. This is a point-based system, similar to BREEAM, but resulting in buildings being awarded bronze, silver, gold or platinum status.

There are many performance indicators applied by the real estate industry that address maintenance performance and cost effectiveness. The currently existing indicators collected by Pati et al. (2009) are listed below. An additional Maintenance productivity indicator is under development to compare various

maintenance policies on costs and maintained building state. Maintenance productivity is defined as a ratio of a building's state and maintenance cost, and may be used for maintenance policy justification and budget allocation.

The currently existing indicators (Pati, D. et al. 2009) are:

- Building performance indicator (BPI)
- Maintenance efficiency indicator (MEI)
- Manpower sources diagram (MSD): a ratio of in-house and outsourcing expenditures
- Managerial span of control (MSC): a ratio of a manager and subordinated personnel
- Business availability in %: an available floor area over an entire floor area over year
- Manpower utilization index (MUI) in %: a ratio of man-hours spent on maintenance and total available man-hours
- Preventive maintenance ratio (PMR) in %: a ratio of man-hours spent on preventive maintenance and total maintenance
- Urgent repair request indicator (URI) and general repair request indicator (GRI): occurrence/10,000 m²
- Average time to repair (ATTR): unit repairing time in hour
- Maintenance productivity (under development)

Benchmarking is considered to be a valuable tool or process for assessing the effectiveness and efficiency of the maintenance operation. It is becoming increasingly common in maintenance management to seek benchmarks by which the performance and costs of a building or facilities can be measured against other comparable facilities or against previous cost data. However, it is imperative that true comparables are used. CEN TC 348 is the facility management standards committee operating across Europe and works on European standards development. The new CEN TC 348 prEN 1522-7, Facility Management - Performance Benchmarking has been published; it standardises the method to be used when collecting data on maintenance, operation and occupancy costs.

2.3 Importance of the Survey for Hungary

Facility Management as an industry has emerged as one of the fastest growing sectors in Hungary; its weight and importance has been increasing since the mid 90s. The FM industry delivers 7% of the GDP and employs 10% of the working-age population. Facility Management services are provided entirely by Hungarian-owned small and medium enterprises (SMEs). To sustain future success, the FM industry needs a complementary FM profession, one which can bring to bear the analytical and business skills in the industry. The international ratios and metrics

cannot be adopted, because of the different bases of the survey, cultures, climates, and different legislation and economical, social, and environmental circumstances. We should create our own measures and metrics in the local business environment and local property market to support the FM industry and FM providers and clients. Although tools for measurements are widely used in the Hungarian construction industry, the measurements are focused on local measurement in the company, and national measurement and benchmarking mostly do not exist.

3 Methodology

The IFMA has developed a method for facility benchmarking that you may find useful to review in developing a benchmark for current FM services. The IFMA periodically sponsors benchmarking research projects, and the results are published in benchmarking reports. The Building Managers Association (BOMA), based in Washington DC, publishes an annual benchmarking report known as the BOMA Exchange Report. Another organisation that has developed a benchmarking methodology is the American Productivity and Quality Center (APQC). Facility professionals should review this organisation's benchmarking process and related information as it defines and uses benchmarking from a business perspective. APQC also has a *Code of Ethics for Benchmarking* that you may consider adopting.

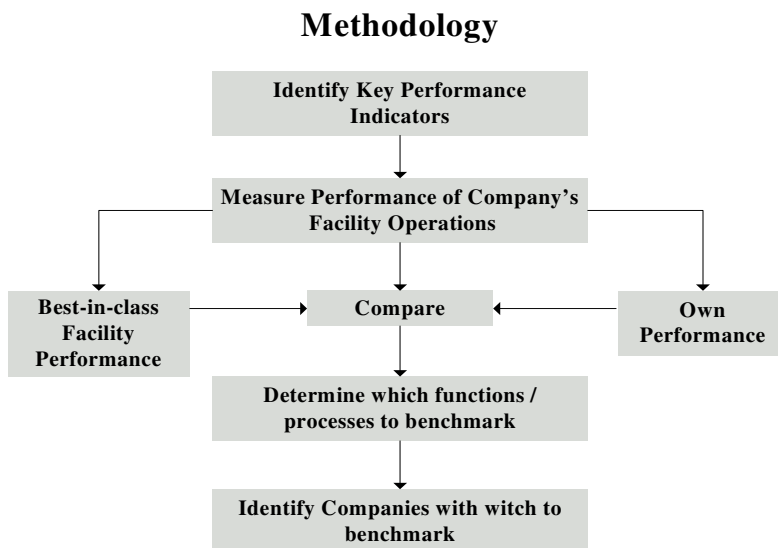


Figure 2
IFMA Methodology of benchmarking process

3.1 Key Performance Indicators

In order to be able to measure the performance of the facilities, a set of so-called key performance indicators (KPI) must be defined. As regards the definition of the indicators, the following important factors should be considered:

- The indicator must be easily measurable, an most optimally it should come automatically out of a system, if possible;
- Indicators must be defined not only for monitoring the actual process, but also for controlling it. Many of the performance indicators used to measure property are based on the area of the property.

Table 1
IFMA's 9 KPIs

1) Description of Facilities	Industries represented, Facility use, Ownership, Hours of operation, No. of occupants, Location of facility
2) Sizes and Uses of Facilities	Gross area, Rentable area, Usable area, Square footage per occupant, Building efficiency rates, Workstation utilization rates, Office space per worker, Support area
3) Office space planning	Vacancy rates, Space allocation policies, Office type and size
4) Relocation and Churn	Organizational moves, Cost of moves, Churn rate
5) Maintenance, Janitorial and Indirect Costs	Maintenance costs <ul style="list-style-type: none"> • By age of facility • Percentage of replacement cost • Repair vs. preventive maintenance • Outsourcing of maintenance function Janitorial costs, Indirect costs
6) Utility costs	Utility costs, Utility usage
7) Environmental and Life safety costs	Environmental costs, Life-safety costs
8) Support and Project costs	Security costs, Project costs, Space planning costs, Employee amenities costs
9) Financial Indicators	Replacement value of facility, Lease type and cost, Cost of operations, Cost of providing the fixed asset, Occupancy cost, Financial ratios, Total annual facility costs

3.2 Questionnaire Survey

The Hungarian Facility Management Society (HFMS) and the Hungarian Real Estate Association (MAISZ) developed the Facility Management Benchmarks Questionnaire in spring 2007. Questions were asked in an objective fashion in order to obtain responses that were truly representative of industry practices. The questionnaire covered several topics. The project team designed and added questions pertaining to sustainable cleaning, maintenance and utility practices.

Information was collected for the research report through surveys that were mailed to HFMS's and MAISZ's professional members. More than 26 surveys were returned with 21 deemed usable for analysis in 2009. Members were encouraged to pass the survey to the most appropriate person for completion. Respondents were asked to provide information on the facilities they manage for a 12-month period of time. Many chose to report the data for the 2008 calendar year. A total of 26 surveys were deemed usable for tabulation purposes. A completion rate of 80% was considered usable. If a certain question was left unanswered, the respondent was contacted to supply this pertinent data.

The survey questionnaire consists of two parts. The first part attempts to determine activities related to development, operation and maintenance in which the case study property has participated. In this part the survey gathers resource consumption and costs data over a 1-year period and specific operating practices related to environmental management activities and cleaning. The second part of the survey is focused on gathering information related to the management structure of the maintenance management activities inside the organisation.

Additional calculations were made to determine cost and utility consumption per square meter. Utility consumption data was changed to match the unit specified. Hungarian cost data was asked of the participants. If the data appeared out of range, the respondent was contacted to determine how the information was derived. New information was subsequently entered. A convenience sample of 26 firms was selected from a range of core businesses in Hungary.

4 Results of the Survey 2009

HFMS's and MAISZ's Facility Management Benchmarks report breaks down environmental, health, janitorial, cleaning, maintenance and utility costs by facility type, industry, age, main function, and many other sorts. The report also includes staffing and utility consumption data for nearly 200,000 square meters of facilities. The first additional factor that must be taken into account when calculating the relationship between the cost and the performance of the facility is the building's age. The chart in Figure 3 shows the age of the surveyed buildings. The percentile chart shows that the 52% of the surveyed buildings are older than 26 Years.

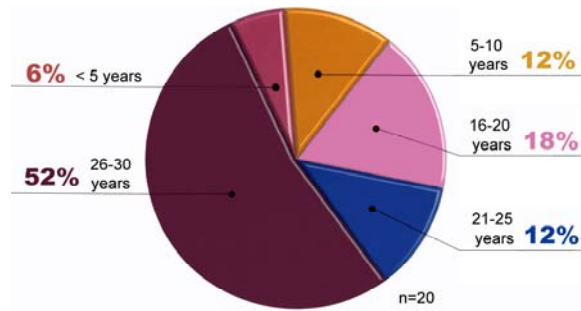


Figure 3
Age of the buildings

The percentile charts in Figure 4 allow you to see how your operation ranks against other organisations. The data should help you identify areas where you can improve the facility operation.

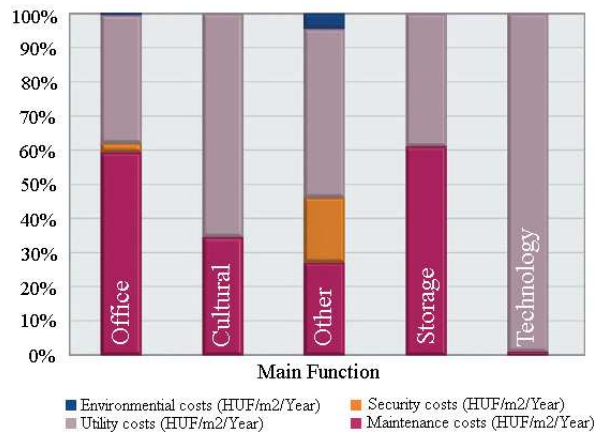


Figure 4
Elements of function specific operation costs

Figure 4 shows the operation costs per main function in HUF/m²/Year. The main property functions are:

- Office,
- Cultural,
- Other,
- Storage,
- Technology.

The highest values of maintenance costs are for the Office function. The lowest of the operating costs for the Office function are the environmental costs.

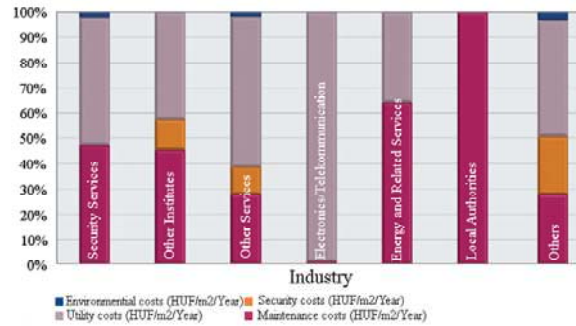


Figure 5
Elements of industry specific operation costs

The percentile charts in Figure 5 shows that the lowest of the industry-specific operation costs are the environmental costs. Figure 5 shows the operation costs per Industry in HUF/ m² /Year. The Industry types are:

- Security Services,
- Other Industries,
- Other Services,
- Electronics/Telecommunication,
- Energy and related services,
- Local Authorities,
- Others.

The tables in Figure 6 show the maintenance costs per area by age of the buildings and by function and the distribution of values. The highest value for maintenance cost has the buildings in age between 21 and 26 years and the highest value get the function of Office.

MAINTENANCE COSTS / AREA (HUF/m ² /Y)		DISTRIBUTION OF VALUES	
Age	Total: (HUF/m ² /Y)	%	(HUF/m ² /Y)
< 5 years	1 732	99	23 633
16-20 years	1 874	95	11 071
21-25 years	26 773	90	6 795
26-30 years	5 723	75	5 723
Older than 30 years	1 282	50	1 874
		25	1 282
		10	0
		5	0
		1	0
		Mean Value	4 548
		Lowest Value	26
		Highest Value	26 773
		Samples	19

MAINTENANCE COSTS / AREA (HUF/m ² /Y)		
Function	Total: (HUF/m ² /Y)	Total: (HUF/m ² /M)
Office	4 885	407
Cultural	1 381	115
Others	681	57
Storage	1 282	107
Technology	26	2

Figure 6
Maintenance cost per area by Age and Function and the Distribution of the values

The number of samples in this period of research was relatively small; therefore, the main target in the following survey is to broaden the range of data providers. To achieve the desired goal of creating a representative sample in the next period of survey, the Budapest University of Technology and Economics (BME) will take part in data collection as well as in statistical evaluation of the data.

Conclusions

Real estate managers as well as professional bodies tend to measure performance from an operational efficiency and sustainability perspective. The benchmarking of real estate maintenance management is essential for the support of the sustainable operation of buildings. Facility Management benchmarking is the search for the best industry practices that lead to superior performance. It can be concluded that the method presented in this paper is applicable for benchmarking. It offers an opportunity for improving the organisation on a continuous basis and considers all better practices. The results of the research clearly support the case for undertaking a similar survey among other types of organisations to ascertain whether the best practice criteria are similar to those of tertiary educational institutions and whether the model can be used for other types of organisations as well. It would be interesting to carry out the same study regionally in order to find out possible culture-related differences. There is a need for further research in which descriptions of different types of relationships in the real estate industry and metrics for managing these types can be provided.

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Multi-Criteria Comparison of Bridge Designs

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Abstract: The selection of a bridge design from among a number of alternatives that meets desired conditions is a complex task. In such projects the stakeholders may have conflicting interests as they represent dissimilar perspectives. It is especially difficult to simultaneously satisfy the diverse engineering, economical, legal and environmental requirements implying both tangible and intangible data of multiple criteria. This paper discusses the methodology and the key activities of the project completion reports of bridge designs. The fundamentals of two well-known methods, a multiple-criteria decision making method, the analytic hierarchy process (AHP) and the Kane simulation technique (KSIM) are described. A realistic application of these methods to the evaluation and comparison of three bridges of different types is also presented.

Keywords: bridge design; analytic hierarchy process; Kane simulation

1 Introduction

In the planning of bridges, the close relationship between design and construction planning should be recognized. Broadly speaking, design is a process of creating the description of a new bridge, usually represented by detailed plans and specifications; construction planning is a process of identifying activities and resources required to make the design a physical reality. Hence, construction is the implementation of a design envisioned by architects and engineers. Several characteristics are unique to the planning of bridges and should be kept in mind even at the very early stage of the project life cycle. These include that nearly every bridge is custom-designed, it often requires a long time to complete, both the design and construction must satisfy several potentialities peculiar to a specific site and its execution is strongly influenced by natural, social, environmental and other local conditions.

The planning for a construction project begins with the generation of concepts which should meet the required engineering standards and the stakeholders' needs. Innovative concepts in design are highly valued for their contributions to reducing costs and to the improvement of aesthetics, comfort or convenience and

environmental aspects. They must be tested for technological feasibility, safety and economic attractiveness. Since bridge construction is site specific, it is very important to investigate the subsurface conditions which often affect the design as well as its foundation. The uncertainty in the design is particularly acute in geotechnical engineering so that the assignment of risks in this area should be a major concern. Since the degree of uncertainty in a project is perceived differently by different parties involved in a given project, the assignment of risks arising from numerous unknowns to the owner, engineer and contractor is inherently difficult. For more detailed information about bridge projects, the interested reader may turn to the excellent books of [1] and [9].

An integral part of the planning process is to examine and evaluate various alternatives of the different bridge designs with respect to the desired system of criteria set up by the stakeholders. The analytic hierarchy process (AHP) is a multiple criteria scaling method proposed by T. Saaty [12]. It was designed to cope with both the rational (measurable characteristics) and the intuitive (qualitative attributes) in order to select the best from a number of alternatives evaluated with respect to several criteria. In this procedure the decision maker (stakeholder) carries out pairwise comparison judgments for every possible pair of alternatives according to each criterion. These are used to develop the overall priorities for ranking the alternatives.

The design process attempts to optimize a number of objectives in determining the suitability of a particular bridge for a defined geographic site and often involves a multitude of factors, sometime contradicting. Some of the important factors that add to the difficulty of the proper choice include the existence of possible options within a territory, intangible objectives, the diversity of interest groups, uncertainties regarding the objectives as well as their timing and magnitude, government and public influence on the design process through legislation, and uncertainties regarding possible delays of permitting and construction. In this paper the AHP method will be used to evaluate and compare bridge designs of different types (a cable-stayed suspension bridge, a truss bridge and a tied-arch bridge) planned to build at a given location as a flagship project of a given district in the USA. To relax some limitations of the AHP the use of a qualitative structural modeling technique called Kane simulation language (KSIM) [10] will also be discussed and applied to help the stakeholders in understanding the dynamic behavior of the system of evaluation criteria through the development of the interactions among the variables.

In Section 2, the methodology and the key activities related to the preparation of a bridge project completion report are discussed. In Section 3, a brief overview of the AHP method is presented. In Section 4, the KSIM procedure is shortly described together with its mathematical background. Finally, in Section 5, a real-world application of these methods to a bridge selection problem is reported.

2 The Methodology and Key Activities of Bridge Project Completion Reports

The preparation of a project completion report for a bridge design includes a series of multi-task professional activities (see e.g. in [16]). The major functional areas and the necessary content of a comprehensive preliminary analysis are described below.

2.1 Engineering and Project Management Analysis

The technical assistance experts (TA) appointed to a given project are responsible for reviewing the engineering aspects of the preliminary study and the design prepared by the feasibility study consultants. An engineering feasibility study is based on test work and subtle engineering analysis, which presents enough information to determine whether or not the project should be advanced to the final engineering and construction stage. The conceptual study is the first document that should be completed on a project. This is the preliminary evaluation of a project and is based on assumptions and factors. Conceptual studies typically identify technical issues that will require additional examination or test work. Generally, the end result of the study is a description of the general features and parameters of the project and an order of magnitude estimate of capital and operating costs. The TA consultants should ensure that the studies and plans are based on uniform design methodologies and design standards, with allowable variations on account of specific site conditions. Sites will be visited as necessary. Topographic surveys, hydrological risks of changing river morphology, design standards, traffic studies, proposed improvements and alignment, soil and material investigations, pavement options, toll plaza and wayside amenities, drainage and bridge structures, road safety measures, contract packaging, and cost estimates are reviewed. The TA will also carry out an institutional assessment of the project, focusing on the suitability of the current staff strength and expertise, authority for successful project management, and its current reporting arrangements. They will make recommendations on the institutional arrangements that need to be granted to ensure successful construction planning and implementation of the proposed bridge.

The assessment of institutional capability investigations for engineering and project management must comprise the following tasks:

- (i) Review the existing traffic data, traffic counts, origin-destination, axle load surveys, and traffic forecasts for the project.
- (ii) Review the engineering aspects (road, bridges, and river training works) in the feasibility study and preliminary design, and do surveys necessary to collect additional information and to verify the data and analysis, as well as the major engineering characteristics (geometric data, structural materials, bearing forces, mechanical stresses, vibration modes, etc.).

- (iii) Review the cost estimates for the proposed improvements for the project components.
- (iv) Establish criteria for selecting bidders, and assist in evaluating proposals and selecting successful bidders, as required.
- (v) Carry out an institutional assessment necessary for successful project implementation.
- (vi) Review the contracting practices of the authorities and the investors and recommend measures to ensure effective utilization of project funds in line with good governance principles.

2.2 Economic Analysis

Economic expert assistance should be provided to supplement efforts in ensuring that the economic analysis is in accordance with the state/regional *Guidelines for the Economic Analysis of Projects*. The TA reviews and improves as necessary

- (a) the feasibility study, the consultants' economic analysis of the proposed bridge project; and
- (b) the traffic forecasts, cost estimates, and benefits.

The economic internal rate of return (EIRR) will then be calculated. Sensitivity analyses are carried out with the project's risk assessment. The TA conducts additional surveys as necessary, and prepares the benefits distribution analysis. In addition, it is highly recommended that the TA look into the fiscal implications of the financing, sustainability, and eventually the foreign exchange components of the Government/ State taking loans for the implementation of the project and identify how the Government/State can raise the revenue necessary to finance its portion of the total cost. The TA may perform a comparative economic assessment of the project vis-a-vis other proposed bridge projects of similar size.

The assessment of the economic analysis should comprise the following tasks:

- (i) Review the feasibility study, economic analysis, sensitivity analysis, and traffic diversion.
- (ii) Prepare a socioeconomic profile of the area of influence, based on a review of existing studies and surveys of the representative road section.
- (iii) Analyze the fiscal impacts of the project cost on the Government's/State's fiscal policies and sustainability, and the macroeconomic implications for the country.
- (iv) Review the impacts of the investment in the bridge on other sectors.
- (v) Analyze possible sources of revenue that the Government/State could use to finance its portion of the proposed construction cost.
- (vi) Assess competitiveness in the road transport industry and the likelihood of vehicle cost savings being passed on to the general community.
- (vii) Prepare a distribution analysis of the quantified benefits of the proposed project.

2.3 Financial Analysis

The TA should carry out a detailed financial analysis of the proposed project in accordance with the state/regional *Guidelines for the Financial Management and Governance of Investment Projects*. The TA reviews the project cost estimates and then will propose a financing plan. Also the TA prepares financial projections as well as the financial internal rate of return (FIRR) and compares it with the weighted average cost of capital (WACC). Sensitivity analysis will be carried out with the project's risk assessment. The minimum acceptable rate of return (MARR), also called the hurdle rate, is the minimum rate of return on a project the financial management is willing to accept before starting the project, given its risk and the opportunity cost of forgoing.

The key activities are to be undertaken in the financial analysis assessment component include the following tasks:

- (i) Review project cost estimates and proposed drawdown schedules as provided by the engineers.
- (ii) Review the proposed financing plan and assess the capacity of financiers to fulfill financing obligations to the project.
- (iii) Assess and prepare financial projections for the proposed project.
- (iv) Carry out a financial evaluation as well as a sensitivity analysis over the project construction and operation period by calculating the financial internal rate of return (FIRR) and comparing it with the weighted average cost of capital (WACC).
- (v) Undertake a financial management assessment, which should include an assessment of the financial management control systems in place.
- (vi) Collaborate with the project economist to ensure the consistency of the approach and the assumptions between financial and economic analyses.

2.4 Environmental Impact Study

The TA should collaborate with the appointed experts in complying with the environmental safeguard policies, by ensuring that environmental assessments are prepared in accordance with the Government's/State's environmental requirements, state/regional *Environmental Assessment Guidelines*. The consultants review, verify, and recommend any revision necessary to the environmental management plan prepared by the independent consultants and perform the environmental impact assessment (EIA) reports, including an environmental management and monitoring plan, in accordance with the approved environmental policy.

The work assignments that need to be carried out by the consultant for this component include, but are not limited to, these tasks:

(i) Review the environmental studies undertaken by the Government/State and other funding agencies and identify additional works to comply with State's environmental safeguard policy.

(ii) Based on environmental studies reports prepared by the Government/State and other funding agencies as well as civil environmentalist organizations, undertake an exercise to confirm the scope of the environmental impact assessment (EIA) study to determine

- (a) environmental aspects that will be affected by the project;
- (b) which environmental data should be collected as data primer and which data from secondary data sources will be adequate; and
- (c) the boundary of the project area and the affected areas.

The scope of the EIA study should be set by consulting relevant stakeholders that may include local communities.

(iii) Gather necessary environmental data and describe systematically the environmental conditions of the study area, i.e., project areas and affected areas. For ecological conditions, collect primary data for water conditions as well as the bottom sediments of the river.

(iv) Work closely with the project engineers to identify project activities that would generate environmental impacts.

(v) Assess the environmental impacts of the proposed project in detail by following the order of the project cycle (impact during preconstruction/associated with location, environmental impact during construction and operation). The assessment should cover direct and indirect impacts and main project activities as well as supporting activities such as construction of bunds to regulate river flow, if any; construction of approach roads, if any; construction for river training; dredging; and others.

(vi) Classify the significance of the identified impacts.

(vii) Prepare mitigating measures in detail for technical, social, and institutional aspects of all expected environmental impacts.

(viii) Work closely with the project economist of the team to provide a detailed assessment of alternatives, and undertake environmental cost and benefits analysis.

(ix) Prepare a detailed environmental management plan and a monitoring plan.

(x) Undertake adequate consultation with local communities when preparing the EIA study. Two-step consultations are needed:

- (a) to determine the public's concerns;
- (b) to inform the public of the findings of the study.

(xi) Prepare concise EIA.

3 Overview of the AHP Method

In this section we describe the major characteristics of the AHP in short. The most effective form used to structure a decision problem is a hierarchy consisting usually of three levels: the goal of the decision at the top level, followed by a second level containing the criteria by which the alternatives, located in the third level, will be evaluated. Hierarchical decomposition of the given complex system is central to AHP.

The AHP is used to derive the most advanced scales of measurement, called ratio scales, from both discrete and continuous paired comparisons in multilevel hierarchic structures. These comparisons may be taken from actual physical measurements or from subjective estimates that reflect the relative strength of preferences of the experts. Since the number of the participants (experts) in such a decision making group is usually 5-15, there is a need for aggregation, which is called the process of synthesizing group judgments. By synthesizing the particular priorities with the average weighting factors of the attributes, the ultimate output is yielded in the form of a weighted priority ranking indicating the overall preference scores for each of the alternatives under study. Thus, AHP is a method that can be used to establish measures in both the physical and human domains. The AHP is especially concerned with departure from consistency, and the measurement of this departure and dependence within and between the groups of elements of its structure.

The AHP utilizes relative comparisons to derive ratio scales of measurement. Here, the alternatives are compared in pairs according to a common attribute. The relative measurement, w_i , $i=1, \dots, n$, of each n elements is a ratio scale of values assigned to that element and derived by comparing it in pairs with the others. In paired comparisons, two elements i and j are compared with respect to a property they have in common. The smaller i is used as the unit and the larger j is estimated as a multiple of that unit in the form $(w_i / w_j) / 1$ where the ratio w_i / w_j is taken from a fundamental scale of absolute values. Thus, such a dominance matrix of these ratio comparisons, denoted by \mathbf{A} , may be given in the form:

$$\mathbf{A} = \begin{bmatrix} 1 & \frac{w_1}{w_2} & \cdot & \cdot & \cdot & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & 1 & \cdot & \cdot & \cdot & \frac{w_2}{w_n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & \cdot & \cdot & \cdot & 1 \end{bmatrix}.$$

The process produces a ratio scale score for each alternative. The scores thus obtained of the alternatives can finally be normalized by dividing each of them by their sum.

Paired comparison judgments in the AHP are applied to pairs of homogeneous elements. The fundamental scale of values proposed by Saaty [14] to represent the intensities of judgments is shown in Table 1. This scale has been validated for effectiveness by numerous applications in a variety of professional fields of interest. As a matter of fact, for these ratios, arbitrary positive numbers can also be used, e.g. 4.1 or 6.87, or even beyond the lower and upper boundaries of the proposed scale, e.g. 23.6 or 0.05.

Table 1
The fundamental scale used in the AHP [14]

Intensity of importance, Strength of preference	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
2	Weak	
3	Moderate importance	Judgment slightly favor one activity over another
4	Moderate plus	
5	Strong importance	Judgement strongly favor one activity over another
6	Strong plus	
7	Very strong importance	An activity is favored very strongly over another
8	Very, very strong	
9	Extreme importance	Favoring one activity over another is of the highest affirmation
Reciprocals of above	If activity i has one of the above nonzero numbers assigned to it when compared with activity j , then j has the reciprocal value when compared with i	

The major objective of using a scaling method is to derive the vector of weights (termed as decision priorities) from the input data elicited from experts' judgments and/or from measurements. In the AHP, this task is accomplished by an eigenvalue-eigenvector formulation which is well-known in linear algebra. The components of the weights of the alternatives are given by the (normalized) components of the right-hand side eigenvector associated with the maximal eigenvalue of matrix A . It should be noted that there are a great number of other methods to generate these priorities, e.g., extremum value procedures, like the least squares optimization method [3, 4], or using the singular value decomposition of the comparison matrix [8]. An excellent review of these procedures can be found in [3]. Of course, there is no perfect scaling method which would outperform all the others with respect to each of the relevant properties. One of the most important features is the consistency condition,

commonly interpreted in practice as the degree of inconsistency of the matrix of comparisons. This measure is directly related to the variance of the error incurred in estimating the entries of the matrix by the respondents. The AHP includes a consistency index for both the single matrices and also for the entire hierarchy.

We now give the formal description of the mathematics of the AHP in a concise form:

Let the finite set of alternatives (systems, objects) be denoted by $A_i, i=1,2, \dots,n$. Let $C_k, k=1,2, \dots,m$, denote a criterion (attribute) with respect to which every alternative is being evaluated. Let an $n \times n$ matrix $\mathbf{A}=[a_{ij}]$ with all entries positive numbers ($n \geq 3$) be introduced. Matrix \mathbf{A} is called a *symmetrically reciprocal* (SR) matrix if the entries satisfy $a_{ij}a_{ji}=1$ for $i \neq j, i,j=1,2, \dots,n$, and $a_{ii}=1, i=1,2, \dots,n$. The use of these matrices was first proposed by Saaty [12]. Here an entry a_{ij} from R^n represents a *ratio*, i.e., a_{ij} indicates the strength with which alternative A_i dominates alternative A_j with respect to a given criterion C_k . Such a matrix is called a *pairwise comparison* matrix (PCM) and is usually constructed by eliciting experts' judgments. The basic objective is to derive implicit *weights* (priority scores), w_1, w_2, \dots, w_m , with respect to each criterion C_k . A vector of the *weights*, $\mathbf{w}=[w_i], w_i > 0, i=1, \dots, n$, may be determined by using the eigenvalue formulation $\mathbf{A}\mathbf{w}=\lambda\mathbf{w}$. Since the single criteria are usually not equally important, therefore, a vector of the *weighting factors* of each criterion, $\mathbf{s}=[s_k]$, should also be determined, where $s_k, k=1,2, \dots,m$ is often normalized so that $0 < s_k < 1$.

Further, let an $n \times n$ matrix $\mathbf{B}=[b_{ij}]$ denote an element-wise, positive matrix whose entries are all nonzero numbers. Matrix \mathbf{B} is called a *transitive* matrix if $b_{ij}b_{jk}=b_{ik}$, for $i,j,k=1,2, \dots,n$. In [7] it is proven that any transitive matrix is a one-rank SR matrix. In the AHP, a transitive matrix \mathbf{B} is usually termed a *consistent* matrix. If the PCM is not transitive, then it is termed *inconsistent*. Saaty [13] proved that the priority score of an alternative, what he called the *relative dominance* of the i th alternative A_i , is the i th component of the principal right eigenvector of \mathbf{B} , u_i , i.e., even if the PCM is *not* transitive. The *principal* right eigenvector belongs to the eigenvalue of largest modulus. The eigenvalue of largest modulus will be called the *maximal* eigenvalue. By Perron's theorem, for matrices with positive elements, the maximal eigenvalue is always positive, simple and the components of its associated eigenvector are positive [15]. Since any transitive matrix can be expressed as the product of a column vector \mathbf{u} and a row vector \mathbf{v}^T , \mathbf{B} can be written in the form of an the outer product: $\mathbf{B}=\mathbf{u}\mathbf{v}^T$ (the superscript indicates the transpose). This way, it can be shown that the characteristic polynomial of \mathbf{B} , $p_n(\lambda)$ can be obtained in the form: $\lambda^{n-1}(\lambda-1)$. From this expression it is apparent that \mathbf{B} has a zero eigenvalue with multiplicity $n-1$ and one simple positive eigenvalue: $\lambda=n$, with its corresponding right and left eigenvectors, \mathbf{u} and \mathbf{v}^T , respectively. The weights $w_i, i=1, \dots, n$, of the alternatives are given by the components of \mathbf{u} . This solution for the weights is *unique* up to a multiplicative constant. Conventionally, it is normalized so that its components sum to unity.

In the transitive case the eigenvector method provides the true relative dominance of the alternatives. In reality, however, an individual cannot give his/her estimates such that they would conform to perfect consistency. Recognizing this fact, Saaty [12] proposed a *measure* for the *inconsistency* of a PCM: $\mu=(\lambda_{\max}-n)/(n-1)$. Results might be accepted if $\mu\leq 0.08$. Otherwise the problem should be reconsidered and the associated PCM must be revised [13]. Obviously, for a consistent PCM: $\mu=0.00$, since this fact apparently follows from the above considerations (i.e. in that case: $\lambda_{\max}=n$).

To compute the components of the *overall priority scores*, $\pi_1, \pi_2, \dots, \pi_n$, (or overall weights) for the set of the alternatives (i.e. when taking into account the weighting factors of each of the criteria) the AHP utilizes an *additive* type aggregation function: $\pi_i = \sum_{k=1}^m S_k W_{ik}$, $i=1,2, \dots,n$. We note that there are other ways of computing the overall priorities, e.g. a *multiplicative* weighted-geometric-mean aggregation is proposed in [2].

4 Structural Modeling – Kane Simulation (KSIM)

A specific mathematical language (KSIM) originally called Kane simulation [10] has been developed and designed for interactive team use. Many features of the different versions of KSIM make it particularly appropriate for use in project planning, investment analysis, formulating environmental policy, etc., since the

- (1) KSIM is easily grasped by the nonmathematical specialist and can communicate the workings of complex, nonlinear feedback systems to such people,
- (2) KSIM allows for ready entry of such ‘soft’ subjective variables as environmental quality,
- (3) KSIM emphasizes the significance of structural relations rather than exact numerical prediction,
- (4) KSIM is flexible and it can be easily generalized, and
- (5) KSIM is sufficiently powerful that it can express the interaction of variables in an easily interpretable way and graphic fashion.

Realistic problems involve a multiplicity of interacting variables, presenting a complexity of behavior that usually dwarfs human capacity for comprehension. The direct use of non-quantitative variables within the KSIM framework is one of its main advantages, so they are usually incorporated in the model of the complex systems to be analyzed by the procedure. Such models can be formulated and run not only by highly skilled computer scientists; project managers and policy makers may also use them without having specific knowledge in applied informatics.

The procedure is simplicity itself. First, all the relevant variables (both the tangible and the intangible ones) x_i , $i= 1,2,\dots,N$ are selected and listed. Each of these

variables is assigned an appropriately chosen *initial value*, $x_i(0)$. It is the nature of all variables encountered in human experience to be bounded. Invariably there is a minimum below which the variable cannot descend, and at the other extreme there is a maximum beyond which it cannot penetrate. Thus, the range of each of the variables can always be scaled on an interval scale between zero and one.

Second a matrix $\mathbf{M}=[m_{ij}]$, $i,j=1,2,\dots,N$, is developed, called a *cross-impact* matrix, elements of which are real numbers positive and negative integers. The entries m_{ij} of this matrix \mathbf{M} are elicited from subjective judgments made by the members of the decision making group. \mathbf{M} summarizes the interactions between the variables. The estimation procedure is done in the following manner. At each location we enter the action of the column heading upon the row heading. A plus entry indicates that the action of variable A upon variable B is positive. In other words, A (or more properly the change in A) induces B 's growth and such an effect will be proportional to both the relative size of A and the magnitude of the interaction coefficient (not necessarily integer values). Similarly, a minus entry indicates that the action of the impacting variable gives rise to decay in the impacted variable. Self-interactions appearing at the main entries are mostly zeros indicating the lack of autocorrelation, or they can be positive in accord with the idea that a variable may tend to foster its own growth. An exception is when a variable is set as minus. This is to suggest that this variable has reached a stage of obsolescence in its evolution.

There is an extremely important pedagogical value in choosing the matrix entries as combinations of pluses and minuses rather than numerical entries. By not asking for numerical coefficients at the outset psychological barriers are greatly reduced, stimulating group participation and discussion. Furthermore *subjective* variables can very easily be introduced and there is no inhibition in making them play their proper role. Of course, ultimately the pluses and minuses are translated into specific numbers. These numbers express not only the direction of the impacting effects, but their magnitudes. In this respect Saaty's propositions can be used (see in Table 1), i.e., for the relationship between a particular numerical value and the strength of an effect. In line with the real-world occurrences, the entries in the cross-impact matrix \mathbf{M} are not necessarily symmetric, the action of A upon B is not usually the same as B upon A . In KSIM, each interaction is weighted proportionately to the strength of the interaction and also to the relative size of the variable producing the interaction. Although the model seems to imply that the impact coefficients are constants, this need not be so, since they are changing in the course of the iteration process. Also, and most important, growth and decay follow logistic type growth variations, i.e. they are sigmoidal curves rather than exponential ones, *automatically limiting reaction rates near threshold and saturation*.

The properties of the original version of KSIM and the mathematics with which it achieves these features is outlined below (quoted from [10]):”

- (1) System variables are bounded. It is now widely recognized that any variable of human significance cannot increase indefinitely. There must be distinct limits. In an appropriate set of units these can always be set to one and zero.
- (2) A variable increases or decreases according to whether the net impact of the other variables is positive or negative.
- (3) A variable's response to a given impact decreases to zero as that variable approaches its upper or lower bound. It is generally found that bounded growth and decay processes exhibit this sigmoidal character.
- (4) All other things being equal, a variable will produce greater impact on the system as it grows or it declines larger.
- (5) Complex interactions are described by a looped network of binary interactions.

With these conditions consider the following mathematical structure. Since state variables are bounded above and below, they can be rescaled to the range zero to one. Thus for each variable we have

$$0 < x_i(t) < 1 \quad \text{for all } i = 1, 2, \dots, N \text{ and all } t > 0. \quad (1)$$

To preserve boundedness, $x_i(t + \Delta t)$ is calculated by the transformation

$$x_i(t + \Delta t) = x_i(t)^{p_i}, \quad (2)$$

where the exponent $p_i(t)$ is given by

$$p_i(t) = \frac{1 + \frac{\Delta t}{2} \sum_{j=1}^N (|\alpha_{ij}| - \alpha_{ij}) x_j}{1 + \frac{\Delta t}{2} \sum_{j=1}^N (|\alpha_{ij}| + \alpha_{ij}) x_j}, \quad (3)$$

where α_{ij} are the matrix elements (also denoted by m_{ij}) giving the impact of x_j on x_i and Δt is the time period of one iteration. It can be seen how Equation (3) guarantees that $p_i(t) > 0$ for all $i = 1, 2, \dots, N$ and all $t > 0$. Thus the transformation (2) maps the open interval (0,1) onto itself, preserving boundedness of the state variables (condition 1 above). Equation (3) can be made somewhat clearer if we write it in the following form:

$$p_i(t) = \frac{1 + \Delta t \left| \text{sum of negative impacts on } x_i \right|}{1 + \Delta t \left| \text{sum of positive impacts on } x_i \right|}. \quad (4)$$

When the negative impacts are greater than the positive ones, $p_i > 1$ and x_i decreases; while if the negative impacts are less than the positive ones, $p_i < 1$ and x_i increases. Finally, when the negative and positive impacts are equal, $p_i = 1$ and x_i remains constant. Thus the second condition holds. To demonstrate conditions (3-5) let us first observe that for small Δt , Equations (2) and (3) describe the solution of the following differential equation:

$$\frac{dx_i}{dt} = - \sum_{j=1}^N \alpha_{ij} x_i x_j \ln x_i. \quad (5)$$

From Equation (5) it is clear that as $x_i \rightarrow 0$ or 1, then $dx_i/dt \rightarrow 0$ (condition 3). Thus, the expression $x_i \ln(x_i)$ may be said to modulate the response of variable x_i to the impact it received from x_j . Considering x_j individually, we see that as it increases or decreases the magnitude of the impact of x_j upon any x_i increases or decreases (condition 4). Finally, it is seen that condition (5) holds since system behavior is modeled, through the coefficients α_{ij} , each of which describes the binary interaction of x_j upon x_i .”

Although the model seems to imply that the impact coefficients are constants, this need not be so. Any of these coefficients may be a function of the state variables and time. The system exhibits sigmoidal-type growth or decay corresponding to α positive or negative. Such growth and decay patterns are characteristic of many economic, technological, and biological processes.

5 The Selection of a Bridge Type: A Case-Study

Here, we present an application of the use of the AHP and the KSIM for selecting the most appropriate bridge design. This study concerns an actual bridge construction project to provide an alternative route across the Monongahela River in the city of Pittsburgh, USA. More detailed reports of this study have appeared in Saaty and Vargas [14], and in [11] and [5]. The author of the present article participated in one of the seven decision making groups of this project. The three types of bridges considered by The Port Authority of Allegheny County were ($n=3$):

A = A Cable-stayed bridge (Figure 1); it belongs to the group of the longest bridges called suspension bridges. The deck is hung from suspenders of wire rope, eyebars or other materials. Materials for the other parts also vary: piers may be steel or masonry; the deck may be made of girders or trussed. This type of bridge is usually applied with very high tensile strength, which minimizes beam deflection as the span is increased significantly. Moreover, adding several stay cables allows the use of more slender deck beams, which require less flexural stiffness. By decreasing the cable spacing supports, local bending moments in the girders are also reduced. Simple double-edge girders supporting transverse floor beams and top slabs provide a synergistic reinforcing action. The economic viability and aesthetic appeal make this type of bridge very popular.

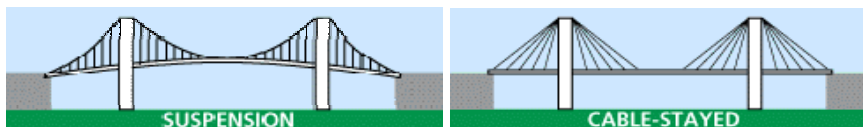


Figure 1

Suspension bridges including their “cousin” the cable-stayed bridge [17]

B = A Truss bridge (Figure 2); it allows applied loads to be resisted primarily by axial forces in its straight truss members. Its open web system permits the use of a greater overall depth than for an equivalent solid web girder. These factors lead to an economy in material and a reduced dead weight. Deflection is reduced and the structure is more rigid. However, fabrication and maintenance costs are increased. In addition, a truss bridge rarely possesses aesthetic beauty.

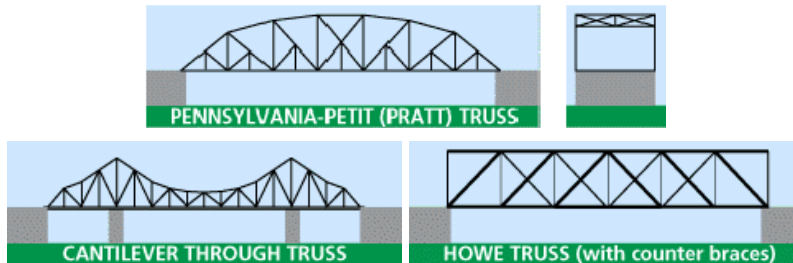


Figure 2
Bridges of Truss type [17]

C = A Tied-Arch bridge (Figure 3); it has been used for its architectural beauty and outstanding strength for centuries. With the aid of its inward-acting horizontal components, the arch is capable of distributing loads both above and below its structure. In a tied-arch design the horizontal reactions to the arch rib are supplied by a tie at deck level. It reduces bending moments in the superstructure and is fairly economical. Aesthetically, the arch has been perhaps the most appealing of all bridge types. It has, however, high relative fabrication and building costs.

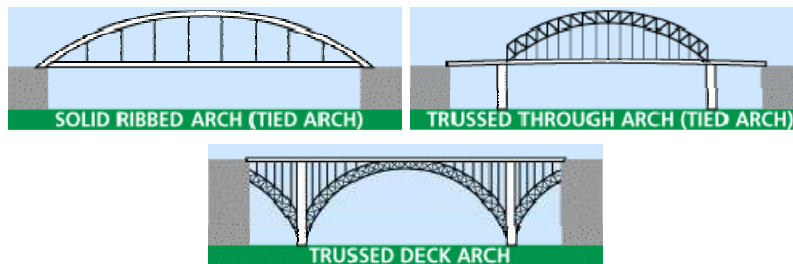


Figure 3
Arch bridges of different configurations including the tied-arch type bridges [17]

The most desirable bridge type would conceivably be the one that brings the most satisfaction to the greatest number of stakeholders. Keeping an eye on this goal, a hierarchy was developed with major stakeholders at the second level, the driving criteria at the third level and the three alternative bridge types at the fourth level. The major stakeholders were then arranged into seven groups each with a number of 8-15 people. These groups are as follows:

FWHA = A Federal Agency, which represents an array of federal departments. It is a key financier of the project and will have dictates with respect to the engineering integrity of any bridge type.

CBD = The Commercial Business District, which broadly represents the businesses in the downtown of Pittsburgh. Its interest implies to maintain the historical appearance of the building site as well.

PUB = The Public, which represents the population of the city that would use the new bridge.

DOT = The Pennsylvania Department of Transportation, which represents the complex interests of the state. These interests are financial (as the state provides part of the capital), political, technical and environmental.

DES = The Designers, who represent engineers, architects and planners and their professional organizations. They provide crucial technical input and so, they have a great influence.

SIG = Special Interest Groups; this means a very broad category with diverse and possibly conflicting interests. They are the concrete suppliers, the steel manufacturers and the environmentalists. The steel industry has declined in size and influence in this region; however, the concrete industry remains strong. Environmentalists are active and vocal.

PAT = The Port Authority Transit; it is the ultimate project owner. This premier stakeholder is concerned with all management issues from conception to construction, as well as maintenance.

In the level below the stakeholders are the six criteria with respect to which the bridge types were evaluated. They are interpreted as ($m=6$):

C1 = Engineering Feasibility (**EF**): The technical knowledge and experience of both the designers and contractors in regard to the bridge type.

C2 = Capital Cost (**CC**): Necessary funding. Because the costs were committed, low costs are included in the overall benefits hierarchy as one of the criteria.

C3 = Maintenance (**MA**): General cleaning, painting, repair and inspection vary dramatically with bridge type.

C4 = Aesthetics (**AE**): Architectural attractiveness.

C5 = Environmental Impact (**EI**): The ecological and historical adjustments that must be compromised.

C6 = Durability (**DU**): The lifetime of the bridge and the potential major repairs over and above the routine maintenance.

Tangible data supporting the engineering characteristics (**C1**, **C2**, **C3**, **C6**) have been derived partially from measurements, while the ratios for the intangible attributes (**C4**, **C5**) were judged by the groups of stakeholders. Numerical computations were done by the software package Expert Choice. First, the actors were compared to determine their relative importance (weighting factors). The 7×7 sized pairwise comparison matrix **A** is displayed on the next page. Note that matrix **A** is a slightly inconsistent matrix. Its calculated inconsistency measure yielded: $\mu=0.03$.

$$\mathbf{A} = \begin{bmatrix} 1 & 2 & 1/5 & 1 & 1/2 & 1/3 & 3 \\ 1/2 & 1 & 1/6 & 1/2 & 1/3 & 1/4 & 2 \\ 5 & 6 & 1 & 5 & 4 & 3 & 7 \\ 1 & 2 & 1/5 & 1 & 1/2 & 1/3 & 3 \\ 2 & 3 & 1/4 & 2 & 1 & 1/2 & 4 \\ 3 & 4 & 1/3 & 3 & 2 & 1 & 5 \\ 1/3 & 1/2 & 1/7 & 1/3 & 1/4 & 1/5 & 1 \end{bmatrix}.$$

The criteria were then compared according to each factor and the composite priorities computed (see Table 2).

Table 2
Weighting factors and weights (priorities) of the criteria

Weighting factor, s_k	0.135	0.221	0.029	0.136	0.085	0.056	0.337	
Stakeholder	FHWA	CBD	PUB	DOT	DES	SIG	PAT	Weight w_i
Criterion C_k								
C1 = EF	0.117	0.048	0.037	0.216	0.313	0.033	0.260	0.173
C2 = CC	0.340	0.048	0.297	0.082	0.197	0.357	0.100	0.147
C3 = MA	0.069	0.116	0.297	0.052	0.118	0.097	0.260	0.154
C4 = AE	0.069	0.401	0.074	0.216	0.136	0.224	0.061	0.174
C5 = EI	0.202	0.270	0.114	0.352	0.117	0.224	0.061	0.181
C6 = DU	0.202	0.116	0.182	0.082	0.118	0.064	0.260	0.171
Inconsistency μ	0.02	0.07	0.05	0.04	0.08	0.06	0.05	

Finally, the alternatives were compared according to each criterion and the composite priority scores (weights) computed. This information was synthesized to yield the overall priority ranking and the overall priorities of the bridges:

Overall ranking and the overall priorities, π_i
B (0.371)
C (0.320)
A (0.309)

Thus, in this project, the most desirable bridge is of a **Truss** type. It is quite interesting to note that a couple of months later this result was reconsidered. The major difference in the duplicated decision making process was the addition of a new stakeholder, the US Coast Guard (USCG), the responsible authority for river traffic, and the deletion of the Public (PUB). Due to the effect of the USCG concerning the reinforcement of the safety aspects of river transportation and the further ecological claims of the environmentalists, the final ranking of the types of bridges changed in favour of a **Tied-arch** type bridge. Since then, the new bridge has been built to the Wabash Tunnel, consisting of three high occupancy vehicle lanes and one for pedestrian traffic.

There are a great number of beneficial properties implied by the AHP which have made it perhaps the most popular scaling method worldwide, although it possesses some shortcomings as well. Especially, its static nature and the implicit independence assumption among the variables (criteria) should be mentioned from the perspective of the comparison of the bridge types. To overcome these difficulties, the author of this paper extended the scope of the investigations of the original study and applied the KSIM technique to this problem, following the steps described in Section 4.

This work has been built upon the subjective assessment of an expert group under the guidance of the author and was based on the preliminary project completion reports for each of the three bridge designs. As an illustration, we now show the results for the **Tied-arch** type bridge. The initial values, $x_i(0)$, of the variables were chosen as:

Engineering Feasibility (**EF**) = 0.8;

Capital Cost (**CC**) = 0.3;

Maintenance (**MA**) = 0.4;

Aesthetics (**AE**) = 0.6;

Environmental Impact (**EI**) = 0.7;

Durability (**DU**) = 0.5.

In the model we introduced six variables. It is apparent that most of them interact with each other. Accordingly, there are thirty potential binary interactions and six possible self-interactions. Choosing these thirty six parameters will define the system. A reasonable first approximation is given in the cross-impact matrix:

$$\mathbf{M} = \begin{matrix} & \begin{matrix} \text{EF} & \text{CC} & \text{MA} & \text{AE} & \text{EI} & \text{DU} \end{matrix} \\ \begin{matrix} \downarrow \\ \downarrow \\ \downarrow \\ \downarrow \\ \downarrow \\ \downarrow \end{matrix} & \begin{matrix} 1 & 3 & 2 & 0 & 1 & 4 \\ 4 & 0 & -1 & -1 & 2 & 5 \\ -2 & -3 & 0 & 1 & 3 & 1 \\ 0 & 1 & 1 & 0 & -3 & 1 \\ -2 & 2 & 2 & 0 & 0 & -3 \\ 1 & 2 & 3 & 1 & 0 & 0 \end{matrix} \end{matrix}.$$

It should be noticed that both the initial values of the variables and the entries of the interaction matrix are somewhat arbitrary. Hence, there is considerable room for disagreement. For example, it would be easy to argue that a variable should be assigned an initial value of 0.8 rather than 0.7. Likewise it could be argued that the action of a variable upon another is negative rather than positive owing to a grounded reasoning. The ease of the model's formulation allows such contrary views to be, expressed easily and in a self-consistent fashion.

Once the model's configuration, i.e., the initial values and the matrix of interactions has been agreed upon it follows the simulation run to project the

future states of the system [6]. Figure 4 exhibits the subsequent behavior of the system that emerges from the above assumptions. Here, the increase in time expresses the change in a variable.

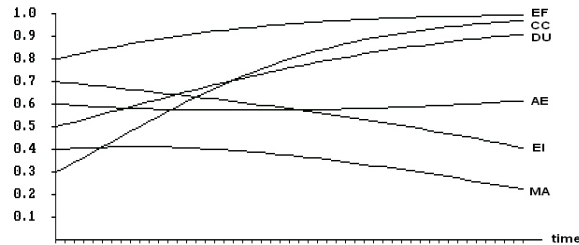


Figure 4

Projected interaction effects as set by the cross-impact matrix **M**

By displaying the dynamic behavior of the system (for the project of the Tied-arch type bridge), further alternative designs or changes of the present plans can be executed; furthermore, new intervention strategies can be implemented in a reasonable way.

Conclusions

In this paper a multiple criteria decision making method and a graphical cross-impact simulation model have been discussed and applied to comparing and evaluating different bridge design projects. Certainly, these qualitative input-based methods and models are hardly conclusive. No doubt many readers would argue for different choices of initial conditions or interactions. This is just what we wanted to be reflected: i.e., controversy and interrelationships. But also any one can use these simple models, even policy makers and citizens. A major objective in devising these models is to show the overriding importance of *structure rather than state* to project managers. The relevance dwells in the *linkages of* any variable to the other variables of the system.

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