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PREFACE

The 2013 September issue of Budapest Management Review published Miszlivetz Ferenc and Márkus Eszter's article „Kraft-index – Creative Cities-Sustainable Regions”. This particular study presents the conceptual starting point for the essays published in the current issue. The implementation of this new conceptual approach (may) require several significant social changes.

The program 'Creative cities – sustainable regions' (KRAFT) is an innovative way of thinking about regional development, which builds on the idea that the success of a region's innovations and investments largely depends on the effective cooperation of economic and social sectors. The integrative view that this brings about is crucial to future success, i.e. the realisation of social-economic and ecological sustainability. This cultural atmosphere, thanks to its technological, institutional and social achievements, produces a win-win situation for all social actors. KRAFT is no magic pill, but the imprint of a new way of seeing and thinking that is in tune with current demands. The main benefit of the 'creative cities– sustainable regions' program is that it is able to utilise capacities of a city's residents and organisations and it can bring out their potential in the areas of science, art, technology and social relations. Sustainable development is what satisfies demands of current generations without jeopardising those of the future generations (Brunland Commission, 1987).

KRAFT interprets sustainable development as the simultaneous harmony of ecological, economic and social sustainability. The novel element of the concept is the foregrounding and measurement of 'soft factors', such as creativity, innovation capacity, producing and transferring new knowledge, trust, cooperation capability and so on. Global crisis has devalued traditional strategies of investment and regional development. At the same time creativity, knowledge production and social-economic cohesion have increased in value. Innovation, as a condition of survival, has become an especially tough (i.e. hard) condition. There are no big cities in Central and Eastern Europe that are popular for multinational capital. The concept of KRAFT regards the settlement structure of these countries and regions as constant. The primary factor in determining their potential for development are the clusters that these small and middle-sized cities arrange themselves into, and

the interconnections they can create. In order to form these functioning clusters however, they need a common language and a common interpretative frame that enables them to better understand their motivations, functioning, and mid-term as well as long-term interests. This deeper understanding and the ability to consider both individual and communal interests in a balanced way are key to create sustainability and forge future success in these cities.

There are a host of index-systems that exist in the literature as well as in practice. These systems are generally used to measure different segments of towns and thereby make them comparable entities. The KRAFT-index is a complex system which signals a variety of attributes that cities and their surrounding regions, or city clusters exhibit. Such attributes are their development tendencies, networks, their capabilities for cooperation, their creativity potentials and also possibilities and types of cooperation that agents may forge. The KRAFT-index does not only show a state, or a momentary image, but it describes and forecasts processes, and it provides a description and an assessment of larger trends.

According to the concept of 'creative cities-sustainable regions', the KRAFT-index measures three different dimensions: (A) creativity and innovation potential, or the capacity to produce new knowledge, (B) social or relational capital, the network potential and cooperation capacity, (C) sustainability potential. Certain potentials are divided into different pillars and factors for the sake of more nuanced measurements and thus ensuring a necessary degree of comparability.

The six chapters published in this issue are closely in line with the profile of this periodical as they recount and analyse some of the important themes mentioned above.

Connecting to these topics we may read other interesting and thought-provoking articles in the volume "The Renaissance of Small Towns", edited by Ferenc Miszlivetz (Savaria University Press – Institute of Advanced Studies, Szombathely – Kőszeg 2016).

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Zoltán Gaál

SZABÓ, Lajos

SUSTAINABILITY, CREATIVITY AND INNOVATION IN PROJECT MANAGEMENT

– MODEL DEVELOPMENT FOR ASSESSING ORGANIZATIONAL PERFORMANCE THROUGH PROJECTS

Today a number of studies are published on how organizational strategy is developed and how organizations contribute to local and regional development through the realization of these strategies. There are also many articles dealing with the success of a project by identifying the criteria and the factors that influence them. This article introduces the project-oriented strategic planning process that reveals how projects contribute to local and regional development and demonstrates the relationship between this approach and the regional competitiveness model as well as the KRAFT concept.

There is a lot of research that focuses on sustainability in business. These studies argue that sustainability is very important to the success of a business in the future. The Project Excellence Model that analyses project success does not contain the sustainability criteria; the GPM P5 standard consists of sustainability components related either to the organizational level. To fill this gap a Project Sustainability Excellence Model (PSEM) was developed. The model was tested by interviews with managers of Hungarian for-profit and non-profit organizations. This paper introduces the PSEM and highlights the most important elements of the empirical analysis.

Keywords: project-oriented strategic planning process, regional development, Project Excellence Model

Today we are surrounded by projects that affect many areas of our lives. Large infrastructural investments – subway, bridge, railway and highway construction, building residential communities – are completed as projects. Large enterprises start projects to develop new products, services and to introduce them to the market. “Project” is also one of the most often used terms regarding the planning, organizing and hosting of international sporting and cultural events. The culture of projects has not only spread rapidly in the last few years among small- and medium-sized enterprises and the public sector in the member states of the European Union, but project management methods, techniques, and related knowledge used during these projects are also of extreme importance.

These projects have become part of organizational and regional development strategies. The purpose of projects is to contribute to the realization of organizational and regional development strategies and goals. The realization of organizational strategic goals affects the external environment in which the organization operates. The main challenge both for the top- and pro-

ject managers is to be able to respond to the needs of external environment, and this depends on how these needs are identified.

These needs are becoming more closely related to sustainability and innovation. From a different perspective, the concept of sustainability and innovation has been linked to project management (Gareis et al., 2011; Silvius et al., 2012). There are several approaches in this field, some of which try to discover the relationship between project management, sustainability, and innovation (Silvius – Shipper, 2014; Daneshpour, 2015; Eskerod – Huemann, 2013). This paper represents the viewpoint that using an appropriate assessment tool to analyze projects is an efficient way to reveal such a relationship.

Tools and methods for analyzing and assessing projects have been developed over the last two decades. These examine what project leaders and other contributors have done in order to achieve a successful outcome. Also, tools can be used to measure to what extent the project satisfied the expectations of project stakeholders. Stakeholder expectations and the responses of

project management to them represent the traditional approach of project success. In recent years, besides the traditional magic triangle – cost, time and quality – sustainability and innovation became a matter of great importance regarding stakeholder expectations. All of these factors need to be taken into consideration both in project planning and in its realization. Thus, methods for analyzing and assessing projects should contain aspects of sustainability and innovation as well. This paper introduces a new method that was specifically developed to assess projects taking into account sustainability and innovation. Through the analysis of both for-profit and non-profit organizations, it also presents how to apply the method in practice.

Project-oriented strategic planning

There are several approaches to create an organizational strategy (Hunger – Wheelen, 2011). However, they all share a common feature that the foundation of a successful strategy is the analysis of internal conditions and the external environment. During the analysis of internal conditions, the strengths are collected and the weaknesses are faced, then an attempt is made to adjust these to the market opportunities and threats. The best solution in analyzing the external environment is to have an integrated approach to analyze the different environmental segments (legal, economic, political, cultural, and geographical). As a result of these analyses, a decision can be made on those business areas that the operation needs to focus on in the future (Luthans – Doh, 2012).

The next step is the formulation of the vision and the mission. The vision describes the desired future state of the organization. It does not contain numerical values to be obtained, it rather outlines those conditions the organization will endeavor to achieve in the future. The mission is the formulation of the guidelines of the core of the organizational strategy and values which is the guiding principle for managers and employees. The vision and mission are essential because during the development of strategic goals, the determination of the operational and action plans, the development of the control system, the achievement of the goals and objective defined in the vision and mission need to be taken into consideration.

The organizational goals compared to the mission are more specifically defined. They are the core elements of the organizational management system (Luthans – Doh, 2012). The quantitative determination should be kept in mind when they are formed.

The organizational strategy and thus the strategic goals are related to different areas: customers (products and services, markets or market segments), financial (profit,

income, cost), internal processes (effectiveness, productivity) and learning and growth (courses, trainings).

The strategic goals defined in the above mentioned target areas, can also be converted into specific, short-term operational plans. However, the market introduction of a new product or an organization of an international event has also great significance regarding the organizational success. Therefore, it is necessary to deal with these target areas from a strategic point of view. In these areas, the strategic goals can be accomplished as a series of projects, the purposes of which are aligned to strategic goals. The organizational strategic goals can be successfully achieved by the successful accomplishment of the projects conducted in the same target areas. The above presented system is called project-oriented strategic planning.

Figure 1

Project-oriented strategic planning

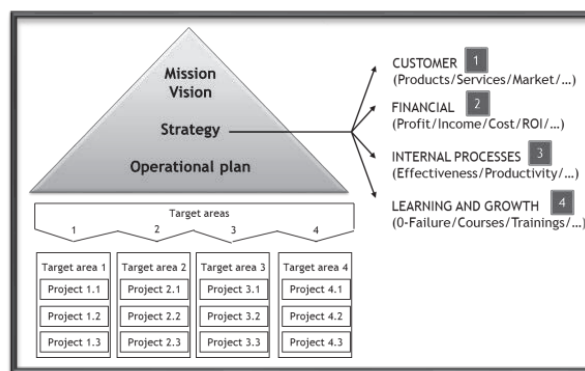


Figure 1 shows the relationship between single projects and the key target areas of strategic goals. The organizational project portfolio includes all those projects that have been identified in order to realize strategic goals. Projects in the project portfolio that need coordination because of their resource-based and/or result-based interdependency form part of a program (Görög, 2013). Thus projects in a program “are managed in a coordinated fashion in support of the portfolio” (PMBOK, 2015, p. 4.). The project-oriented strategic planning is consistent with the PMBOK approach that states “projects and programs within a portfolio are linked to the organization’s strategic plan by means of the organization’s portfolio” (PMBOK, 2015, p. 4.).

The project-oriented strategic planning is of high importance not only for for-profit companies, but for non-profit organizations as well. Reconstruction and renovation of public places, cultural and sporting events, festivals, and the introduction of new learning methods are examples of how non-profit organizations interpret these model when formulating their strategies.

Project-oriented strategic planning and regional competitiveness

Meyer-Stamer states that “we can define (systemic) competitiveness of a territory as the ability of a locality or region to generate high and rising incomes and improve the livelihoods of the people living there” (Meyer-Stamer, 2008, p. 7). Meanwhile the WEF (World Economic Forum) definition of competitiveness focuses on the concept of productivity, this definition takes into consideration the benefits to people living in a region. Annoni and Dijkstra define regional competitiveness as “the ability to offer an attractive and sustainable environment for firms and residents to live and work” (Annoni – Dijkstra, 2013, p. 3.). Fehérvölgyi et al. (2012) stress that development of economy, commerce, and tourism, as well as environmental protection are the most important success factors of cross-border regional development.

Lengyel’s model (2000) gives a systematic view of regional competitiveness by differentiating between basic categories, development factors and success determinants. Basic categories measure the regional competitiveness and include income created in the region, labour productivity and the rate of employment. The development factors of regional competitiveness have a direct, meanwhile the success determinants an indirect impact on these basic categories.

Figure 2 introduces the relationship between regional competitiveness and the successful realization of development projects of organizations operating in a region. Projects related to factors like R&D, human capital or large infrastructural development have a direct

affect on regional competitiveness. Projects contributing to social, economic or environmental improvements through the realization of organizational strategies can have an impact on the basic categories in the long run.

Project-oriented strategic planning, sustainability and innovation

Research on the success of projects and project management is abundant. Most of such work try to define success by identifying the criteria for success, the most important success factors, and the relationship between factors and criteria (e.g. Belassi – Tukel, 1996; Cooke-Davies, 2002; Gemünden – Lechler, 1997; Lim – Mohamed, 1999; Müller – Turner, 2007; Pinto – Slevin, 1988; Turner, 2000; Cserhádi – Szabó, 2014; Görög, 2016; Blaskovics, 2016; Berényi, 2014; Deák, 2004).

There is also a wide range of publications dealing with different aspects of effective innovation management (e.g Wang – Ahmed, 2004; Martins – Terblanche, 2003; Elmquist et al., 2009; Chuang – Lin, 2015; van der Panne et al., 2003; Deutsch, 2014). Models for the assessment of different aspects of organizational innovation are also available. One approach to rate and improve the organizational capability to innovate is the application of the Innovation Capability Maturity Model (ICMM). The Innovation Management Maturity Model by Planview (Nauyalis, 2013) enables the measurement of the organization’s current and desired innovation management maturity across people, processes and tools.

A lot is being written on sustainability in business as well. According to the UN Global Compact – Accenture CEO Study on Sustainability (2013) survey, 93% of CEOs believe that “sustainability will be important to the future success of their business” (Lacy – Hayward, 2013, p. 11.). The Accenture 2010 Report had already stated “CEOs believe that we are moving toward an era in which businesses will no longer focus purely on profit and loss as the primary means of valuation. Rather, [they

The relationship between the project-oriented strategic planning and the regional competitiveness

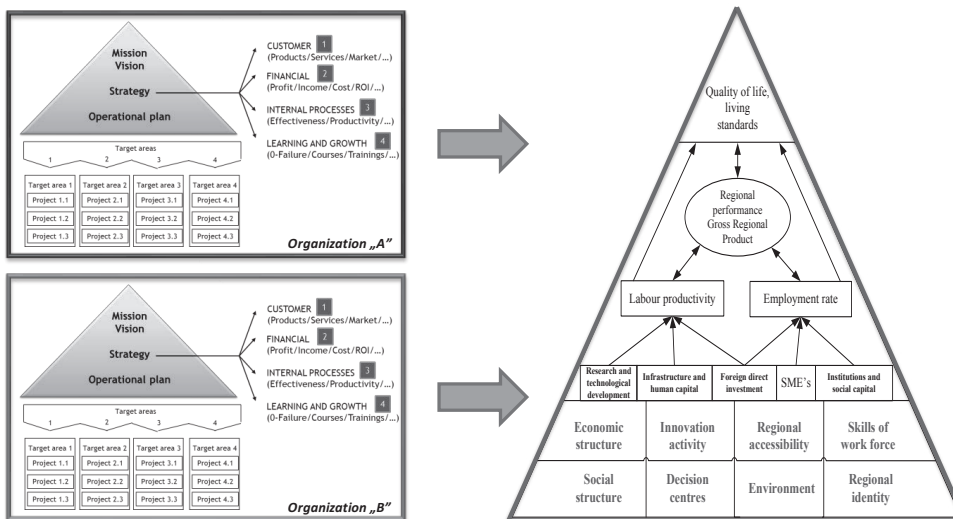


Figure 2

will] take into account also the positive and negative impacts on society and the environment” (Lacy et al., 2010, p. 10).

In the course of the survey and conversations with CEOs, researchers witnessed a fundamental shift since the previous Global Compact survey in 2007. “Then, sustainability was just emerging on the periphery of business issues, an increasing concern that was beginning to reshape the rules of competition. Three years later, sustainability is truly top-of-mind for CEOs around the world. While environmental, social and governance challenges continue to grow and CEOs wrestle with competing strategic priorities, sustainable business practices and products are opening up new markets and sources of demand; driving new business models and sources of innovation; changing industry cost structures; and beginning to permeate business from corporate strategy to all elements of operations” (Lacy et al., 2010, p. 10).

According to a study by MIT Sloan Management Review and The Boston Consulting Group Report 2009, 68% of business leaders cited improved financial returns as a benefit of their organization’s investments in socially responsible practices (Berns et al., 2009).

However, a research conducted by Bonn and Fisher (2011) has demonstrated that many managers do not understand how to make their organizations more sustainable, even though they recognize the benefits of doing so. The framework developed by the authors suggests a way for managers to integrate sustainability into their strategies. It focuses on the strategic decision making process, including the strategy content at the corporate, business and functional levels.

Martens and De Carvalho (2013) state that project management and sustainability themes have been addressed by countless studies. According to studies, initiatives aiming at integrating these two themes are already in progress (Anning, 2009; Bodea et al., 2010; Fernández-Sánchez – Rodríguez-López, 2010; Jones, 2006; Mulder – Brent, 2006; Turlea et al., 2010; Vifell – Soneryd, 2012), but much additional research is required to develop tools, techniques and methodologies (Singh et al., 2012; Thomson et al., 2011) that can be applied in

project management in order to analyze sustainability at the project level (Cole, 2005; Deakin et al., 2002; Thomson et al., 2011).

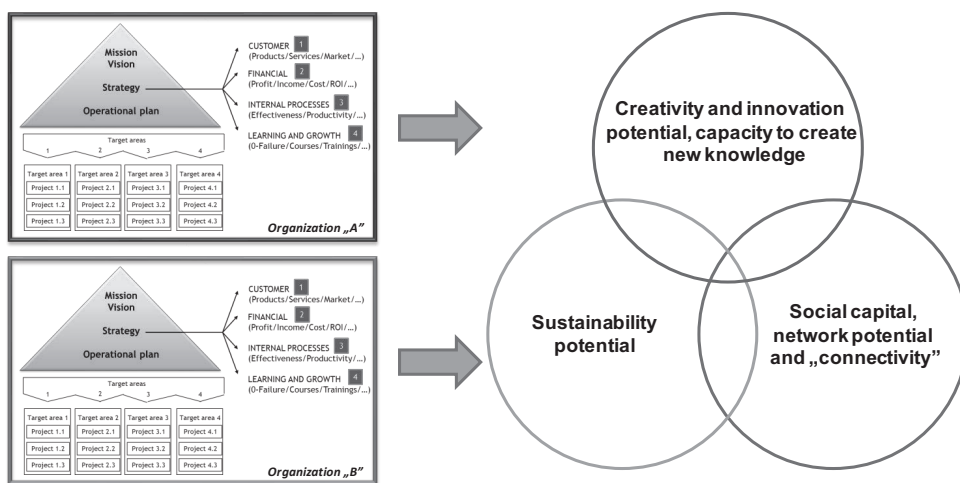
Despite this abundance of publications, there is still a lack of a complex model that accounts for the sustainability, creativity and innovation of projects. The current paper develops such an integrated model and provides examples for its practical applications. This aspect is closely linked to the concept of “Creative Cities and Sustainable Region” developed by Miszlivetz et al. (Miszlivetz – Jensen, 2015; Miszlivetz – Márkus, 2013a; Miszlivetz – Márkus, 2013b), especially related to the dimensions of creativity and innovation potential as well as to potential for sustainability. The Creative City – Sustainable Region is a relatively new concept that “perceives effective regional cooperation among economic and social actors as the measure of successful investment and development” (Miszlivetz – Márkus, 2013a, p. 5).

The KRAFT Index not only proposes an integrated analytical framework that “enables the collective recognition of individual (i.e., corporate, governmental, academic) and common interests”, but also provides “the framework for a more complex and profound understanding of the middle- and long-term development aims of dominant actors” (Miszlivetz – Márkus, 2013a, p. 5). This integrated approach is the key to future success and socio-economic and ecological sustainability.

Figure 3 indicates the relationship between the KRAFT concept and project-oriented strategic planning. Projects like renovation and infrastructure development, the organization of musical and sporting events, product and service development, R&D projects are examples of how projects are directly linked to the elements of the KRAFT concept.

Figure 3

The relationship between the KRAFT concept and the project-oriented strategic planning



The aim of research

The aim of the research is to develop a model to assess how projects become successful by contributing to realization of strategic goals and to local and regional development.

The main focus is on the following key areas:

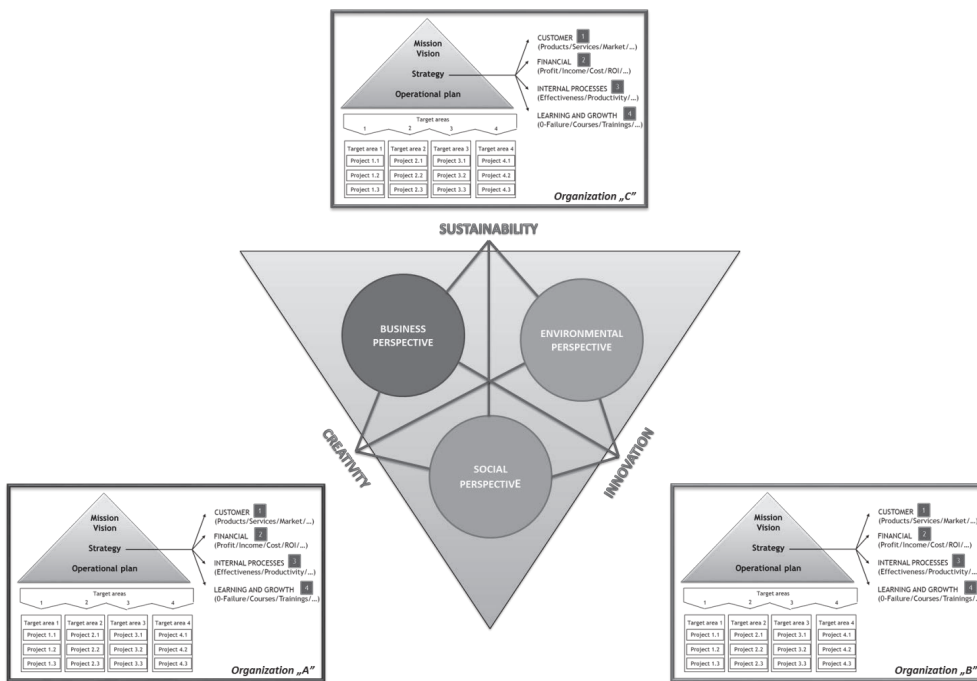
Sustainability: the aim is to reveal how projects contribute to organizational, local and regional economic and social development, as well as to the environmental protection.

Innovation: the aim is to discover the innovation potential of the projects and to analyze how different forms of innovation contribute to organizational, local and regional economic and social development as well as to environmental protection.

Creativity: the aim is to explore how sustainability and innovation are supported by the degree, extent and intensity of individual, organizational and social creativity.

Figure 4 highlights the integrated approach of the research. The innovative aspect of this model is in the multidimensional analysis of project contribution to organizational, local and regional development focusing on innovation, sustainability and creativity.

The innovative approach of the research



Selected theories for model development

The GPM P5 Standard

The Project Sustainability Excellence Model (PSEM) was developed based on two models.

The GPM P5 Standard is a management tool that “supports the alignment of portfolios, programs and projects with organizational strategy for sustainability and focuses on the impacts of project processes and deliverables on the environment, society, the corporate bottom line and the local economy. The simplest way to explain P5 is that it is made up of bonds between the triple bottom line (fiscal, environmental, social) approach, project processes and the resulting products or services” (The GPM Global P5 Standard for Sustainability in Project Management, p. 6).

Elkington coined the phrase “triple bottom line” in his book *Cannibals with Forks* (Elkington, 1997). He stressed that companies should manage three separate bottom lines:

- ✓ Profit: the traditional measurement of corporate success,
- ✓ People: how socially responsible an organization’s operations are,
- ✓ Planet: how they impact the environment.

Figure 4 Although the concept describes the bottom lines in detail, it poses great challenge to create a system of measurement for them under the same terms.

P5 expands on the triple bottom line theory of project management. It contains a checklist that was developed at the 2010 IPMA® Expert Seminar, “Survival and Sustainability as Challenges to Projects”.

P5 provides a “measurable framework for portfolios, programs and projects that are, by definition, unique and considered for inclusion to reports” (The GPM Global P5 Standard for Sustainability in Project Management, p. 10).

The most important advantage of the P5 standard is that it is the first tool that provides a systematic framework for the analysis of company sustainability, but it creates difficulties when applied at the single project level. Meanwhile business sustainability criteria can be interpreted to different projects, environmental and social sustainability criteria analyze governance policies, organizational approaches, standards, processes and practices. These are very important factors but they appear at the organizational level and it is very difficult to interpret on a single project level.

The Project Excellence model

The EFQM Business Excellence Model was developed to improve the quality management of organizations. The EFQM model assesses the overall quality of an organization. However, project organizations differ from permanent organization, therefore a different model is needed for the assessment of projects. The Project Excellence model takes advantage of the EFQM model but it is more than a transformation of the EFQM model to project situations (Westerveld, 2003).

The Project Excellence model is a benchmarking tool that helps project teams to reflect on their own strengths and potential areas for improvement. The model is an adaptable and open concept which allows for many different approaches to projects.

The target for the Project Excellence Award applicants is to collect 1000 points. The model divides the assessment criteria into two sections of 500 points each: Project Management and Project Results.

Project Management criteria:

1. Project Objectives (140 points),
2. Leadership (80 points),
3. People (70 points),
4. Resources (70 points),
5. Processes (140 points).

Criteria of Project Results:

6. Customer Results (180 points),
7. People Results (80 points),
8. Results of other parties involved (60 points),
9. Key Performance and Project Results (180 points).

The IPMA annually presents project management awards to project management teams that exploit and can prove great achievements in project management. The IPMA International Project Excellence Award supports professional project management in achieving high performance in projects and identifies projects as examples of excellent project management. By rewarding teams that prove their success in project manage-

ment, IPMA recognizes and acknowledges excellent and innovative projects. The IPMA Project Excellence Award motivates project teams to identify and optimize their strengths.

General benefits for the award applicants

- The Project Excellence Award is a unique form of benchmarking for project work.
- All award applicants receive an individual, detailed written benchmarking report from a team of qualified and experienced project experts in leading positions.
- The benchmarking report shows not only the strengths in project management but also indicates in which areas project work can be improved, which leads to better project results in the future.
- The benchmarking report also includes a comparison of the performance of the best project teams. (www.ipma.world)

The Project Excellence model enables an evaluation of projects based on a unified criterion-system, but sustainability is absent. According to the project-oriented strategic planning approach, project analyses has to encompass issues related to the planning and realization of strategic goals. Considering that organizational strategy focuses on sustainability and innovation, it provides the incentive for further development of the Project Excellence model, taking into account different perspectives of project sustainability as well as innovation.

The Project Sustainability Excellence Model (PSEM)

Based on the strengths, weaknesses and limitations of standards and models, the Project Sustainability Excellence Model (PSEM) was developed as an instrument to assess development projects that focuses on sustainability, creativity and innovation. The frame of the model is the Project Excellence Model in which the modified and reinterpreted GPM Global P5 Standard is integrated. The modification of the GPM Global P5 Standard means that the indicators which can be applied to projects have been put into the model without any changes, the indicators formulated in a very general way have been concretized and have been made project-related. In addition, new indicators have been created in order to cover all the areas of project-related sustainability, innovation and creativity. The PSEM contains 9 evaluation criteria and in each criterion questions are clustered into dimensions like sustainability, creativity and innovation. In some cases, business, environmental and social perspectives of sustainability appear independently.

PROJECT SUSTAINABILITY ASSESSMENT INSTRUMENT

1. PROJECT OBJECTIVES: To what extent is sustainability a feature for setting project objectives?

To what extent do the following issues appear in the project goals?

ECONOMIC SUSTAINABILITY

Return on Investment:

- Direct financial benefit/profit,
- Net Present Value,
- Cost/benefit ratio,
- Profitability index,
- Internal rate of return.

Meeting the project triangle:

- Meeting the deadline,
- Meeting the budget,
- Meeting the quality of the project outcome.

Business Agility:

- Agility/Flexibility in the project execution,
- Agility/Flexibility in the business operation.

ENVIRONMENTAL SUSTAINABILITY

Transport:

- Local procurement (local suppliers),
- Digital Communication (instead of paper based),
- Minimize the Travel,
- Minimize the Transport of Goods, Materials and Machines.

Energy:

- Minimize the Energy used throughout the Project Life Cycle,
- Minimize the Emission,
- Minimize the Energy the project's product will consume during its life span.

Waste:

- Minimize the waste,
- Use of recyclable materials and methods,
- Environmentally friendly disposal of waste.

Water:

- Minimize the Water used throughout the Project Life Cycle,
- Minimize the Water used during the utilization of the project's product,
- Recycle and purify before Disposal.

Materials:

- Minimize the waste of Materials,
- Apply reusable Materials,
- Use of Materials with less energy consumption.

SOCIAL SUSTAINABILITY

Labor Practices and Decent Work:

- Minimize Health and Safety Risks,
- Create new jobs for local people,
- Equal opportunities for employees.

Learning organization and knowledge management:

- Accumulation and documentation of project management knowledge.

Human Rights:

- Respect for Human Right.

Social development:

- Contribute to social development,
- Solve existing social problems,
- Satisfy the needs of the local society,
- Contribute to social wealth.

To what extent are the project goals characterized by the following statements?

INNOVATION

- Technical innovation in the product / service / construction / other project outcome,
- Process innovation in the project outcome,
- Marketing innovation in the project outcome.

CREATIVITY

- Creativity tools and technics are applied in the idea generation during the planning phase,
- Business and financial problems have been identified,
- Creative solutions for identified problems have been developed,
- Opportunities and threats have been identified and these have been used in the construction of the project strategy.

2. PROJECT LEADERSHIP: Is sustainability an important issue for the project leadership? How do managers support and promote sustainability during the project life cycle?

To what extent does the project leadership pay attention to

- reaching the financial goals?
- the improvement of environmental protection?

- the contribution to the social development?
- fostering innovation?
- support creativity and creative solution?

3. PEOPLE: How are project team members involved in the sustainability of the project, how is their potential seen and utilized?

To what extent are the following issues taken into consideration when project team members are selected?

- They should be able to reach the expected financial results.
- They should work environmentally friendly.
- They should have social sensibility.
- They should know or be able to get to know existing social problems and to identify social needs.
- They should be innovative.
- They should be creative.

4. RESOURCES: How are existing resources used effectively and efficiently from the point of view of sustainability as well as innovation and creativity?

How effectively does the project use financial resources in order to

SUSTAINABILITY

- increase the business sustainability of the project?
- increase the environmental sustainability of the project?
- increase the social sustainability of the project?

INNOVATION

- to promote technical innovation in the product / service / construction / other project outcome,
- to promote process innovation in the project outcome,
- to promote marketing innovation in the project outcome.

CREATIVITY

- apply creativity tools and technics in the idea generation during the planning phase,
- identify business and financial problems,
- develop creative solution for the identified problems,
- identify opportunities and threats and to use these for setting up the project strategy.

How effectively does the project use information as a resource in order to

SUSTAINABILITY

- increase the business sustainability of the project?
- increase the environmental sustainability of the project?
- increase the social sustainability of the project?

INNOVATION

- to promote technical innovation in the product / service / construction / other project outcome,
- to promote process innovation in the project outcome,
- to promote marketing innovation in the project outcome.

CREATIVITY

- apply creativity tools and technics in the idea generation during the planning phase,
- identify business and financial problems,
- develop creative solution for the identified problems,
- identify opportunities and threats and to use these for setting up the project strategy.

How effectively does the project use services of the project suppliers in order to

SUSTAINABILITY

- increase the business sustainability of the project?
- increase the environmental sustainability of the project?
- increase the social sustainability of the project?

INNOVATION

- to promote technical innovation in the product / service / construction / other project outcome,
- to promote process innovation in the project outcome,
- to promote marketing innovation in the project outcome.

CREATIVITY

- apply creativity tools and technics in the idea generation during the planning phase,
- identify business and financial problems,
- develop creative solution for the identified problems,
- identify opportunities and threats and to use these for setting up the project strategy.

5. PROCESSES: How do important processes support project sustainability?

To what extent did important processes of the project support the realization of the following goals?

ECONOMIC SUSTAINABILITY

- Return on Investment:
- Direct financial benefit / profit,
- Net Present Value,
- Cost/benefit ratio,
- Profitability index,
- Internal rate of return.

Meeting the project triangle:

- Meeting the deadline,
- Meeting the budget,
- Meeting the quality of the project outcome.

Business Agility:

- Agility/Flexibility in the project execution,
- Agility/Flexibility in the business operation.

ENVIRONMENTAL SUSTAINABILITY

Transport:

- Local procurement (local suppliers),
- Digital Communication (instead of paper based),
- Minimize the Travel,
- Minimize the Transport of Goods, Materials and Machines.

Energy:

- Minimize the Energy used throughout the Project Life Cycle,
- Minimize the Emission,
- Minimize the Energy the project's product will consume during its life span.

Waste:

- Minimize the waste,
- Use of recyclable materials and methods,
- Environmentally friendly disposal of waste.

Water:

- Minimize the Water used throughout the Project Life Cycle,
- Minimize the Water used during the utilization of the project's product,
- Recycle and purify before Disposal.

Materials:

- Minimize the waste of Materials,
- Apply reusable Materials,
- Use of Materials with less energy consumption.

SOCIAL SUSTAINABILITY

Labor Practices and Decent Work:

- Minimize Health and Safety Risks,

- Create new jobs for local people,
- Equal opportunities for employees.

Learning organization and knowledge management:

- Accumulation and documentation of project management knowledge.

Human Rights:

- Respect for Human Right.

Social development:

- Contribute to social development,
- Solve existing social problems,
- Satisfy the needs of the local society,
- Contribute to social wealth.

INNOVATION

- Technical innovation in the product / service / construction / other project outcome,
- Process innovation in the project outcome,
- Marketing innovation in the project outcome.

CREATIVITY

- Creativity tools and technics are applied in the idea generation during the planning phase,
- Business and financial problems have been identified,
- Creative solutions for identified problems have been developed,
- Opportunities and threats have been identified and these have been used in the construction of the project strategy.

6. Customer Results: What did the project achieve regarding customer expectations and satisfaction considering project sustainability?***To what extent did the project achieve customer satisfaction?******ECONOMIC SUSTAINABILITY***

- Provided the project outcome at a suitable value-price relation.

ENVIRONMENTAL SUSTAINABILITY

- Provided the project outcome as environmentally friendly as possible.

SOCIAL SUSTAINABILITY

- Provided the project outcome with a significant added value for the customers,
- Provided the project outcome as innovative as possible for the customers,
- Solved existing problems of the customers,

- Satisfied the needs of the customers.

7. PEOPLE Results: What did the project achieve regarding the expectations and the satisfaction of employees involved concerning project sustainability?

To what extent did the project achieve the satisfaction of the employees involved?

ECONOMIC SUSTAINABILITY

- The project was organized in an economically efficient way.

ENVIRONMENTAL SUSTAINABILITY

- Project execution was as environmentally friendly as possible.

SOCIAL SUSTAINABILITY

- The project ensured an adequate working environment.

8. RESULTS OF OTHER PARTIES INVOLVED: What did the project achieve regarding the expectations and the satisfaction of other stakeholders concerning project sustainability?

Who are the most important stakeholders of the project?

List of stakeholders:

-
-
-

To what extent did the project achieve the satisfaction of other stakeholders?

ECONOMIC SUSTAINABILITY

- Provided the project outcome at a suitable value-price relation.

ENVIRONMENTAL SUSTAINABILITY

- Provided the project outcome as environmentally friendly as possible.

SOCIAL SUSTAINABILITY

- Provided the project outcome with a significant added value,
- Provided the project outcome as innovative as possible,
- Solved existing problems of the stakeholders,
- Satisfied the needs of the stakeholders.

9. KEY PERFORMANCE AND PROJECT RESULTS: What did the project achieve regarding the intended project results concerning project sustainability?

To what extent did the project achieve the project goals taking into account the project goals identified in the criterion 1?

ECONOMIC SUSTAINABILITY

Return on Investment:

- Direct financial benefit/profit,
- Net Present Value,
- Cost/benefit ratio,
- Profitability index,
- Internal rate of return.

Meeting the project triangle:

- Meeting the deadline,
- Meeting the budget,
- Meeting the quality of the project outcome.

Business Agility:

- Agility/Flexibility in the project execution,
- Agility/Flexibility in the business operation.

ENVIRONMENTAL SUSTAINABILITY

Transport:

- Local procurement (local suppliers),
- Digital Communication (instead of paper based),
- Minimize the Travel,
- Minimize the Transport of Goods, Materials and Machines.

Energy:

- Minimize the Energy used throughout the Project Life Cycle,
- Minimize the Emission,
- Minimize the Energy the project's product will consume during its life span.

Waste:

- Minimize the waste,
- Use of recyclable materials and methods,
- Environmentally friendly disposal of waste.

Water:

- Minimize the Water used throughout the Project Life Cycle,
- Minimize the Water used during the utilization of project's product,
- Recycle and purify before Disposal.

Materials:

- Minimize the waste of Materials,
- Apply reusable Materials,
- Use of Materials with less energy consumption.

SOCIAL SUSTAINABILITY**Labor Practices and Decent Work:**

- Minimize Health and Safety Risks,
- Create new jobs for local people,
- Equal opportunities for employees.

Learning organization and knowledge management:

- Accumulation and documentation of project management knowledge.

Human Rights:

- Respect for Human Right.

Social development:

- Contribute to social development,
- Solve existing social problems,
- Satisfy the needs of the local society,
- Contribute to social wealth.

To what extent are the project results characterized by following statements?**INNOVATION**

- Technical innovation in the product/service/construction/other project outcome,
- Process innovation in the project outcome,
- Marketing innovation in the project outcome.

CREATIVITY

- Creativity tools and technics are applied in the idea generation during the planning phase,
- Business and financial problems have been identified,
- Creative solutions for identified problems have been developed,
- Opportunities and threats have been identified and these have been used in the construction of the project strategy.

Case studies using the Project Sustainability Excellence Model**Research methodology**

The methodology can be divided into 2 main parts. First the theory of the selected topic was analyzed. This led to the development of an integrated model for assessing organizational performance through projects focusing on sustainability, creativity and innovation in project management. Using the model case studies were carried out. The preferred method of data collec-

tion was the personal structured interview with selected project- and functional managers. This method enabled the collection of detailed information about the topic. It also assured that answers were reliably collected. Moreover, credible comparisons were drawn between sample subgroups.

Four organizations were selected for the personal interviews. Both for-profit and non-profit organizations' projects were analyzed.

The first organization is the mayor's office in a small Hungarian city. The mission of the mayor's office is to provide public duties and services, with a main focus on town-development, environmental protection, development and maintenance of public places, public transport, support of sports, arts, healthcare and education. Town development projects like development of public and social spaces, kindergarten reconstruction and renovation of historic buildings were analyzed.

The second organization was a small, privately owned Hungarian company operating in the construction industry. Projects like construction of houses as well as commercial and industrial buildings were selected to be analyzed.

The third organization is a German-Hungarian enterprise, one of the world's leading suppliers for the pharmaceutical industry. Nowadays the company employs more than 550 people. Software development, competence center development as well as transport optimization projects were analyzed.

The fourth organization is also a German-Hungarian enterprise operating in the Hungarian market. It was established at the beginning of the 1990s and today employs more than 800 people. The company focuses on the development and production of complex wiring systems for the automotive industry. Product and service development projects were analyzed.

Research results

Project- and functional managers of the selected organizations were interviewed. The answers were measured on a 5 grade scale. Scores of the dimensions were calculated as follows:

$$CSD = MSD \frac{CMSD}{MOSD}$$

CSD = Calculated Score of the Dimension using the PSEM

MSD = Measured Score of the Dimension (Sum of the points given by the interview partners to the questions of the dimension within a given criterion).

MOSD = The Maximum Obtainable Score of the Dimension within a given criterion.

CMSD= Calculated Maximum Score of the Dimension (The maximum point of the given criterion divided by the number of the dimensions in the criterion. It assumes that dimensions within the criterion are taken into consideration with the same weight).

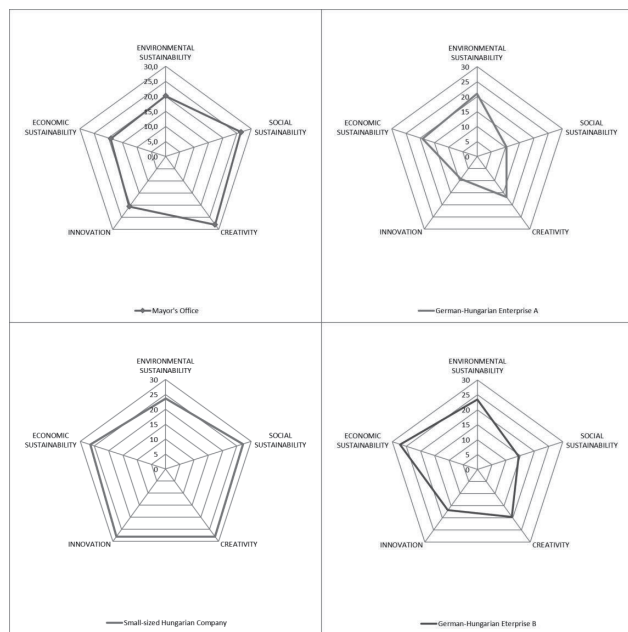
Using the Project Sustainability Excellence Model, the sustainability, innovation and creativity profile of the organization was created.

To be concise, the paper will focus on how sustainability, innovation and creativity are taken into consideration in setting project goals (criterion 1), what does the project achieve considering customer expectations and satisfaction (criterion 6) and to what extent does the project achieve its goals concerning sustainability (criterion 9).

The following profiles indicate the strengths and weaknesses of the analyzed organizations based on the selected criteria.

Figure 5

The spider diagram of the interviewed organizations based on the project objectives



DIMENSION	CMSD	CSD			
		Mayor's Office	HU SME	G-HU E (A)	G-HU E (B)
ECONOMIC SUSTAINABILITY	28	19,2	23,7	19,2	27,2
ENVIRONMENTAL SUSTAINABILITY	28	20,2	27,2	21	23,4
SOCIAL SUSTAINABILITY	28	26,4	28	10,3	14,6
INNOVATION	28	20,5	28	9,3	16,8
CREATIVITY	28	28	26,4	16,8	19,6
SCORE OF THE CRITERION 1		114,3	133,3	76,6	101,6

PROJECT OBJECTIVES: To what extent is sustainability a feature of setting the project objectives?

Figure 5 indicates the importance of the three perspectives of sustainability as well as creativity and innovation in setting the project objectives.

In the case of the *Mayor's office*, the social aspect of sustainability plays the most important role. The aim of these projects is to provide products, services or other outcomes with added value for the local community. The interpretation of creativity is mainly related to the invention of the added value of the project characterized by the very limited budget which creates a win-win solution for both society and the mayor's office.

To increase the competitiveness of the *Small Hungarian Company*, attention has to be paid to innovation and creativity. In this case, technical innovation in the product/service/construction, process innovation, as well as marketing innovation are the centers of attention when designing a new project. Significantly less attention is paid to environmental sustainability, which is unfortunately typical of the construction industry.

The *German-Hungarian Enterprise (A and B)* are affiliated firms of German companies. In these cases, projects are mainly initiated and strategically designed by the parent organization. The main focus is on the economic expectations of the stakeholders as well as on the creative components of the project.

CUSTOMER RESULTS: What did the project achieve regarding customer expectations and satisfaction considering project sustainability?

This category focuses on customer satisfaction. It analyses to what extent the project met customer expectations and achieved customer satisfaction related to the sustainability of the project outcome.

Projects of the *Mayor's office* achieved a high level of customer satisfaction from the point of view of sustainability. Economic, environmental as well as social perspectives of sustainability demonstrate an equally high level of customer satisfaction related to the project outcomes.

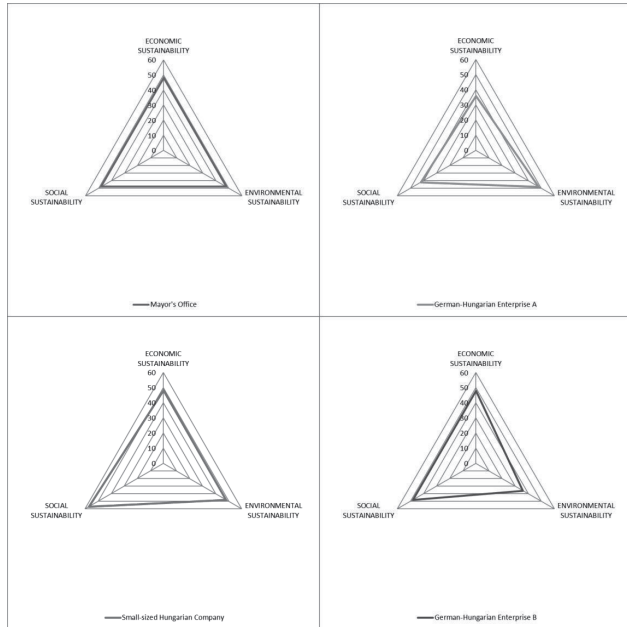
The *Small Hungarian Company* also reached a high level of customer satisfaction. In the project objectives, social sustainability appeared as one of the most important project goals, Figure 6 shows that the company was able to realize this goal and as a for-profit company, this result enables the company to get new orders from these customers.

The *German-Hungarian Enterprise A* also has good results in customer satisfaction, however, the value of economic sustainability is surprisingly lower. The

company should pay more attention to this perspective when launching a new project.

Figure 6

The spider diagram of the interviewed organizations based on the customer results



DIMENSION	CMSD	CSD			
		Mayor's Office	HU SME	G-HU E (A)	G-HU E (B)
ECONOMIC SUSTAINABILITY	60	48	48	36	48
ENVIRONMENTAL SUSTAINABILITY	60	48	48	48	36
SOCIAL SUSTAINABILITY	60	48	57	42	48
SCORE OF THE CRITERION 6		144	153	126	132

At the *German-Hungarian Enterprise B* looking at the goals in category 1, we can state that the economic and environmental aspects of sustainability are more highlighted than social ones. Regarding customer results, customer satisfaction level is higher with regard to the economic and social perspectives of sustainability than with regard to environmental aspect. This indicates that the company should pay more attention to environmental protection considering that customer expectations toward this perspective of sustainability.

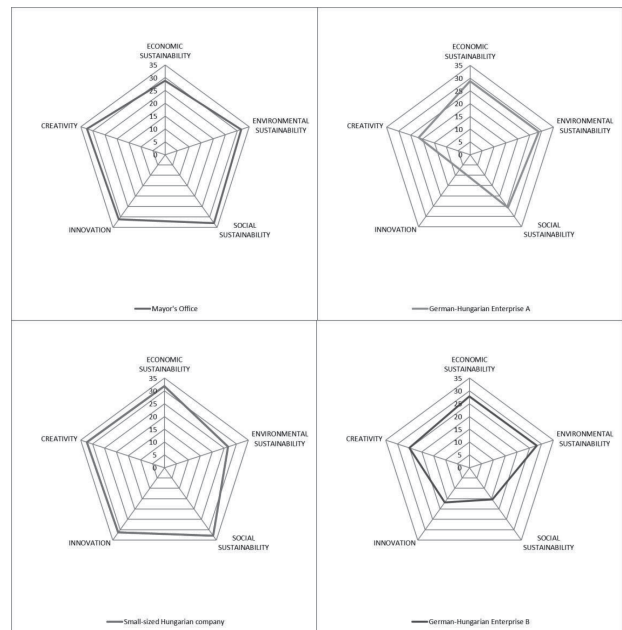
KEY PERFORMANCE AND PROJECT RESULTS: What did the project achieve regarding the intended project results concerning project sustainability?

This dimension indicates what the project realized concerning sustainability. It is important to evaluate the success of the project execution. The main goals of

the project were and the extent to which the projects realized these goals must be taken into consideration (Figure 7).

Figure 7

The spider diagram of the interviewed organizations based on key performance and project results



DIMENSION	CMSD	CSD			
		Mayor's Office	HU SME	G-HU E (A)	G-HU E (B)
ECONOMIC SUSTAINABILITY	36	28,8	31,9	28,8	27,8
ENVIRONMENTAL SUSTAINABILITY	36	31,6	26,6	28,8	28,1
SOCIAL SUSTAINABILITY	36	32,9	32,9	25,7	15,4
INNOVATION	36	31,2	31,2	7,2	16,8
CREATIVITY	36	32,4	32,4	21,6	25,2
SCORE OF THE CRITERION 9		156,9	155	112,1	113,3

Projects of the *Mayor's office* preferred social sustainability and creativity when setting goals. The project results show that these projects match these goals. The analyzed projects exhibit a high level of project success regarding project sustainability.

Projects at the *Small Hungarian Company* also show very good results regarding sustainability, however, the results from the point of view of environmental sustainability should be developed more in the future.

Projects at the *German-Hungarian Enterprise A* demonstrate good results from the three perspectives of sustainability. Results regarding creativity and innovation are lower.

The *German-Hungarian Enterprise B* has successful projects regarding economic and environmental

sustainability. Other aspects should be investigated where development possibilities arise.

Practical applications, limitations and further research development

In the first part of the research program, a model for assessing project sustainability was developed. The Project Sustainability Excellence Model enables companies as well as consultants to evaluate projects with regards to sustainability, innovation and creativity. Using the model, strengths and weaknesses of the analyzed project can be identified and based on these results action plans can be developed in order to improve the project management system of the organization.

This paper aimed to introduce the Project Sustainability Excellence Model. Practical applications of the model were presented through case studies that analyzed local development projects. After completing this research, the new challenge is to carry out a quantitative empirical research utilizing the standardized questionnaire of the Project Sustainability Excellence Model. Building up an international database, quantitative analyses will be applied in order to validate the usefulness and the standardization of the instrument.

The usage of PSEM is not limited to development projects. By analogy with the Project Excellence Award and the related competition a Project Sustainability Excellence Award could be established. For this the application and assessment process, and other requirements such as categorization and fees should be developed and assessors should be trained in order to provide uniform conditions for applicants.

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ARE YOU READY FOR A TENDER PROJECT?

– ANALYSIS OF ORGANISATIONAL PROJECT MANAGEMENT MATURITY IN THE AUSTRIAN-HUNGARIAN BORDER REGION

Are you ready for a tender project? – Analysis of organisational project management maturity in the Austrian-Hungarian border region

Since the 1990s the European Union has paid more and more attention to subsidising cross-border development. It is understandable that different funding from proposal sources is particularly important for the border area, especially to those of utmost importance that support co-operation and rural development. Therefore, they could become a driving force for development. The authors' research analyses the organisational project management maturity of the projects implemented in the frame of the Austria-Hungary Cross-border Cooperation Programme 2007-2013 (AT-HU). Analysing this kind of organisation is an important issue, since the new call for proposals are open in 2016 and the results of this study may provide a self-evaluation opportunity to organisations that need to know if they are ready or mature enough for a new tender project.

The aim of this study was twofold. First of all, those indicators that could be used to analyse the project management maturity of implementing organisations in the AT-HU programme were identified. Based on the empirical research these are the project experience accumulated by the organisation, the internal processes operating at the institution and the professional background. Secondly, factors that can affect this project management maturity were explored and we determined five influencing area: the organisational structure, culture, project managers motivation and the typical and important competences.¹

Keywords: cross-border region, cross-border projects, organisational project management maturity, Austria-Hungary Cross-border Cooperation Programme 2007-2013

The regional development, the co-operation of geographical areas has become an important research area in the 20th century, since these collaborations has not only economic role, but also multi-dimensional sense (Teló, 2007). As Süli-Zakar declared the regionalism, as a process means the development of natural relationships, horizontal integrations based on the natural, social, economic regularities (Süli-Zakar, 2003). The integration among different destinations also means that in the 21th century the strong competition cannot be observed within the region, but rather between regions. Within a region the cooperative competition occur, the actors make local strategic covenants (Lengyel, 2003). These alliances often go beyond the national borders and create cross-border connections. As Faragó mentioned if we do not focus on the borders, but on tasks, a more flexible and network-oriented function can be created

(Faragó, 2004).

Based on Rechnitzer the history of Hungarian regional development can be divided into four parts between 1990 and 2013. The first is the departure between 1990 and 1995, than the institutionalization (1996-1998). A third phase is the preparation from 1999 till 2003 and finally the European Union (EU) membership after 2004 (Rechnitzer, 2012).

Before and even after the EU accession the new opportunities opened up to the border regions in order to strengthen their cross-border relationships. Since this period several EU funded projects were implemented in the border regions and numerous types of organisations took part in them. Therefor the aim of this paper is to analyse the project management maturity of these institutions and answer the questions: are they ready for these tender projects?

Theoretical background

Border region and regionalism

The notion of a border is defined as ‘a zone, a strip of land or line that marks the territories of states off from one another’ (Süli-Zakar, 2003, p. 233.). The development of civilian states and geographical identity has been characteristic of Europe since the 17th century, which symbolises independence at the same time. Simultaneously, each community has been striving to establish such networks that would not be obstructed by border lines when setting up their own. Therefore, the function of border lines has become dual: they defend integrity and individuality while providing a certain degree of protection against those originating from outside their borders.

However the meaning of border is not the full extent. Especially in the Carpathian Basin we can find areas, where the majority of inhabitants belong to another country from cultural and historical terms. Faragó said that a region can only be considered as a separate entity, when its population has those kinds of special and common features (eg. language, culture, tradition, history, specific economic), that separate it from the environment, and they want to preserve and develop them (Faragó, 2004). From this reason those borders, which are separating different cultures can lose their significance over time mainly as a result of accession to common economic and social space (Fehérvölgyi, 2010, p. 28.).

In the studied Hungarian-Austrian cross-border region the above are present mainly due to the integrating impact of the European Union. However, this was not always the case in recent decades. The specific feature that makes border regions distinct, not only as geographical territories but also cultures and nations, can be attributed to Hungarian history (Baranyai, 2007).

It must be understood that the standard of living of inhabitants in the border region can rise if the frameworks of cooperation between regions and countries can be extended (Fehérvölgyi, 2010, p. 29.). Cross-border projects may explicitly serve this purpose, since they may help these regions to be able to combine each other’s comparative advantages (Hardi, 2000). The definition of border region by Schmitt and Egner is based on this approach, which says that the border region is “a transnational interaction between neighbouring regions and their actors in order to maintain, manage and improve a mutual living space” (Schmitt – Egner, 1998, p. 61.).

Cross-border cooperation in the framework of projects

Since the 1990s the European Union has paid more and more attention to subsidising cross-border developments both along its own outer boundaries and in the border regions of future member states. However, cross-border cooperation is not as easy as it seems at first. As Gaál et al. described in their study, the capability of initiation or maintaining relationships is much easier in those organizations, in which the national and cultural background is similar; in the case when employees come from different countries and cultural backgrounds, social relationships become more significant. Otherwise co-operation can lead to a poor level of knowledge sharing (Gaál et al., 2013) and thus a decrease in project success.

Cross-border cooperation programmes have been present in Europe since the 1990s and the European Committee has subsidised this form of cooperation significantly: INTERREG I between 1989 and 1993, INTERREG IIA between 1994 and 1999, INTERREG IIIA between 2000 and 2006 and INTERREG IVC between 2007 and 2013 (Lados, 2009).

Following accession to the EU, Hungary has received numerous possibilities for proposals, which has created a new concept notion at the same time: projects have appeared and thus, Hungary has had the chance to participate in various European territorial cooperation programmes that are financed by the European Regional Development Fund of the EU.

The first Phare CBC (Cross-Border Cooperation) programme was launched in Hungary in 1995 at the time of Austria’s accession to the EU based on a previous EU initiative, the Interreg. With respect to Austria and Hungary the first stage of these programmes was the *Cross-border cooperation programme Austria-Hungary* and then from 2007 onwards the *Austria-Hungary European Territorial Cooperation* can be mentioned. The European Territorial Cooperation took on special responsibilities during the studied period (2007-2013); it became an independent objective of the EU regional policy and thus, the cooperation of two or more countries and the cross-border regions took on even more important roles. A special characteristic of these programmes is that they do not define national programmes and priorities but coordinated, common topics instead.

The Austria-Hungary European Territorial Programme 2007-2013

The Austria-Hungary European Territorial Programme concentrates on two main priorities (Innovation, integration and competitiveness; Sustainable develop-

ment and accessibility), which include several areas of development (www.at-hu.net, 2015). The core programme area is comprised of eight NUTS III regions: Wien, Wiener Umland-Südteil, Nord-, Mittel- and Südburgenland, Győr-Moson-Sopron, Vas, and Zala. Niederösterreich Süd and Oststeiermark are the so-called adjoining regions.

The Austria-Hungary European Territorial Programme is financed by the European Regional Development Fund (ERDF), to which the EU contributed 82 million EUR between 2007 and 2013.

Public or public equivalent bodies, non-profit organisations and other institutions that act in the public interest can act as lead partners or partners in the projects. In accordance with the above, the following legal entities can be: national, regional or local authorities; municipalities; universities; bodies mainly financed or governed by public institutions; and non-profit organisations and associations.

The organisations above can submit their application in the frame of a consortium, where the project partnership must consist of at least one Austrian and one Hungarian organisation. According to Szabó and Cserháti the projects, which involve more participants and partners, require new approach and management methods, focusing on goal orientation, conflict management, and the conscious intertwining of different interests and effects. In these cases the expression project governance is more suitable than project leadership (Szabó – Cserháti, 2013).

Between 2007 and 2013 a total of 87 projects received funding as part of the AT-HU Programme, which translated into 358 project partners (www.at-hu.net 13 July 2015). In our paper we are analysing the project management maturity of these, above-mentioned project implementing organisation. The main questions were that through which factors we can measure the maturity and which influencing factors can contribute to this maturity?

The approaches of organisational project management maturity

Measuring the maturity of organizations is a complex task, but many theoretical approaches refer to its growing importance (Backlaud et al., 2014).

According to Crawford maturity primarily describes the efficiency of an organization (Crawford, 2006). However, according to Levin and Skulmoski maturity is simply defined as the organization's openness and responsiveness with regard to project management (Levin – Skulmoski, 2000; Skulmoski, 2001). We consider this approach important because it points to the openness for new tools, methods, techniques and partnerships,

which play significant roles in the life of present-day tender projects.

According to the economic approach, maturity means a fully developed process. From this statement we should admit that the continuous developments of different competences are also required in order that the above-mentioned processes can be performed (Gareis, 2007). According to this approach, maturity is a self-reinforcing process, since the development of a variety of human and organizational capabilities is essential in order to supply the developed and developing processes. In our opinion, it cannot be determined beyond reasonable doubt where the highest, most advanced level is. Because project management is a highly popular and widely researched discipline at present, and we come across new research results day by day, we have to admit that the learning process has to be continuous, as well. This is especially true in the management of tender projects; we have to continuously keep tabs on the latest calls and modifications of the reporting requirements.

According to Kerzner's point of view for instance, maturity is the development of those repetitive processes and systems which are likely to contribute to the success of the project (Kerzner, 2009).

After presenting the different organisational project management maturity approaches one can conclude that project management maturity means a kind of development which aims to achieve the project goals and technical parameters. Since the authors do not agree on which dimensions and aspects development can be measured, maturity models have been developed. According to Grant and Pennypacker more than thirty maturity models exist (Grant-Pennypacker, 2006). During our empirical research we are going to develop our own, above-mentioned models based on the organisational tender project management maturity model.

The empirical research of the cross-border cooperation programme in the Austrian-Hungarian region

Research methodology

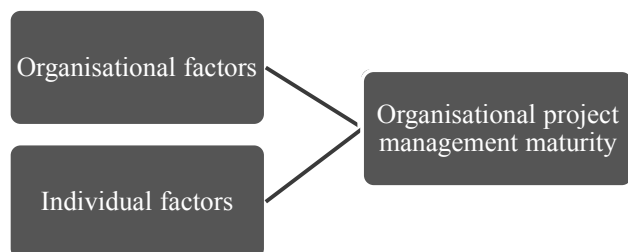
In the course of the present research, the organisational project management maturity of projects in the framework of the Austria-Hungary European Territorial Programme was studied. Furthermore, the aim was to explore those organisational and individual factors that can influence the above-mentioned project management maturity of the organisations.

During the research the correlation between certain factors that rely on quantitative data was explored and analysed. Based on the related chapters of scientific literature and the findings of previous pieces of research, a

research model was developed which presents the potential relations between the analysed elements. (Figure 1)

Figure 1

Research model



According to the initial model of my research the measurement possibilities of organisational project management maturity were identified. Having studied the scientific literature these dimensions of organisational project management maturity were assumed to primarily be influenced by various organisational and individual factors. Therefore, the present research was conducted with regard to the correlation between these variables based on empirical data. From this reason the authors used the method of factor analyses and the regression analyses.

During the factor analyses artificial dimensions, factors are created, which are strongly correlated with more observed variables and which are independent from each other (Babbie, 2003). The factor analysis has two essential goals: on the one hand is able to uncover the structure of the data, on the other hand can reduce the amount of data. Following the analysis, new, latent variables (factors) are created, which are well-mapped the behaviour and the content of the base data, but make measure the correlation between the original variables. In our study we used this analysis in order explore the project management maturity criteria in the case of tender project implementing organisation at the AT-HU border region. Furthermore we used factor analyses in order to reduce the data among the potential organisational or individual influencing factors, as well.

After the factor analyses we were looking for the correlation among the influencing the maturity factors, so we used the regression analyses. In the case of multivariate regression we can measure the strength of connection with a multiple determination coefficient (labelled R^2). The higher the R^2 value, the stronger the connection can be said, so the explanatory power of the model can prove the better. The low significance value ($p < 0.05$) of the F-test and T-test prove the existence of the supposed connection (Sajtos – Mitev, 2007).

Since the empirical research concerned several

countries, the questionnaire was not only developed in Hungarian but also in German. The Hungarian and German questionnaires were sent electronically via e-mails to the partner organisations in the studied programme.

Characteristic features of the sample

The geographical area of the questionnaire was limited by the geographical boundaries of the studied programme since, according to what is laid down in the documents of the Austria-Hungary European Territorial Programme, only organisations in these two countries could submit applications. In the course of the present research the aim was to question the entire population and send the questionnaire to every organisation implementing projects that could be contacted online. Data collection through questionnaires lasted from July to late August 2015. A total of 268 e-mails were sent to the two countries comprising 125 Hungarian and 143 Austrian project managers. 79 responses out of the 268 questionnaires were received that could be evaluated; 41 from Hungarian and 38 from Austrian organisations.

A quarter of the studied organisations were non-profit but a significant proportion of associations, foundations (20%) and other public institutions (18%) were also present. The 'other' category included e.g. Austrian Ltds, chambers, government agencies and financially independent central budgetary institutions. In view of the number of employees, most respondents (29%) employ 11-50 employees and there were equal proportions of institutions employing fewer than 5 people or over 200 people in the sample.

Project management maturity of the organisations

The project management maturity of the organisations implementing the projects of the Austria-Hungary European Territorial Programme 2007-2013 is the focus of our research. The 11 variables used in the questionnaire were divided into the 5 categories used during the research that were considered relevant after having consulted the scientific literature.

The respondents had the opportunity to a self-evaluation on a 1-5 scale. Based on the answers we supposed that the professional background is what is mostly missing from the studied organisations, that is, the knowledge and application of project management techniques. Moreover, the Hungarian organisations considered their own network as inappropriate with regard to project management maturity.

With the help of factor analysis the variables present in the questionnaire were examined and variables that correlate with one another identified. After the first iteration the Kaiser–Meyer–Olkin (KMO) indicator, which shows how much the variables are suitable for factor analysis was 0,733. This value can be on a scale from 0

till 1 means that the analysis is appropriate. The initial proportion of variance with the 12 involved variables was 48,661%. Finally along with a 0.707 KMO value and a 57.3002% proportion of variance, three project management maturity factors were created (project experiences, internal processes and professional background) as can be seen in Table 1.

- those excelling in professional expertise (7 organisations): these 7 organisations are characterised by the knowledge and application of project management techniques, however, their experiences are not significant. Besides, they fall behind in terms of organising project processes.

Table 1

The created project management maturity factors

	Factor		
	Project experience	Internal processes	Professional background
Experiences of the organisation gained in projects with national funding	,657	,140	,177
Experiences of the organisation gained in projects with international funding	,662	,121	,158
Experiences of the members of the organisation in various projects	,813	,231	,118
Network of the organisation in the preparation of each application	,460	,107	,058
Smooth implementation of project activities	,274	,575	,071
Effective internal channels of communication in the organisation	,075	,991	,102
Effective external channels of communication in the organisation	,203	,549	,229
Knowledge of various project planning techniques	,199	,086	,976
Application of various project planning techniques	,150	,201	,613
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

Based on the above table three different organisational project management maturity factors were identified that are relevant in the AT-HU cross-border projects: the project experiences, the internal processes and the professional background. We declare that we will measure the organisational project management maturity through these elements.

Cluster analysis based on the three factors above with regard to maturity was conducted; as a result, four groups were created with the following characteristics:

- experienced (16 organisations): the members of this cluster are said to have great experience in the field of projects. Even though the professional background and project processes are fully developed, these organisations need to be improved in these two areas.
- those lagging behind (21 organisations): these organisations perform slightly above the average with regard to organising project processes (such as in various communication processes or in implementing project activities), but they lag behind considerably as far as the other two dimensions are concerned.

- mature (35 organisations): almost half of the studied organisations belong to this category and all of them exhibit above-average performance in each dimension. They are most developed with regard to professional background.

Factors determining the project management maturity of organisations

Having explored the project management maturity indicators of organisations it is worth looking into the scope of factors influencing them. With reference to the research model, project success is supposed to be remarkably influenced by various organisational and human factors. In order to identify these factors we used factor analyses and created new, latent factors from the aspect of organisational structure, knowledge transfer, project management motivation and competences.

Introduction of organisational factors

Firstly, using factor analysis the bunch of variables to be grouped that would help evaluate the *organisational structure* measurement was determined. By means of econometric analyses the 25 variables present in the

questionnaire were reduced. After the first iteration the Kaiser-Meyer-Olkin (KMO) indicator was 0,620. This value can be on a scale from 0 till 1 means that the analysis is appropriate. The initial proportion of variance with the 25 involved variables was 23,403%. The criteria were finally compacted into two factors: consciousness of project processes and the place and role of a project manager (see Table 2). The efficiency of the analysis is justified by the 0.642 KMO value and the 46.313% proportion of variance.

- externally focused (41 organisations): a mixture of market and adhocracy culture types, a common feature is external focus, to turn to the target group. Challenges and innovative approaches are important.
- clan (20 organisations): clan-oriented cultures are family-like, people know and rely on one another. The leadership style supports teamwork; they value cohesion, commitment and loyalty.

Table 2

The created structure factors

	Factor	
	Consciousness of project processes	Place and role of project manager
high-level coordination and succession between projects	,537	,071
expertise and resources acquired at the given organisational unit are readily available for the project	,638	-,206
respect and willingness to compromise are distinctly characteristic of the employees of the organisation	,786	-,239
the organisation has significant social capital	,717	,164
the organisation has significant potential to create applications (necessary knowledge, expertise and experience)	,558	,224
the scope of action and authority of the project manager depends on the head of each organisational unit	,069	,724
the project manager has no direct controlling rights over the employees of different organisational units	-,028	,626
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

The assessment of *organisational culture* is also a very important issue in the life of organisations; even the examined institutions are mostly smaller ones. As Péter wrote: the smaller the organisation is, the more intimate the atmosphere. Paying attention to co-workers is also fundamental at this kind of institution (Péter, 2015). To assess the organisational culture the theory of Cameron and Quinn was used as a basis and the four culture types they define identified: adhocracy, clan, market and hierarchy. The results supported the existence of three of the four types and another group composed of mixed characteristics was also formed. These clusters can be defined as follows:

- hierarchy (13 organisations): hierarchy-oriented cultures are structured and controlled with a focus on efficiency, stability and 'doing things right'. They value standardization, control and a well-defined structure for authority and decision-making.

- market (5 organisations): the organisation is results-oriented with a focus on achievement and the leaders support competition and high expectations. It is important that everyone in the organisation is subordinate to the common goal.

Among organisational factors the typically applied *knowledge transfer methods* were analysed last of all. It was assumed that organisations prefer off-the-job competence development such as participation in workshops and training sessions or attendance at different lectures. This statement is particularly true in the case of Austrian respondents. With regard to on-the-job competences, such as coaching, mentoring schemes or employing a professional counsellor for certain applications, no differences were detected among the respondents of the two countries. Of the various knowledge transfer tools the most popular choices were project evaluation and problem-solving meetings but respondents also use IT

solutions to support knowledge transfer to a remarkable degree.

Introduction of individual factors

When investigating the individual project manager factors, motivations, highly regarded competences and available competences were analysed.

To analyse *motivation* internal and external factors were formulated based on the scientific literature. Internal factors such as intellectual inspiration and challenge brought about by the job, the diversity of the job or the possibility to develop are more important than external motivators (e.g. pleasant working atmosphere, working style provided by the task). With regard to the motivation of the managers of the two countries there is minimal divergence: for Hungarian respondents financial and social security guaranteed by the job and the pay is somewhat more motivational than in the case of Austrian managers.

The econometric analyses justified the existence of internal and external motivational factors found in the scientific literature so the analysis was continued using the following set of variables. (Table 3)

Concerning the comparison of the *competences regarded as important* by project managers, it was observed during the research that a gap in competences is mainly present in terms of professional skills (such as (project) planning skills, management approach or knowledge of foreign languages) since although the studied managers find the given competence important, they were considered not to possess these abilities. Contrasting results were obtained with regard to methodological competences (e.g. clear targeting, ability to make decisions, far-sighted and effective risk management), which project managers do not consider important though they are thought to possess these abilities.

Based on the received answers with respect to the competences regarded as important by project managers, 2-2 viewpoints can be merged, which were justified by factor analysis with a 0.830 KMO value and 56.312 proportion of variance. The factors are: professional and personal competences; and social and methodological competences.

Several differences can be observed between the competences regarded as important by project managers and *the competences they actually possess*.

Table 3

The created motivational factors

	Factor	
	External motivational factors	Internal motivational factors
development possibility that the job offers	,718	,231
independence provided by the job	,510	,125
the diversity of the job	,693	-,036
intellectual inspiration and challenge brought about by the job	,912	,055
financial and social security guaranteed by the job	,283	,943
the status generated by the job	,041	,590
the pay	,025	,639
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

After the first iteration the Kaiser-Meyer-Olkin (KMO) indicator was 0,686. This value can be on a scale from 0 till 1 means that the analysis is appropriate. The initial proportion of variance with the 11 involved variables was 45,588%. In the course of factor analysis finally a 0.699 KMO value and 55.544% proportion of variance was used.

Therefore, the data reduction of certain variables was performed in connection with the competences characteristic of the respondents creating two major variables (professional competences and managerial abilities) with a 0.793 KMO value and 46.901 proportion of variance (see Table 4 and 5).

VEZETÉSTUDOMÁNY

Table 4

Competence factors regarded as important by project managers

	Factor	
	Professional and personal competence	Social and methodological competence
ability to plan (projects)	,755	,168
management approach	,743	,000
experiences gained in the field of project management	,680	,085
foreign language knowledge	,733	-,082
creativity, innovative mind	,801	,127
commitment to the current project	,808	,087
good organisational skills	,891	,107
good stress management	,840	,123
good ability to explain and summarise	,169	,768
ability to work as part of a team	,214	,710
clear targeting	,228	,683
result-centred	,253	,646
far-sighted and effective risk management	-,175	,571
ability to integrate and systematise	-,173	,567
Extraction Method: Maximum Likelihood.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

Table 5

Competence factors typical of project managers

	Factor	
	Managerial abilities	Professional competences
flexibility	,548	,222
good stress management	,573	,147
openness	,665	-,097
good ability to maintain contacts	,644	-,206
ability to cooperate	,626	-,082
decision-making ability	,784	-,066
identifying problems and suggestions as solutions	,793	-,038
far-sighted and effective risk management	,503	-,154
ability to plan (projects)	-,034	,762
management approach	-,132	,741
experiences gained in the field of project management	,020	,691
Extraction Method: Maximum Likelihood.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

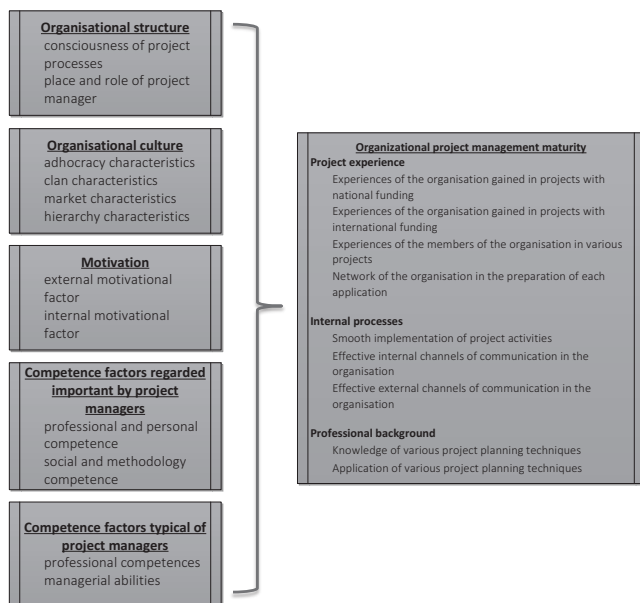
The analysis of factors influencing maturity through regression analysis

Through the organisational structure and cultural factors presented and created above and through the creation of motivational and competence factors the aim of the research was to analyse how these organisational and human factors affect organisational project management maturity. In order to analyse this regression analysis was used, which shows the correlations between certain variables, at the same time it ensures the exclusion of the scope of non-relevant and non-significant factors from the analysis.

The scope of the involved organisational and human explanatory variables was made up of those factors that were brought about through factor analysis. (Figure 2)

Figure 2

Variables involved in regression analysis



The effect on organisational project management maturity of the above-listed factors was analysed and a total of eleven cases were found where a correlation was justified statistically. The multiple determination coefficient (R^2) results, which show the connection strength between the variables, can be seen in the brackets.

An organisation can be regarded as mature in terms of *project experience* and networking if:

- structure – consciousness of project processes (0.297): based on his/her main activity he/she establishes his/her professional network consciously and involves partners in various projects (and vice

versa) that could help accumulate experiences. Provided the organisation is able to compromise and its projects are built on one another focusing on a 1-1 idea, it can also help building from project to project.

- culture – market (0.232): activities are result-oriented, expectations are high and competition within the organisation is supported. Members of the organisation subordinate themselves to the common goal and success and strive to be the best, which facilitates the acquisition of comprehensive experiences and fundamental openness.
- culture – hierarchy (0.414): if standardization is present regarding project tasks and it strives for balance and stability. If the organisation continuously implements newer projects based on these regulations and standards, it will become ever more professional in terms of the project type concerned.
- motivation – external (0.267): project manager is motivated by payment, status and security.

Channels of communication and the internal processes will function well and project activities go smoothly if:

- structure – consciousness of project processes (0.363): due to conscious networking, building projects on one another and their ability to compromise they can accumulate experiences. The practised activities contribute to the smooth implementation of project activities and good channels of communication participate in maintaining established relationships.
- culture – market (-0.263): activities are result-oriented, expectations are high and competition within the organisation is supported. Members of the organisation subordinate themselves to the common goal and success and strive to be the best, which facilitates the acquisition of comprehensive experiences and fundamental openness.
- motivation – internal (0.270): independence, a need for diversity and the creativity of the project manager is provided and these opportunities motivate him/her to implement the project successfully. In this case the project manager regards the tasks as creative challenges and is ready to implement them using any method and tool.
- important competences – social and methodological (-0.297): risk management and clear objectives are not necessarily essential to implement activities smoothly. It can be assumed that social competences and relationships between people are more important.

Those organisations are aware of and apply *project management techniques* that:

- structure – consciousness of project processes (0.321): based on its structure it establishes its professional network consciously, its projects are built on one another and is able to compromise. In the case of several projects running in parallel or projects built on one another these techniques can be necessary, e.g. to allocate various resources.
- culture – market (0.264): activities are result-oriented, expectations are high and competition within the organisation is supported. Members of the organisation subordinate themselves to the common goal and success and strive to be the best, which facilitates the acquisition of comprehensive experiences and fundamental openness.
- motivation – external (0.305): such a project manager is employed who finds financial recognition important. If the financial security of the project manager depends on the project, its preparation will be handled professionally. (Table 6)

Limitations and findings

In this paper the authors had analysed the new notion of border and the commonly implemented projects implemented in the frame of Austria-Hungary Territorial Co-operation Program 2007-2013. Further objective of the paper was to identify a measurement method of the organisational project management maturity in case of the above mentioned projects. In the present research three indicators that could be used to analyse project management maturity of organisations were identified: project experience, internal processes, and professional background.

Since the aim of the research was to have some significance beyond identifying the above-mentioned variables, regression analysis related to factors influencing organisational project management maturity was carried out. The involved scope of organisational and human explanatory variables exhibited a more significant effect on the different mature indicators, so it can be concluded that an organisation can be considered mature with regard to project experience and networking if its processes are consciously organised; its corporate culture is characterised by ‘market’ and ‘hierarchy’ features; and the project manager is motivated by payment, status and security. The channels of communication are also very important, those will function well and project activities will go smoothly if project processes are conscious; the corporate culture belongs to the ‘market’ type; internal motivational factors are dominant for project managers; and methodological and social competences are important. Those organisations understand and apply project management techniques that make the consciousness of processes a priority; ‘market’ type corporate culture; and external motivators appear for project managers.

The present survey was conducted as the sequel to a previously started piece of research. In recent years projects in the Hungary-Croatia IPA (HU-HR) and the Slovenia-Hungary (SI-HU) Cross-border Cooperation Programmes implemented between 2007 and 2013 were analysed. However the results showed in this paper, has the limitation and can be interpreted only for the organisations which have implemented tender projects in the AT-HU program between 2007 and 2013.

On the other hand in relation to organisational project management maturity it is worth testing our project management maturity model and compares the maturity criteria to the previously funded criteria.

Bases on Table 7 it can be seen that in both cases the professional background and the project experiences factors can be mentioned as maturity criteria. However compared to the previously analysed programs this study about the project implementing organisations in the AT-HU programs identified a new criterion, as well. The internal processes, like the communication recognized as relevant issue in this projects. In our opinion this can be

Table 6

The result of regression analyses

Dependent Variable: Maturity – Project experience	Standardized Coefficients	t	Sig.
	Beta		
(Constant)		-,001	1,000
consciousness of project processes	,297	2,557	,013
culture – market	,232	2,115	,038
culture – hierarchy	,414	3,439	,001
external motivation	,267	2,448	,017

Dependent Variable: Maturity – Professional background	Standardized Coefficients	t	Sig.
	Beta		
(Constant)		,002	,998
consciousness of project processes	,321	3,092	,003
culture – market	,264	2,544	,013
external motivation	,305	2,832	,006

Dependent Variable: Maturity – Internal processes	Standardized Coefficients	t	Sig.
	Beta		
(Constant)		-,001	,999
consciousness of project processes	,363	3,513	,001
culture – market	-,263	-2,541	,013
internal motivation	,270	2,589	,012
important social and met- hodological competences	-,297	-2,846	,006

Table 7

Comparison of project management maturity criteria of the organisations implementing projects in the HU-HR, SI-HU and AT-HU programmes

Project management maturity factors in the HU-HR and SI-HU programmes		Project management maturity factors in the AT-HU programme	
Professional background	<ul style="list-style-type: none"> • knowledge of project planning techniques • applying project planning techniques 	Professional background	<ul style="list-style-type: none"> • knowledge of project planning techniques • applying project planning techniques
Experience and network	<ul style="list-style-type: none"> • experience in national projects • experience in international projects • project experience of the members of the organisation • widespread professional network 	Project experience	<ul style="list-style-type: none"> • experience in national projects • experience in international projects • project experience of the members of the organisation • widespread professional network
		Internal processes	<ul style="list-style-type: none"> • smooth implementation of project tasks • effective internal channels of communication • effective external channels of communication

explained by the higher number of project partners in case of AT-HU, unlike other analysed cross-border program. So the smooth inner communication and coordination are indispensable for the successful project implementation.

Conclusions

The present research was motivated by the desire to specify those factors, through which project management maturity of the implementing organisations in the Austria-Hungary cross-border projects becomes measurable in this special field. Based on the empirical research these are the project experience accumulated by the organisation, the internal processes operating at the institution and the professional background. Furthermore, the aim was to point out which organisational factors can contribute to the successful implementation of projects and what kind of motivation and competences of project managers are necessary to make these applications successful. It was declared in the paper that there are five influential factors: the organisational structure, culture, project managers' motivation and the typical and important competences of the project managers.

The paper can give an equipment to the involved organisations through the above described project management maturity model, so they can examine themselves from the aspects of the three maturity factor and the ingredient variables. On the other hand the authors

provided a well-mapped description about the influencing factors, so the institutions have the opportunity to re-consider the organisational structure and the culture and apply those kind of project managers who has the above-mentioned motivation and competences.

During the empirical research we used the method of cluster analyses and explored that there are 35 mature organisations among the 79 involved. This result means that almost half of the studied organisations exhibit above-average performance in the project management maturity dimension. So all in all we can answer the question asked in the title of the paper, and we can declare that just half of the project implementing institutions at the AT-HU border region is ready enough for tender projects.

Lábjegyzet

¹ Some results of this study were obtained in the framework of the TÁMOP 4.2.1.D-15/1/KONV-2015-0006 – “The development of the innovation research base and knowledge centre in Kőszeg in the framework of the educational and research network at the University of Pannonia” key project, which is subsidised by the European Union and Hungary and co-financed by the European Social Fund.

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HÁRY, András

FUTURE POSSIBILITIES, SOCIAL CHALLENGES AND ADAPTATION REQUIREMENTS OF INDUSTRIAL PROGRESS

The paper addresses the technological change that is currently happening in industry. First, a review of the global trends that impact industrial developments is made, then a summary of expanding intelligent technologies and their systems. The report describes in detail the concept of Industry 4.0 and its major technology-related aspects. At the end of the paper, a summary of social consequences is addressed, especially concerning generational concerns connected to the current change in industrial technology. The purpose of the study is to raise some special aspects and considerations in the given subject.

Key words: Industry 4.0, intelligent, technology change

In recent decades technological development has accelerated and created many challenges to businesses and to individuals alike. This article addresses basic questions and dilemmas regarding management and the broader social environment. It touches on issues that can be useful for all business ventures that would like to take advantage of the products of current technological advancement, or who would simply like to remain competitive on the market amidst today's rapid changes. The purpose of the study is to raise some special aspects and suggest certain considerations related to the already running industrial revolutions.

Worldwide Megatrends

Recognizing the trends and tendencies that shape our future is the first step towards intelligent diversification and conscious action. Megatrends are all the changes and tendencies that have fundamental, long-term impact on a global scale. Understanding the characteristics of large-scale trends, and adaptation to the new conditions that possibilities bring, can not happen unless one forms and uses a network approach. Megatrends shape resources on which a region, a company cluster, or a technological development platform can base their profiles. Trying to unpack the nature and implications of such megatrends, one comes across basic principles or laws that companies can rely on in developing their business.

There are several megatrends in the world today; I would like to highlight a few of these, which are directly relevant for company management:

- demographic changes,
- disruptive technologies (available for the masses),
- mobility,
- volatility,
- increasing polarisation,
- ability to adapt to changes,
- generational gap.

Technological changes are partly the source, partly the consequence of the above-mentioned global megatrends, in line with consequences of an overview in this subject (http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf).

What are the characteristics of intelligent technologies?

Typically, there are two types of technological innovation. One is a *paradigm change*, the other employ *old methods in a novel form*. The first category comprises technologies whose approach is fundamentally different from those of earlier ones, and usually brings about new ways of production based on fresh, new research results and ideas (e.g. information technology,

nanotechnology). The second category – more common than the first – comprises technological innovation that combines already existing elements resulting in a novel system or solution. An example of this phenomenon is the intelligent environment where connecting different appliances (alarm, heating and electrical system, electronical devices, kitchen appliances) into one network creates a new valuable product for consumers (Nagy-Kulcsár, 2006). If companies are to stay competitive on the market, such systematic innovations will certainly have to be the way forward. This dual phenomenon, i.e. paradigm change versus developing already known methods, is also called „*the innovator’s dilemma*” (Christensen, 1997).

Contemporary Technological Systems

The revolution of digital technology „took over” chains of production and transport years ago. Today companies focus more on creating intelligent systems of production and distribution, and try to become more competitive using available production and logistical data. There are many examples that show what has changed in recent years regarding the handling of information and creating network-based solutions. For instance, we now have Big Data, IoT (Internet of Things) and IoS (Internet of Services). There is a boom in advanced mobile communication devices, robots, automotive vehicles and transportation devices. Also, companies use more and more alternative energy sources to run industrial plants. Such new technologies can help to reduce costs while increasing the pace of production flows, and the reliability and controllability of production processes. Thus, companies, both manufacturers and logistical service providers, that started implementing new technologies into their business models are on the right path to becoming more and more competitive on the market.

Challenges of the Abundance of Data and Information

Increasing digitalisation of information in operational processes (Big Data), coupled with state-of-the-art analytical methods and the construction of effective process models are transforming models of management as well. Company leaders usually see that implementing such technologies will only be useful if, in the long run, they will be integrated into the structures of management as well. This integration, however will require profound systematic changes. Furthermore, it will also require the renewal of professional training of employees because data-based decision-making is a skill that needs to be learned. The greatest obstacle to such development is that company leaders are not

yet certain whether the organisational units that collect and process data are the ones that can make consistent improvements in the reliability of supply chains. Therefore, experts suggest that when they want to make such improvements, companies should work with traditional methods of measurement and analysis, upon which they should build „breaks” into the system. If this convinces leaders that data-based operations indeed support decision-making measures, and the first results make this visible, then they may become more confident to use evidence-based methods. Having adequate information and data, transport routes could become shorter, which would cut costs, save time and increase productivity. Analysing available data correctly is not only important for developing production or its logistical systems. It is also crucial to uncovering and correcting weak elements of the entire supply chain, for example transport costs and time.

Networks Everywhere

One of the intelligent technologies is the so-called IoT (Internet of Things). It refers to physical objects or equipment – such as machines producing or hauling goods, or spare parts – to which sensors or any other type of data-communication devices are added. Tools with such built-in sensors or data-communicative functions can monitor, coordinate and control through the internet. This enables communication between machines (M2M, Machine-to-Machine). As a result, networks can be built where devices can communicate and exchange information while simultaneously they collect and analyse data about it. In this way Big Data and IoT go hand-in-hand. Today it is becoming more and more natural to control our TV from our mobile phones and TVs are more like home-information centers. Increasingly equipment can connect to the wi-fi network as well. It is interesting to think about what kind of networks can be created and what degree of intelligence we can achieve in a factory or warehouse where we use robots, and automatised transport routes, storing devices and forklifts and where the work is continuously supported by combined systems of energy-supply, storage control and transport optimisation. Through these integrated systems companies can make unprecedented progress in *efficiency, predictability* and real-time *controllability*.

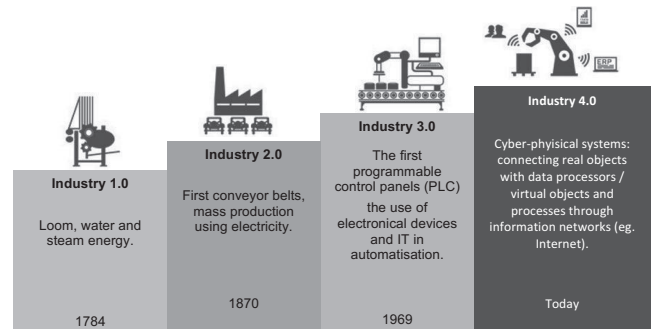
Industry 4.0: Companies of the Future

Generally we speak about industrial revolution when some technological innovation produces a drastic growth in the efficiency of production systems, in other words, these systems undergo a paradigm change.

- The first industrial revolution started in the second half of the 18th century when the steam engine brought about systematic industrial production.
- The second industrial revolution spanned from the second half of the 19th century to the end of the First World War and resulted in mass and serial production; its peak was Ford's Model-T.
- The third industrial revolution is sometimes called the „digital revolution“. It started in the second half of the 20th century and has brought about the global-wide use of logical circuits, the spread of computers, mobile phones and the internet. Concurrently, the first steps towards the automatization of production were taken.
- The fourth industrial revolution is usually referred to as „Industry 4.0“ by mostly German experts. It is a process that is already happening but will reach its peak in the near future when it creates „smart manufacturing“, i.e. the rethinking of production technologies with a network-based approach, and new business models that take advantage of this approach. (Figure 1)

During the first industrial revolution the appearance of *mechanical-based production chains* jump started all the great radical changes that were later given a further boost by the spread of *electricity* during the second industrial revolution. During the third industrial revolution, automatization offered new alternatives for

Figure 1
Complexity of Industrial revolutions and Production Systems

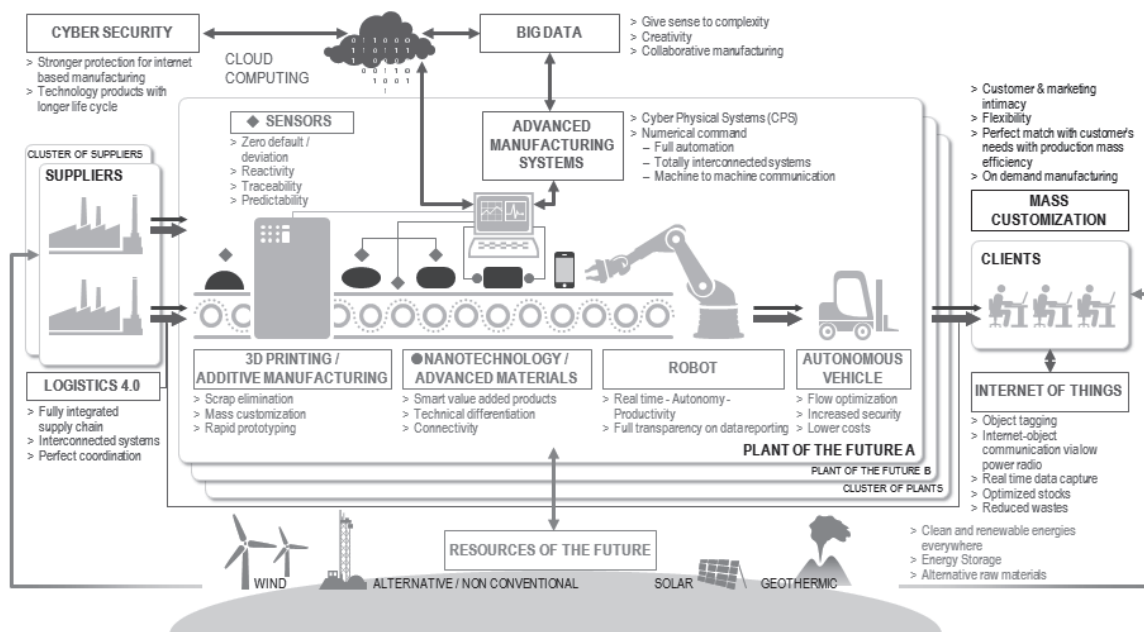


(Source: Heng, 2014)

human labour and made the processes of production faster and more specialized. Today it is primarily the *intergration of these elements* that will produce a breakthrough, because we will be able to use technologies and approaches that will make it possible to operate and control more complex systems and entire supply chains simultaneously. This level of development will require both the seamless integration of systems of production and their IT support systems, i.e. their treatment as *cyber-physical systems*, and the adoption of a radically innovative management approach.

Figure 2

Industry 4.0 ecosystem



(Source: Morris - Berger, 2015)

Hermann (2015) collected six *principles for design* regarding Industry 4.0:

- **Ability to cooperate:** the ability to harmonise cyber-physical networks (e.g. product carriers, assembly stations and endproducts), and enabling communication among people, SmartFactories, through the Internet of Things.
- **Virtualisation:** creating a virtual copy of the SmartFactory, on the basis of information derived by sensors (monitoring physical processes), virtual factory models and simulation models.
- **Decentralisation:** the decision-making ability of cyber-physical systems within the Smart Factory.
- **Real-time capability:** the ability to collect and process data in real time.
- **Service-centered approach:** providing services (for cyber-physical systems, people or for the SmartFactory) through the Internet of Services.
- **Being Modular:** the ability of SmartFactories to adapt to changing circumstances by changing or expanding certain elements.

The basis of Industry 4.0 is that we create smart units that are autonomous but that are in close connection with one another and are intelligent. These complex systems can optimise through detailed inter-connected models in order to fulfil pre-set goals. Besides arranging these smart elements into systematic networks, this process also requires their fine-tuning in „cyber space”. We can do this through a model-based optimisation and a new type of development of simulation devices. Accordingly, Cyber-Physical Production Systems (CPPS) will create intelligent networks comprising not

only classic production tools but also entire supply chains including energy systems, logistical processes, systems of building management and so on. (Figure 3)

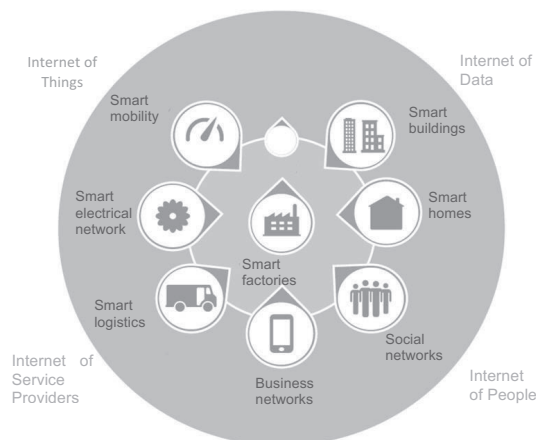
A comprehensive study (TÁMOP 2015) has shown that restructuring production systems in this way can only happen step-by-step, through a digital upgrade of current equipment. There will not be any need to build new factories, but we can gradually make current factories more up-to-date by modernising individual elements and connecting them to a wireless network. We can thus ensure the constant flow of information and can process signals from different sensors. It will then be possible to recognise complex outcomes, foresee and analyse problems, and correct further steps based on the results. Thanks to the increasing number of data collecting stations in the world today, there are enormous amounts of data available. While humans can not handle this boom of data, they are easily processed by machines. Thus, it seems logical that in certain areas of production machines communicate with machines making a vast array of processes more efficient, flexible and cost-effective. Sensors placed in different parts of machines can chart the surrounding environment and track their wireless communication.

These networks differ from current mechatronic systems in that they are able to communicate and cooperate with their environment and by learning new behavioural patterns and strategies, they can adjust their behavior accordingly. This makes production more economical, even when it comes to different types or small numbers of products. With the help of such built-in sensors, machine-to-machine communication and active semantic product memory, it is possible to optimise resources as well as make complex production processes more environmentally friendly and financially more efficient. Machines that can understand their context will fundamentally change industrial production.

All of this requires highly effective communication: the intelligent processing of all contextual information. Softwares play a central role in this because it is not enough to collect and continuously forward information but also necessary to decode it. The software of our Future Factory, thus, needs to have a conceptual system, which allows us to describe the function of production units, tasks, stages and results. Industry 4.0 uses the internet for machine-to-machine communication which is why such systems are called the Internet of Things. This enables Industry 4.0 to achieve the highest degree of complexity, reliability and stability. With the help of cyber-physical systems a factory can be transformed while it is running. Sensors can be integrated as necessary and different pieces of equipment can be run independently if needed.

Figure 3

The logic of cyber-physical systems bringing about Industry 4.0



(Source: Deloitte, 2014)

Connecting these different components into one system will revolutionise Industry 4.0. Of course, a common protocol and built-in interfaces are necessary as everything happens in real time. Besides electronic integration though, the issue of data security is also rather important and it is a problem that many companies will need to face and solve in the near future. Currently, we witness the continuous process of connecting components and creating networks that are already producing measurable results for companies. The installment time for machines is reduced because units that are produced simultaneously have a much lower demand for cables and wiring. Furthermore, users can ensure more stability in their productivity through constant monitoring and they can ensure the security of production processes through steady data analysis (Shaw, 1990).

Technological Foundations of Industry 4.0

In what follows a few elements will be highlighted that are especially important for Industry 4.0, as also discussed Abonyi-Miszlivetz in their study from 2015.

Virtual Design

The end-to-end virtual design is one of the corner stones of Industry 4.0 and has brought a new era in production. In the centre is data itself: how it is processed, how it is distributed among devices and how it is transformed into a virtual prototype and finally, an endproduct. Utilising virtual methods in engineering has several advantages: for instance using the entire digital „script” of a product, the data can move through standardised interfaces from the engineer to the production line. The digital script can also make installing, running and maintenance more efficient. *Virtual prototypes*, together with the digital script of all of their components have immense possibilities both in customised production and in experimentation with new technologies. Based on this concept it is possible to make just one piece of a unique product on the same production line.

IT Support and Networks

IT infrastructure will also expand in time – more and more intelligent devices will be incorporated into each machine and system. The connection and the data flow among these machines and devices will occur amidst various environmental conditions, thus it is vital that the smallest compartment is built into the data security system. Security requirements of compartments for network devices are also strict.

Traditionally *consistency* is seen as the greatest asset in production. It is considered as important as data security. Industry 4.0 is changing this traditional view,

making security the no. 1 priority. Built-in interconnected sensors contribute to the goals of Industry 4.0 in a unique way: costs are reduced, production becomes more rationalised and long-term competitiveness is targeted. Soon several new functions and features will become possible such as customs production; making quick changes in the configuration; or the unprecedented control of resources, production time and consumption. But a production device that is part of a network needs to be monitored constantly, not only because of environmental factors (temperature, humidity etc.) but also because of unauthorised access.

Machine-Machine Communication, Integrated Production Management

Running machines and complex networks will be strengthened by M2M (Machine-to-Machine) technology in many respects. M2M is itself a new paradigm, which enables the remote control of machines and their supervision. It helps to create efficient

- remote supervision,
- remote diagnostics,
- computerised remote advisory services.

On request it is possible for the centre to get real-time information about the condition of remote machines, and receive statistics of their productivity. Two-way communication enables even some program modifications in their micro-controlled networks. The later needs to be carried out while observing strict info-communication regulations. One of the basic conditions of M2M technology is for the machines to have the ability to communicate. For this they require a unit, a modem or some other communication gateway, which can create a connection between the machine’s own controlling network and the greater network.

Regarding data communication of mobile machines, it is most popular to use the technology of mobile phones.

Today, up-to-date production processes and devices are equipped with *the ability to learn and know* partly through traditional algorithms and databases built into their brains, partly through new methods offered by AI (expert systems, intelligent control, learning neural networks).

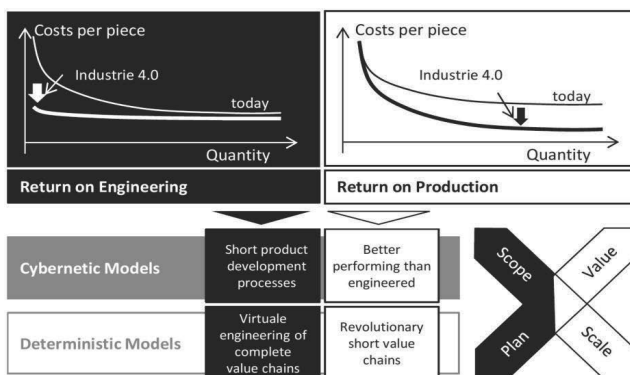
In sum, built-in artificial intelligence makes Intelligent Manufacturing Systems (IMS) and production without human supervision a reality. Intelligent manufacturing encompasses several subdivisions (computer-numeric control, computer-aided design and manufacturing technologies, robotics, transport of materials, production IT, organisation and supervision, production programming, waste analysis, etc.).

The Impact of Industry 4.0 on Business Models

One of the most important characteristics of the features and mechanisms mentioned above is how integrated these different functions are during a life cycle. Integration will bring about a shortened span of innovation time and production processes and consequently will result in lower unit prices and potentially, enhanced competitiveness. (Figure 4)

Figure 4

Advantages of Integration and Cooperation

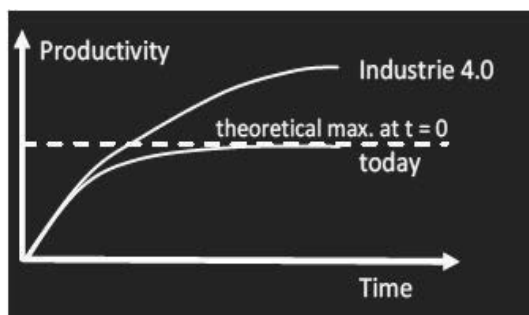


(Source: Schuh, 2014)

Innovation time can be significantly reduced by tools and methods designed for quick prototype design. Such processes of development are usually assessed based on *the time that has elapsed between product idea and the start of manufacturing*. Simulation devices can help to directly reduce problems that occur during production. They can also help to estimate productivity and identify possibilities for improvement. Simulation devices help us develop processes and products together, in a synchronised manner. A key indicator of this approach is *the preparation and evaluation time of simulation tests*, which is significantly

Figure 5

Evolution of productivity



(Source: Schuh, 2014)

cantly shorter than in the case of more traditional technologies (Schuh, 2014). (Figure 5)

Besides quantitative and economic considerations, the most important success factor is the *capacity for customs manufacturing*. Production units usually complete distinct, specialised tasks, so different functions are done by different machines. Because of this degree of specialisation, manufacturing systems are becoming increasingly complex. In the near future, problems that stem from such complexity will need to be solved by merging several functions. For instance, robots will need to be able to tackle more tasks simultaneously. The merging of disparate functions will result in shortened production time, which will allow for a more balanced production process. Production units will be utilised more evenly (Schuh, 2014). In view of such expectations, Industry 4.0 is in sharp contrast with earlier trends of Taylorist development that emphasized more specialized production tools. The goals is of course not to go backwards, but to find the adequate number of work stations, workers and necessary functions. The decentralised running of independent manufacturing and assembling units can only be done through their strong interconnection and cooperation. Designing processes of cooperation can also be done in the „virtual factory” and its simulation devices.

Social and Demographic Implications

The impact of Industry 4.0 and intelligent technologies on the current job market is an important issue. In order to produce an assessment, it is necessary to review the current trends with a main focus here on demography-related aspects. (Further conclusions can be found in the following study: Meeting 21st-Century Challenges with Science, Technology and Innovation a Roadmap for Policymaking). Wider view than demography can be the subject of a further analysis, beyond the scope of the current discussion.

As the population of developing countries increases, the population in developed countries is decreasing. The population of Europe has been declining year after year, and most significantly in Eastern Europe. Additionally, the problem of ageing societies must be faced, especially in the EU countries. (Figure 6)

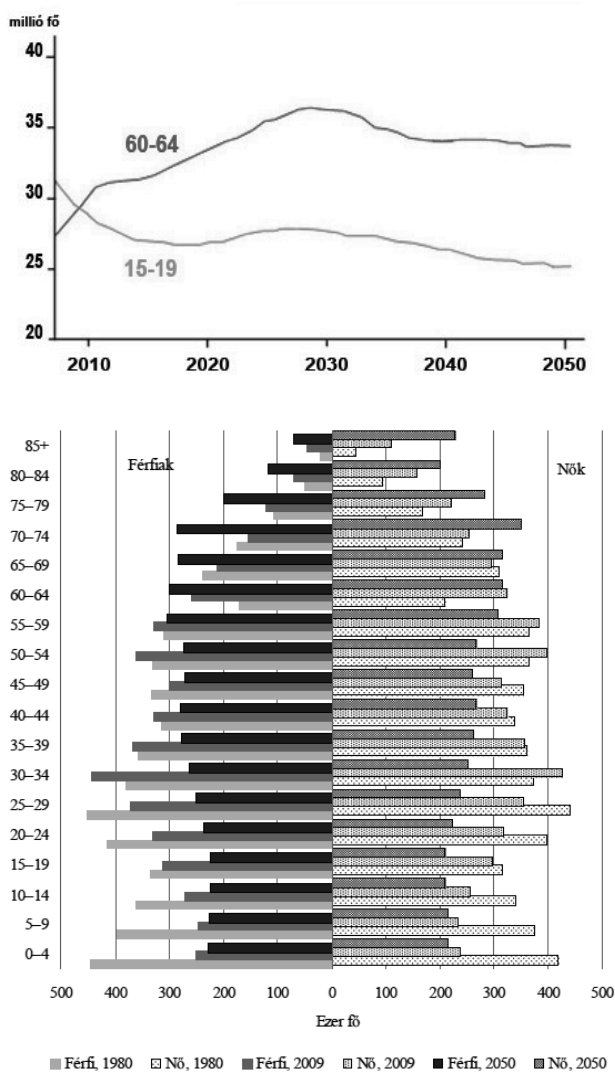
Such demographic tendencies suggest that new technologies, i.e. Industry 4.0 and intelligent technologies, that are able to increase production rates despite declining populations are becoming increasingly important.

Finally, another important factor is the generational implications. Research shows that generation Y (1980-1995) has socialized in consumerism; their lifestyle and their relationship to technology is in sharp contrast to that of their parents (Tari, 2010 and Tari, 2011). This ge-

neration is free, ambitious, the product of internet and virtual communication. They are open-minded, pragmatic and inclusive. Growing up they have received much validation from their parents, they are reluctant to be adults, and they delay life events and life phases: they finish school later, they start working later, they start families later. They are self-conscious employees who change jobs without much emotional turmoil. At work they do not follow their parents' example: they want to shape their place of work according to their needs. They strive for a work-life balance and do not want to become enslaved to their work. Many refer to this generation as „children of the digital age” or „internet generation”.

Figure 6

Demographical changes in Europe and Ageing in Hungary



(Source: Schuh, 2014)

Others argue that the so-called generation Z (those born after 1995) has an even higher inclination to be skilled at information technologies and are even more flexible and literate in the use of new electronic gadgets. For generation Z everything is available through the internet.

The profound technological changes, referred to as Industry 4.0, has profoundly shaped these generations. This is the reality in which they can be truly efficient and productive.

Conclusions

Understanding the current trends and tendencies that shape our future is the first step towards intelligent adaptation and conscious action. It is not possible to stop the unfolding of these global processes, but their deeper understanding is vital to ensuring continuous development and competitiveness at the level of a region, a company, or the individual.

Currently there are two processes that are in the foreground (as key conclusions of this paper): first, the formation of intelligent manufacturing and distribution systems; second, companies are working to transform data derived from production and logistical processes to their competitive advantage. New technologies make it possible to reduce costs and at the same time increase the flow of products and the reliability and controllability of production processes.

Today, the most advanced global systems are those that can work with innovative methods of management and can sustain a strong integration of manufacturing systems and their IT support systems, treating both as one cyber-physical network. The basis of Industry 4.0 is the formation of autonomous, smart units that are closely connected to one another. Their complex systems are run by complex, detailed models.

Similarly to other technological changes, Industry 4.0 is not an easy transformation. It needs stable strategies, clear concepts for development, committed workers and an open-minded business environment where new technologies can be tested and used. If these conditions are met, then a factory or a service-provider have fairly good chances to become more competitive and develop further.

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INTERPRETING INNOVATION – IN ANOTHER WAY

Innovation helps to uncover the future social and economic possibilities. Subsequently familiarising with innovation processes, mapping those involved in innovation and researching the relations and influencing factors is becoming more and more valuable. The authors carried out innovation research in three middle-sized and small towns in Hungary on the basis of a request by a municipality among enterprises involved in the intelligent specialisation strategic program. In the course of the research the role of regional universities, the relationship between organisations involved in social innovation and the researched enterprises, as well as traditional innovation areas were dealt with. The innovation performance of enterprises in all three regions are – despite smaller differences – around the Hungarian average. The presence of a university in the region can be felt, however, it does not remarkably influence the innovation potential of enterprises. It seemed that outside the traditional links to chambers of commerce and industry there were no other civic protagonists in the processes of creating knowledge, and even the relations are rather loose, or mediocre. In the wake of these results, the authors formulated specific suggestions for improving the economic and social possibilities of the involved regions by establishing innovative environments.

Keywords: S3, regional innovation, large enterprises, social innovation, successful regions

Are economic players of small- and medium-size towns able to undertake innovative activities in case the settlement does not boast a high-quality research institution, major university, or development centre of a large company? The authors believe that the answer to this question is “yes” as the ability to renew is omnipresent, irrespective of the size of enterprises and settlements and the social environment.

The authors received a request in the summer of 2015 to conclude a piece of research on innovation among enterprises in the town of Nagykanizsa (a medium-sized town of average level of development in Hungary) in order to help formulate development in the coming planning period. Following the meaning of the proverb “appetite comes with eating” it was decided to use the experience gained from this research to conduct research into two sub-regions of the same level of development (Keszthely and Kőszeg). Motivations were mixed as the researchers were on the one hand curious whether enterprises active in a small-town milieu would demonstrate different innovation performance than those in a medium-sized town. On the other hand, the researchers wanted to investigate whether the innovation influence of a major university (Pannon University) can be seen in the aforementioned three regions (is there a traceable

difference among them?), irrespective of the fact that the large development centre of the university cannot be found in the researched settlements. However, there is some sort of interest in all the investigated settlements (in Keszthely there is a university department, and in Kőszeg and Nagykanizsa there are recently established training centres and young campuses). In the course of the research the aim was to focus on social and economic levels, apart from the Research and Development (R+D) and renewal activities of enterprises which might support the innovation possibilities of companies. Therefore, the social innovation conditions were indirectly researched in the aforementioned towns.

Two new approaches appeared in the field of innovation research which the authors incorporated into their research, one of them being the perspective of the Hungarian S3 strategy, which supports both on the SME and sub-regional levels, to appear as dimensions to be analysed and developed from the point of view of innovation (in the branches and service areas influencing the future of the given areas). The other new direction is the measurement and interpretation of social innovation, which accepts the existence of the fourth and even the fifth helix, apart from the traditional triple helix, as elements influencing innovation processes.

These new approaches were considered when the questions were compiled and subsequently, the following research objectives were formulated:

1. The presentation of highlighted enterprises of the Nagykanizsa, Keszthely, Kőszeg, regions (in accordance with S3).
2. The comparison of the innovation performance of the investigated companies on the basis of the size of the towns.
3. Exploring the areas and relations which influence innovation (special attention was paid to the presence of the Pannon University).

Theoretical background

Innovation became one of the most important sources of the national and regional economy in the past decades. Subsequently, the unveiling of innovation processes, the recognition of entities involved in renovation, as well as the research of relations and influencing factors is becoming more and more important.

Innovation is, according to literature, the ability to do things in another way (Schumpeter, 1939), a change which unveils new dimensions of performance (Drucker, 2003), or an implemented creative idea (Karlsson – Johansson, 2004). Vecsényi (2003) conceives innovation as recognised and utilised business possibility. Davila et al. (2006) are the opinion that enterprises cannot only grow by means of re-regulating processes in the enterprise and cost-reduction, but innovation is the most important tool of a higher growth. Porter (1985) considers innovation to be a series of small development steps which provide the opportunity of a continuous competitive advantage. On the basis of the notions above, it is clear that innovation can be an economic tool to increase profits and company value.

The term innovation has become ever more widespread in disciplines other than economics, therefore it is often used in the interpretation of social, educational, environmental and social changes. Thus it became necessary to define the areas of renewal (Oslo Manual). The major novelty of the 2005 edition is that the activities of organisation development and marketing are enlisted among the innovation areas. This is the most accepted and used definition in Europe and its strength is that it can be interpreted for organisations other than economic ones.

“Innovation is the introduction of new or largely improved products (goods or services), new marketing methods, or new organisational-structural models into business practice, workplace organisations, or external relations” (Oslo Manual, 2005, p. 30.).

In order to measure innovation the OECD and EUROSTAT issued a joint sample questionnaire (Community Innovation Survey – CIS), which is considered elementary among other non-EU countries. The terms used in the survey are based upon the notions of the Oslo Manual (third edition), thus their interpretation is unique. The CIS is the only harmonised data-source of measuring innovation (Szunyogh, 2010), which several foreign authors use (Leeuwen et al., 2009; Markov – Dobrinsky, 2009). The measurement of the enterprises and diffuse organisations investigated by the authors were compiled on the basis of the research conducted in Hungary according to the CIS questionnaire (CIS10; Innovation in West-Transdanubia, 2008; Birkner, 2010), and the conclusions of previous enterprise research were used (Inzelt – Szerb, 2003; Kocziszky, 2004).

In a knowledge-based society knowledge plays a more important role than ever (Simai, 2015). The terms of knowledge and innovation intertwine, as innovation is the process of applying knowledge. Knowledge and creativity are important notions of innovation. This can be acquired and developed via learning (Szunyogh, 2010). Learning is an interactive process and has three subtypes. Learning through searching helps economic organisations to expand their knowledge in order to solve problems related to production and successful innovation. This is not always successful, therefore the involvement of academic institutions, universities, or other organisations specialised on research, might be necessary and this process is called learning through research. The third type of learning is learning through production, which is learning implemented through use, experience and cooperation (Lundvall, 1992; Smahó, 2008; Péter, 2015).

The innovation system is nothing other, than a framing of factors influencing the existence and spreading of innovation. (Vas – Bajmóczy, 2012). The innovation system is built upon interactions (Cszimadia, 2009). According to this perception it can already be felt, that the complex relations established among the protagonists participating in the innovation processes are of key importance. Several actors dealing with the topic mention, that the success is influenced by their role and behaviour as a part of a system, as well as the structure and function of the entire system (Edquist, 1997; Fischer – Fröhlich, 2001).

The national innovation system (NIR, NIS, Lundvall, 1995; Nelson, 1993) and the regional innovation systems (RIR, RIS-regional innovation system Cooke, 1998) vary on a territorial basis. This approach focuses on a clearly defined territorial entity, a state, or a region (a county/sub-region) rather than a field of technology, or branch, as a complex economic-regional unit. The entire institutional system of these well definable or-

organisational layers can be important from the point of view of innovation processes.

The territoriality is a key constituent of innovation processes (Gál, 2013), as there are huge differences based on the spatial imbalances of access to the knowledge (Vas – Bajmócy, 2012). Therefore the regional research of innovation systems is an important approach (Dóry – Rechnitzer, 2000, 2005; Cooke, 2001).

The regional innovation system is capable of using the locally available, created knowledge elements typical for a given region. The basic condition hereof is the territorial proximity and the existence and utilisation of interpersonal connection systems (Andersson – Karlsson, 2004; Hau-Horváth – Horváth, 2014). The regional/territorial innovation system includes the universities, as elements of technological offer, the research institutes and innovative enterprises, their activities and the connections established among them. Another key element is the environment, which frames the creation of innovations. The living environment, the degree of education and work culture (Dóry, 2007) as “soft” – less measurable – factors also contributed to the success of innovative enterprises over the past few years. The authors fully agree with the territorial approach, therefore three sub-regions were put in the centre of the research, where the knowledge-creating abilities of local actors were investigated.

There is an ever increasing pressure on the universities bestowed upon them by local interested parties for the sake of coordinating their basic needs with the demands of the region. (Chatterton – Goddard, 2000). Bramwell et al. (2012) claim that the universities are the motors of regional economic development. The local devotion of universities can bolster the well-being in many ways, like research, infrastructure development, education, innovation, efficient university-business relations and community development. Therefore, universities undertake the third mission, i.e. the role of development, apart from research and education (Gál, 2010). When the universities integrate into their own region, then they have an obvious impact on the intensity and character of potential relations and thus on the process of spreading knowledge (Gál – Zsibók, 2013). Researchers (Gál – Ptacek, 2011) investigated the role of small- and medium sized universities in the Central-East-European region and concluded that the role of universities away from cities is crucial in the regional system of innovation, however, the economic impact of these universities is still less, than the one in more developed countries. The theoretical approach made it clear for the authors that special attention must be given to the role of the Pannon University in all three sub-regions.

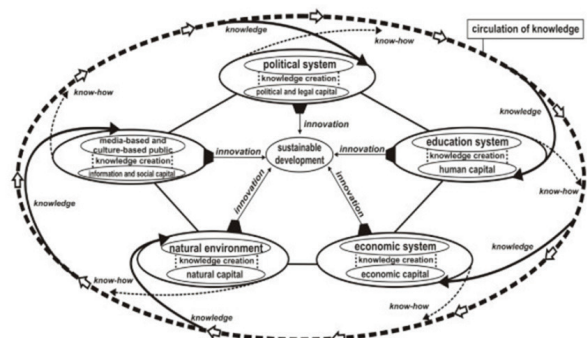
The so-called triple helix model of Etzkowitz and Leyersdorf (2000) describes a common, development-based interactive relation among the three institution types (state-enterprise-university), which can be interpreted well in rural regions. The proximity and intensity of the cooperation of participants defines the dynamics of the regional innovation system. The correlations in the system can be best compared to blood running through our veins. The correlations between the constituents of the model bolster the various levels of the circulatory system. The key of development is hidden in the reduction of factors hindering development, by means of which there is an increased movement in the system and thus the way is open to sustainable development. The supporting role of the state must be given a special attention.

There were initiatives to further expand and develop the triple helix model. The existence of a fourth helix appeared (Etzkowitz – Zhou, 2006). In connection with that suggestions were made to such factors influencing innovations, as labour, risk capital, informal sectors and civic society. Carayannis and Campbell (2012) created the model by thinking the triple-helix model further, where the media and culture-based community space appear as the fourth helix. Through this it is becoming evident that the members of the society and the communities are linked to business, technical, service and scientific areas, thus the NGO sphere has a link to the university-industry-government correlation. The authors considered this stipulation to be of key importance, when the second group of questions were formulated.

Further consideration of the quadruple helix provided the birth of the fifth helix (quintuple helix – Figure 1) (Carayannis et al., 2012). From this moment onwards the literature differentiates between the society and economic environment: the ecological aspect suggesting the unified approach with regard to the natural en-

Figure 1

A quintuple helix model



Source: Carayannis et al. (2012)

environment, social environment and economic development in a way that innovation must be used to achieve sustainable social and economic change also in case of different regional levels)

In summary of the helix-related literature, the authors believe that universities, as the engines of society-based development, are in the centre of the triple helix innovation model, the fourth helix assumes the importance of society. The authors believe that the appearance and scientific acceptance of the third and fourth models has led to the birth of the term social innovation and research concerning it. The fifth helix, the economic aspect, further strengthens the interpretation possibilities of social innovation (this is not yet a genuinely accepted point of view) as the dimensions of knowledge-based development; social, political and civil; are made more complete by adding the question of sustainability. One more remark has to be made in accordance with the helix models, these are modes of interpretation, which means that they can be regionally applied everywhere.

One of the tasks of social innovation is to solve the new social and environmental problems created by social-economic changes by means of social tools. (Szörényiné, 2015). Mulgan et al. (2017) regard social innovation as a series of innovative activities and services, which are meant to fulfil certain social needs and which are developed and spread by organisations,

local community).

The smart specialisation strategy

A novelty of the present research lies in the application of the smart specialisation strategic (S3) aspect. In the following the authors wish to summarise the main characteristics and local practices of the S3.

The EU pays special attention to research development, innovation and the motivation of the social-economic use of its results in the planning period 2014-2020. Thus key objectives over those seven years are to make Europe a scientific player on the global level, remove obstacles to innovation and bolster the relations between the public and private sectors. It is important that all nations and regional units coordinate their own research and innovation strategies with each other.

These documents are the smart specialisation strategies (NISZS/S3, 2014).

Intelligent specialisation has become one of the topics of EU debates, however, it still has a logic (McCann – Ortega-Argilés, 2016). In order for the EU to be successful, the policy – just like the regional policy – meant the involvement of more partners operating on the various levels of government. Complementary, mutually assisting impacts can be reached the best way, if they occur on local and regional levels.

Foray (2015) clearly explains that the term of intelligent specialisation puts the decentralised knowledge acquired in the wake of changes into the centre of all policies. At the same time the term of intelligent specialisation preserves the privilege of policy-makers to define the points of interference by themselves. The most important merit is that there should be a balance between the industrial policy (with the aim of supporting the development of regional economies) and the bottom-up informational processes, which in the end brings the discoveries of enterprises into the policy/strategy.

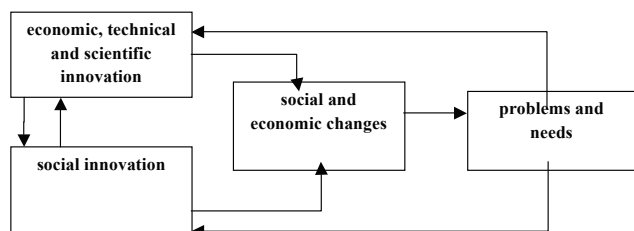
The intelligent specialisation and the regional development can increase the non-localised and localised processes for the sake of economic growth and higher quality of life. (Thissen et al., 2013)

The new S3 strategies differ from their predecessors (NISZS/S3, 2014):

- a wide range of local target communities and resources are involved in strategy-making,
- the focus is shifted from technological research development to supporting the entire range of innovation,
- not only are the best practices copied but economic competition advances and future potentials are key based on the individual strengths and values of the regions.

Figure 2

Close ties between economic and social innovation



Source: Benedek et al. (2015)

whose primary goal is the well-being of the society.

The research conducted by Benedek et al. shows that the major differences between social and economic innovation can be found in the objectives and capital demand of innovation. (Figure 2) The authors accept this notion and complement it by saying that enterprises are key elements in this field and have a striking role in creating traditional (economic, technical, and scientific) innovation. Their performance, however, is identified with considering the following factors (human resources, money and R+D development) and by the key factors of social innovation and related areas (civil society and

Foray and Goenaga (2013) defined the goals of intelligent specialisation as follows:

- appearance and growth of new activities capable of further development and which are rich in innovation,
- diversification of regional systems by means of generating new possibilities/options,
- creating critical masses, networks and clusters in diverse systems.

McCann and Ortega-Argilés (2016) stipulate that the SMEs are key protagonists of the intelligent specialisation policy. The focus in a few European regions is on launching new enterprises, while in other regions the priority is set on the growth of enterprises, or the development of the supply chain. Wherever priorities lay, it must be clear, that the participation, mobility and dynamics of enterprises must have a special role among the indexes of these new policies.

Intelligent specialisation is actually finding the way to be special in a highly competitive world. In order to grant this specialisation, Foray (2015) suggests regional economies to understand this intelligent process as a kind of evolution, building on the economic strengths of a given region, or economy, while completing all this with new, knowledge-based processes.

In the spring of 2014 there were two rounds of S3 workshops held in all 19 counties of Hungary involving the entire range of decision-makers and entrepreneurs. One of the authors of the present article participated in this work as a facilitator in Zala county.

The main task of the county events was to formulate region-specific industry/branch-related priorities on the basis of relevant county-related R+D+I statistics and documents, and introduce specialisation directions. The sectoral division of amounts spent on research development shows that Hungary is diverse. The performance of the entrepreneurial sector is dominant in all but Csongrád and Baranya counties. Here the tertiary educational institutions spend more money on R+D than the business sector. In the cases of Csongrád and Fejér counties there is a significant public performance.

The performances of the tertiary institutions and public sector were not striking in the counties investigated (Zala and Vas). Therefore, the approach was made from the point of view of the business sector in both regions. These towns are similar in the sense that Pannon University can influence innovation possibilities.

The methodology applied during the workshops prevented the possibility of local development policies being based on samples taken from other regions. However, it was expected to take these samples into

consideration when establishing the county specialisations. Imitation can easily lead to the continuity of fixed schemes, however, the S3 wishes to become a tool for establishing bottom-up economic-developmental aims based on local characteristics involving local decision-makers by identifying relevant priorities and RDI needs (NISZ/S3, 2014, p. 7-36.).

The main conclusions of the theoretical background

The first conclusion is the notion to be concluded from the theoretical bases, i.e. the enterprises must understand the necessity of changes and not be afraid of innovation as it can be interpreted as doing previous processes in a slightly different way. The second one is that measuring the R+D background and four types of innovation (product, process, organisation and marketing) are excellent means to define innovation activities of companies. It is an important finding that the knowledge potential of a region is made up of the knowledge of its companies and the human and social capitals of its population. Consequently, both the internal and external environments must be investigated to obtain information about creating knowledge. The fourth conclusion is that the elements of the innovation system of a region (sub-region) or branch; that is the corporate sector, the state (local government), universities and the civil sector and their set of relations; were all created to maintain sustainable development. The EU member states recognised that the Lisbon Model was not successful from the point of view of innovation and the new approach is the smart specialisation strategy, which is a bottom-up process addressing everybody and aims not only to find a new or novel solution to economics, but also to social programmes and needs (social innovation).

Research questions, material and methodology

Whilst formulating the opening questions, experience from previous innovation research in Zala county (Birkner, 2010) was used and some basic questions were included in the following category:

- General questions related to business organisations, size, number of employees, traditional innovation activities (product, process, organisation, marketing), and R+D+I expenses (compared to the national average).

The questions related to the new approach were compiled with the use of the questionnaire applied during the making of the S3 strategy and also the network relations supporting social innovation were investigated:

- Questions related to previously executed or ongoing developments,
- Questions related to the increase of added values (innovation capacity),
- Questions related to factors hindering innovation,
- Questions related to networking,
- Questions related to R+D+I, research infrastructure, and HR management,
- Questions related to university ties,
- Questions related to the future use of knowledge-management tools.

Material and method

Enterprises and diffuse organisations were investigated in the areas stipulated in S3 in Vas/Zala counties (e.g.: mechanic/mechatronic competences, intelligent systems, vehicle electronics, environmental technologies, logistics, wood industry, foodstuff industry, tourism). A total of 51 organisations were addressed, with 31 companies in Nagykanizsa and 10-10 enterprises in Kőszeg and Keszthely. The various companies were included by means of a layered sampling and random selection and the measurement was done primarily by means of structured interviews (35 interviews and 16 company questionnaires), the sample is not representative. The sampling was done in the summer and early autumn of 2015.

Empirical findings of territorial differences of innovation

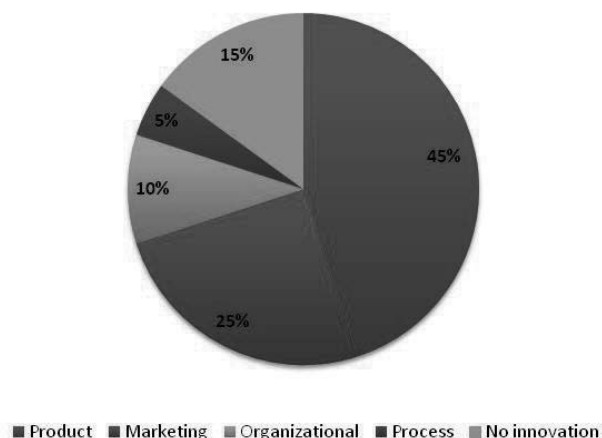
Only the most interesting results of the conducted research were highlighted and only those questions formulated at the beginning of the research, i.e. is there a difference in innovation characteristics because of the medium-sized and small town structures and can the presence of Pannon University be shown in the innovation performances and needs of enterprises, were dealt with in detail. The author's hypothesis in connection with this notion is, that there is no striking difference in the innovation activities of the investigated enterprises according to the size of towns and the quality of the presence of a university. Crosstab research was conducted in relation to the persistence, object of cooperation and innovation performance in order to present the influence of external relations on innovations at enterprises in general. The regions were not differentiated from this point of view. It can be assumed that the universities play a major role in processes of creating knowledge, the tightness of relations is strong (research of Gál – Ptacek, 2011), and the other players do not have a key influence on the performance of companies.

According to research conducted with regard to the four areas of innovation, enterprises in small towns

(Keszthely, Kőszeg) carried out more innovation activities than ones in Nagykanizsa. Product and marketing innovation were the most important in Keszthely and Kőszeg (Figure 3), while process and organisation

Figure 3

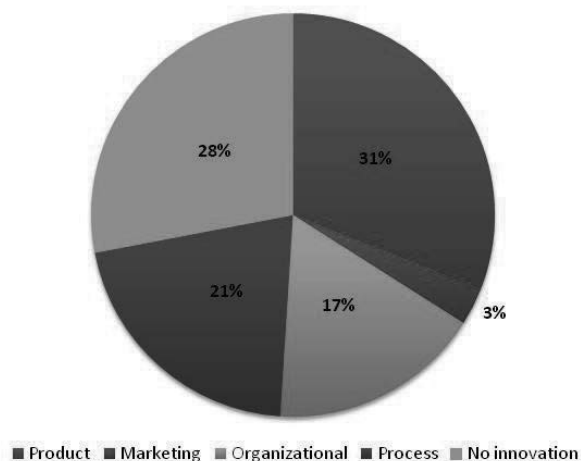
Innovation areas (Keszthely-Kőszeg)



Source: own research

Figure 4

Innovation areas (Nagykanizsa)



Source: own research

innovations instead of marketing were important in Nagykanizsa (Figure 4).

The explanation hereof is that the larger number of medium-sized/large enterprises in Nagykanizsa have more needs for process and organisational innovations. The greater willingness of companies in small towns to innovate can be interpreted as induced by need, medium-sized and large enterprises (especially if they belong to an international company) can afford not to search for innovative solutions at all costs as it is enough to

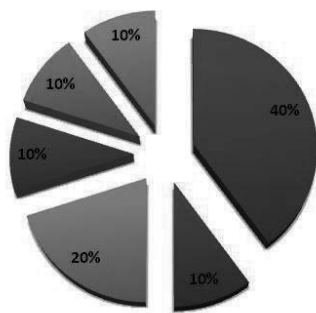
apply them in the supplier chain or via the system of the mother company. Hungarian-owned SMEs enterprises are – because of competition and their size – more open to radical innovations and innovation in general. Research previously conducted in Zala county (Birkner, 2010) showed a similar result with the complement that cooperation with a multinational does not often require novelties from Hungarian affiliates but a cheap and reliable workforce. Marketing innovation was the highest in Kőszeg. The authors do not believe that this is because of a specific reason but is rather characteristic for these companies to give a “forced” explanation that the closeness of the Austrian border makes companies with a more sophisticated business culture more open to

ing or input-providing R+D activities connected to innovation. In the case of R+D, tertiary education institutions may have a major role. Therefore, it was assumed that this is striking in the “home” of the Georgikon Faculty in Keszthely looking back on a long tradition that has been in operation for 219 years (Figure 5-6).

The analysis of the graphs does not show differences between the two small towns. In both cases there are four enterprises that do not invest any money in R+D, and enterprises in the Kőszeg sub-region gave more sophisticated answers. There were three companies investing more than 5% in this area, these were typically knowledge-enterprises (engineering, consultation and IT-development companies). Research centres could primarily be found in Keszthely, mainly in the field of agriculture. These are, however, integral parts of the state-run Pannon University, thus their performance is not present among the larger companies. Enterprises in Kőszeg undertake research-development activities on their own, in Keszthely there were two cases of involving a diffuse organisation in the process (this could be a sign of the presence of the university faculty). When asked about the amount of R+D investments with regard to income, 19 enterprises in Nagykanizsa stated

Figure 5

R&D spend (% of total turnover) – Kőszeg

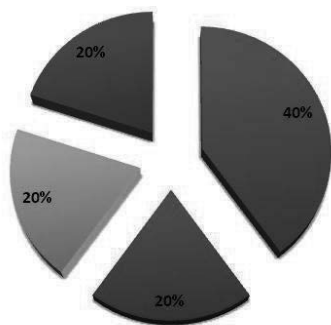


■ None ■ below 1% ■ 1-4.9% ■ 5-9.9% ■ 10-24.9% ■ above 25%

Source: own research

Figure 6

R&D spend (% of total turnover) – Keszthely



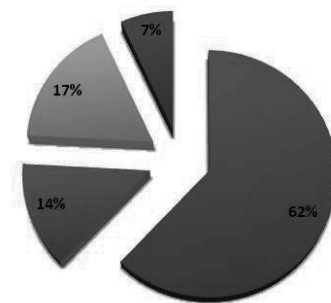
■ None ■ below 1% ■ 1-4.9% ■ above 5%

Source: own research

marketing innovation, but this cannot be verified based on the present amount of samples.

All three regions were asked about assisting, prepar-

Figure 7
R&D spend (% of total turnover) – Nagykanizsa



■ None ■ below 1% ■ 1-4.9% ■ 5-9.9%

Source: own research

that there were no such investments, which is more significant than in the small towns (Figure 7). The result in the medium-sized towns is typical because of the size of companies. There are only a few larger companies in Hungary that spend money on research development, and this activity is rather typical for SMEs (just think of IT and consulting companies). Hungarian-owned companies (irrespective of their size) usually do not spend enough on R+D, innovation, however, this would be beneficial for the increase of their competitiveness, their presence on international markets and their ac-

cession to supplier chains. This fact is undermined in the 2012 report of the Global Entrepreneurship Monitor and this is a partial explanation for the fact that Hungarian enterprises are less viable than their international counterparts.

In the case of implemented and planned developments, enterprises in Keszthely were more active than the others. The reason for this difference can be found in the economic structure of the town, it has a strong service sector (mainly in the field of tourism) and enterprises active in the field of tourism were and are more favoured in rural development programmes. Therefore, they had access to more tenders, inspiring them to develop even if they had to implement developments using their own resources. When asked about the future, companies from Kőszeg were more open, this is understandable as they were less active during previous investments and this temporal displacement correlates to enterprises in Kőszeg having been more careful in past years because of the crisis, or simply as a result of the development-rhythm of their branch/service area. Companies in the medium-sized town won more money via tenders than their counterparts in the smaller towns, an explanation for this can be that tender consultants and systems assisting enterprises have longer-lasting traditions and more sophisticated forms.

The next questions dealt with increasing added value and were aimed at identifying areas inside companies suitable for assisting in the creation of higher values and also with regard to obstacles. In answer to part of the question a Likert scale from 1 to 5 was used in order to better highlight differences.

In Nagykanizsa, human resource management, production, IT and sales were identified as areas where it is viable to increase values in the future. Exact ideas and answers were formulated, e.g.:

- continuous product- and quality-development as a result of introducing the Lean system,
- analysis activities need to be bolstered in order to be more accepted and sought-after by clients. Colleagues need to be trained and new tools and applications are necessary.

The importance of specific areas, when asked as control questions, could be rated according to their importance on a scale of 1-5. It became evident that the companies consider IT and technological development as the key elements for the future (the “very typical” rate was around 80%). Human resources and company infrastructure development received favourable scores, other areas are not exciting according to the interviewees.

In the case of small towns, the enterprises in Keszthely see the potentials of increasing innovation abil-

ities, unlike the ones in Kőszeg. Companies in Keszthely consider their situation to be more than one value lower/worse than in Kőszeg, which is a big difference. Innovation possibilities are created by introducing Lean management, innovative financial and accounting areas, and developing infrastructure in Keszthely. Enterprises in Kőszeg mentioned other areas, mainly the launch of new departments, introduction of new marketing methods, and development of company infrastructures in addition to new possibilities of applying patent-related processes.

The investigation of increasing innovation capacities yielded a similar result in Nagykanizsa and Keszthely with companies in Kőszeg rating their possibilities at the Hungarian border as more than one level higher. Possible explanations could be well-established cross-border connections or the internal need for sampled companies. The authors aimed at highlighting the correlation between the positive innovation possibilities formulated by enterprises in Kőszeg and their existing relations with regard to civil, economic and social organisations, but to no avail.

The similarities between companies in Nagykanizsa and Kőszeg in connection with obstacles is interesting since enterprises in Keszthely are of a different opinion (Figure 8-10). Companies in Nagykanizsa and Kőszeg gave the lack of experts the most points as they believed this to be the reason for a higher degree of industrialisation, while the question of replenishing human resourc-

Figure 8
Obstacles of developing innovation abilities – Keszthely



Source: own research

es in a service-oriented environment in Keszthely was not considered to be a major problem.

The next questions were related to connections linked to supporting and knowledge-institutions. Most of the companies have ties to the Chambers of Commerce and Industry, business incubators in the medium-sized towns, of varying degrees yet the majority of respondents opted for mediocre or weak when describing their nature. Economic-technical services are the

Figure 9

Obstacles of developing innovation abilities – Kőszeg



Source: own research

Figure 10

Obstacles of developing innovation abilities – Nagykanizsa



Source: own research

most characteristic fields of cooperation. Some mentioned R+D, this correlates with university cooperation.

The Keszthely and Kőszeg regions are similar in the sense that in both towns the relations to the Chambers were emphasised, the difference was in the intensity of these ties with the Kőszeg region describing them as mediocre or even strong, joint R+D programmes were even launched with the Chamber. The links in Keszthely were characteristically weak and it was surprising not to have heard any mention of relations to the university faculty (this can probably be explained by the fact that the interviewees were not active in the field of agriculture, which is the profile of the faculty). Clusters were not considered important in any of the towns as tools for developing the economy or innovation were applicable to only one enterprise.

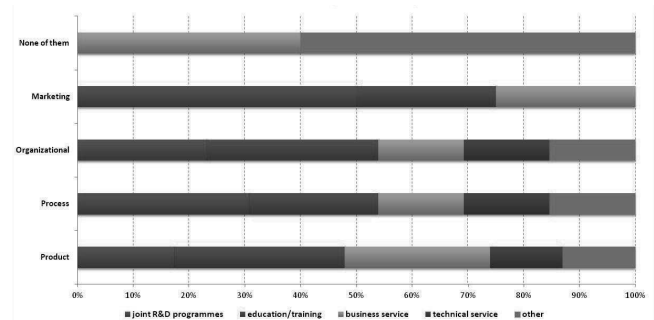
All three regions are similar with regard to social and economic relations, and knowledge-creation as well as not being very multifaceted. The Chambers were emphasised with regards to establishing contact in all three towns and campus links were only mentioned in one case (Nagykanizsa) where civil organisations are irrelevant. Clusters were considered of no importance in all three regions. Training courses, R+D and tech-

nical-economical services were identified as fields of cooperation.

The crosstab of the non-regional measurement related to connections focusing on the correlation between innovation areas and cooperation. There were 58 cases where there was some sort of cooperation for the sake of a certain objective. There were relations even in areas where there were no innovations. All in all there is no striking difference between the areas of innovation and the objectives of cooperation (Figure 11). It is surprising that the need for a joint R+D was voiced with regard to marketing innovation as this is significantly more characteristic concerning product-innovation. This would of course require more university coopera-

Figure 11

Innovation areas and possible cooperations



Source: own research

tion as the Chambers are unable to provide proper support in this field.

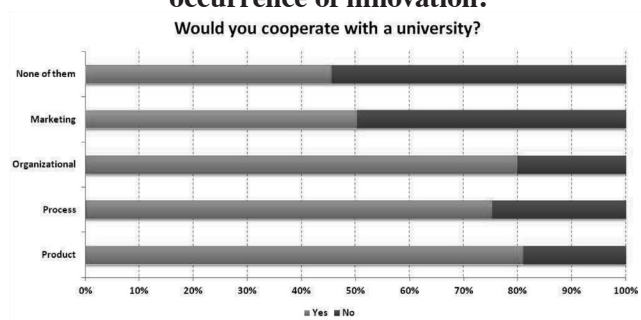
Companies in Keszthely and Nagykanizsa were keen to formulate development areas with regard to the innovation abilities of the towns and the development of relations (there were general formulations and the relations between civil organisations, public administrators, medical and educational institutions, and enterprises were not mentioned in detail). The tender-related responsibilities of the towns and possibilities in the university were highlighted. Those in Keszthely were critical concerning the present situation, companies in Kőszeg made few suggestions and there were even praises towards the innovation supporting activities of the town.

Enterprises in all three towns see possibilities in cooperating with university campuses. Two thirds of them are willing to establish university relations in medium-sized and small settlements.

General questions were raised in this field, it is positive that many consider this question to be important. The crosstabs research indicates that those organisations showing product-, process- and organisational-structure innovation are more likely to cooperate with universities (Figure 12).

Figure 12

To what extent is there a cooperation between companies and the university on the basis of the occurrence of innovation?



Source: own research

Research conducted shows no major differences in innovation performance, needs and preventative factors in the three regions. There is no striking difference between the locations of the towns or the time horizons of the presence of universities in the case of the municipalities. Subsequently the first hypothesis proved to be right. The second hypothesis was only partly right, as the presence of the Pannon University can be felt, however, it does not affect the innovation capacities of enterprises. There were no other players apart from the traditional links to Chambers. In the processes of gaining knowledge, the intensity of ties is rather weak, or mediocre. (Dóry and Gajzágó – 2015 – found a similar result during their research conducted in the Central-Transdanubian region.) Thus it can be said that on the basis of the innovation research conducted by the enterprises in these three small or medium-sized rural towns, the question of social renewal is not of major importance.

Conclusions, suggestions

The innovation performance of all three regions is – despite minor differences – approximately equal to the Hungarian average. Compared to earlier regional/county-wide research, this is a marginally better result. However, according to the authors this change is not because of the companies but rather the methodology of interviewing as it provided means for explanatory sentences, thus for a more exact explanation and measurement of the term *innovation* (according to the Oslo Manual). As in the past, enterprises in the region have not enhanced in the field of innovation, targeted development is necessary.

The S3 approach positioned the sub-regions. The aspect and the social expansion of innovation helped to facilitate the need for new, local research and a new

interpretation of innovation areas.

It is worth continuing the search for and familiarisation with enterprises that are willing to think in a different way. How could the expansion of innovation be increased in companies? The authors believe that there are two possible solutions. On the one hand, establishing a network of new, strong innovative enterprises within the branches of industry and services that either strive for internationally acclaimed quality by themselves or can achieve quality levels accepted by suppliers, i.e. a quality level defined by innovative large companies. On the other hand, further development of research and the tertiary educational portfolio is necessary as the previous measures have not achieved significant results in the case of the sampled companies. The authors believe that an increase in or development of educational and research capacities is required in the case of strong branches because the merger of existing willingness of corporate innovation and relevant university knowledge can bring immediate results.

The towns must strive to establish more complex relation-systems than recent ones because non-governmental organisations, the administrative system, and educational and cultural organisations can significantly bolster the innovation possibilities of enterprises. If the attractiveness of a municipality from the point of view of a young innovative person/group is considered, then it is easy to see that an impulsive, free and creative environment is very important, thus it is a mutual task to create one. Therefore the authors suggest, that the self-governments of the involved towns establish regular meetings between employers, civic organisations, educational and cultural institutions, where the participants have the opportunity to formulate the social and economic aspects of creativity and liveability together with the self-government (the KRAFT project in Kőszeg is a similar, outstanding initiative).

The lack of experts in the region (in the country and even Europe) is a problem that is mentioned more and more frequently. The question of the lack of experts on various levels (ranging from skilled workers to graduates) has been raised among the first notions when entrepreneurs were encountered (it is surprising that not only the omnipresent engineering and IT areas but also the financial-economic sectors were mentioned). One of the possible regional solutions to this problem is the launch of dual-training courses in secondary and tertiary education. The other possibility is a major increase in general wages, this is a countrywide matter and the authors believe that by not creating the necessary resources to tackle this issue, Hungary will face a major political and economic crisis in coming years as the young sector of its workforce will move abroad. Without young people open to new technologies and

processes it is hard to achieve economic growth.

Universities also have major responsibilities in these three regions, e.g. continuing inquiries, sharing knowledge, developing levels of trust, organising vocational meetings, and providing opportunities for innovation. The first step of this work could be a coordination of the offers of tertiary education institutions on Vas and Zala counties, especially on the field of engineering and informatics requiring a lot of tools. Therefore it is suggested that the Pannon University suggest a meeting for other tertiary educational institutions working in the same field, the towns with county rights and the municipalities of Keszthely and Kőszeg and the institutions of special interest groups of the employers for the sake of a vocational distribution among the various trainings once the market needs are discovered. This would bring along two direct benefits. One would be that small campuses would not compete with each other, therefore a focussing on necessary tools and experts would be possible, which could result in raising the level. On the other hand, the presence of current trainings would support the long-term staying of young and creative experts in the region.

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Jody JENSEN

A NEW ROLE FOR MANAGEMENT OF THE SOCIAL SCIENCES IN AN AGE OF COMPLEXITY

A particular scientific world view has become dominant, influential and successful in modern sciences today. Science and technology have transformed the way we view ourselves, our societies and our place in the cosmos. However, just as science and technology seem to be at the peak of their power, unexpected problems are disrupting the sciences from within. This reflects a deeper and more serious problem regarding scientific inquiry. Science is being held back by old assumptions that have become dogmas, the biggest of which is that science already knows all the answers, and only the details need to be worked out. A transformational paradigm shift is required from a mechanistic world view to an organic world view to better address the challenges of the new millenium.

Keywords: sciences, paradigm shift

Every original idea is imaginative, because only imagination can trigger creativity. This is why imagination is just as essential in science and technology as in the arts and humanities. The difference between these two pairs of fields is that in science and technology imagination is disciplined rather than free.

Mario Bunge (2012, p. 1.)

In his book, *Science Set Free: Ten Paths to New Discovery*, Rupert Sheldrake (2012) discusses the 'scientific worldview' that has become dominant, influential and successful in modern sciences today. He agrees that our lives have been profoundly influenced by the advancement of scientific endeavor in medical research and technology. This has transformed the way we view ourselves, our societies and our place in the cosmos. But, he says, "in the second decade of the twenty-first century, when science and technology seem to be at the peak of their power, when their influence has spread all over the world and when their triumph seems indisputable, unexpected problems are disrupting the sciences from within" (Sheldrake, 2012, p. 6.). Sheldrake says that most scientists accept that these problems will eventually be solved by continuing the same kind of research and practise from which the problems and tensions emerged, and this he believes reflects a deeper

and more serious problem regarding scientific inquiry (Sheldrake, 2012, p. 6.). Sheldrake argues that science is being held back by old assumptions that have become dogmas, the biggest of which is that science already knows all the answers, and only the details need to be worked out. The contemporary scientific creed is based on the 10 core beliefs or dogmas below:

- 1) Everything is essentially mechanical.
- 2) All matter is unconscious.
- 3) The total amount of energy and matter is always the same.
- 4) The laws of nature are fixed.
- 5) Nature is purposeless.
- 6) All biological inheritance is material.
- 7) Minds are inside heads and are nothing but the activity of brains.
- 8) Memory is stored in material traces of the brain.
- 9) Unexplained phenomena such as telepathy are illusory.
- 10) Mechanistic medicine is the only one that really works.

Sheldrake's arguments are presented with many clear examples that show how these beliefs compose the philosophy or ideology of materialism, where everything is essentially material or physical, even the

human mind. His purpose is to „set science free,” from its own dogmas to increase its relevance and credibility to tackle really existing problems.

In Samuel Arbesman’s (2012), *The Half-Life of Facts: Why Everything We Know has an Expiration Date*, an anecdote is related that many medical schools tell their students that half of what they have been taught will be wrong within five years – the teachers just don’t know which half. What we know about the world is constantly changing, yet our approach to knowledge and the management of the communication of that knowledge has remained the same. The extreme technical and specialized nature of contemporary scientific discourse alienates all but the initiated, creating an increasing gulf between the sciences and the societies in which they work. This is quite surprising considering the explosion and proliferation of the information society, and the possibilities this provides for better communication management and dialogue.

Arbesman comes from the field of ‘scientometrics’, which is the study of measuring and analysing science, technology and innovation, or the science of science. He explains that knowledge in most fields systematically and predictably evolves. In some fields, change occurs over a few years, in others over centuries. But most of what we know are called ‘mesofacts’ that often change over a single human lifetime. This is important because if we are more aware of how our knowledge changes over time, we are better equipped to deal with contemporary challenges, like improvement in the allocation of resources by companies or governments, for example.

Science is absorbed with its role to explain the nature of everything, and then tries to convert others to believe in the particular methods, explanations and models. For example, since the 1960s, physicists and mathematicians have developed a framework called ‘string theory’ to try and reconcile general relativity with quantum mechanics. Over the years, “it has evolved into the default mainstream theory, even as it has failed to deliver on much of its early promise” (Powell, 2015). The same article discusses the implications for Einstein’s theory of relativity, and the basic assumption (going back to Aristotle) that space is continuous and infinitely divisible, so that any distance could be divided into even smaller distances. This is being questioned by Craig Hogan, a theoretical astrophysicist at the University of Chicago and the director of the Center for Particle Astrophysics at Fermilab who argues that there might be an unbreakable smallest unit of distance: a quantum of space.

What emerges from the dust-up could be nothing less than a third revolution in modern phys-

ics, with staggering implications. It could tell us where the laws of nature came from, and whether the cosmos is built on uncertainty or whether it is fundamentally deterministic, with every event linked definitively to a cause (Powell, 2015).

There have been many great feuds in science that have been popularized in accounts like Hellman’s *Great Feuds in Science; Great Feuds in Technology; Great Feuds in Mathematics* (1998, 2004, 2006 respectively), of Levy’s (2010) *Scientific Feuds: from Galileo to the Human Genome Project*. In many of these cases the assumption that science has successfully delivered accurate knowledge based on authoritative sources does not bear close scrutiny.

Scientists with radically new ideas have difficulty getting an audience among their more orthodox brethren. Sometimes they are ignored or rejected because of personal animosities or simple inertia. In other cases, the rejection seems to violate the canons of open-minded scientific inquiry. Through the whole spectrum of the sciences, one can document an astonishing disregard for facts which contradict fashionable theories, stereotyping of acceptable approaches to problems and theories, and the waving of academic credentials and ritual invocation of the specialist’s mystique to discourage criticism from ‘outsiders’ (Judge, 2012).

Science is engrossed with the importance of ‘validation’, which is most often carried out in the framework of statistical analysis, that often excludes other factors that may appear to be at least as significant if not more than others. This reflects ‘downstream thinking’, that is, a blind focus on imminent causes rather than on the root causes of phenomena, as is the case with many social issues and challenges, including the present migration crisis and terrorism.

Besides the obsession with validation, some other systemic knowledge processes that are neglected by science are outlined here by Judge (2012) as an expansion of Sheldrake: selective appreciation of the creative imagination; unexamined preoccupation with professional reputation and recognition (self-referencing, references in peer-reviewed journals); deprecation of alternatives and anomalies that challenge conventional models; methodological dependence on questionable engagement with society; uncritical belief of science in the appropriateness of its own process; institutionalized incoherence and disagreement; lack of recognition of the constraints and opportunities of an information society; self-referential inadequacy of ‘metascience’.

In Sheldrake's (2012) final chapter, „The Illusions of Objectivity,” he questions the ‘objectivity’ of science, by asking the question „whose objectivity?” Science praises innovation and creativity only within the currently accepted paradigm that is approved by accepted scientific authorities. For example, the imaginative re-framing of paradigms is most often disparaged by the old order, until the new paradigm comes into full being which, most often, occurs after the proponents of the old order have died.

The current practise of science inhibits creative and imaginative thinking in most fields, thereby reinforcing the general tendency to capitulate to present authorities. While the tendency of science is to deprecate or condemn alternative worldviews, there is little capacity of science to reflect on these processes and to discover more holistic ways of relating to perspectives that challenge the current order. This incapacity or reluctance is reinforced also in other sectors of society, in governance and management structures (see below), and the practise of democracy. In other words, there is an uncritical belief of science in the appropriateness of its own process (Judge, 2012). This is complicated by the fact that government and industry supported scientific research is many times complicit with the prevailing power structures, on whom it depends for research funding.

Loren Eiseley (1964), wrote that all human undertakings are driven by the imagination, be they artistic, scientific, or humanistic. The danger lies in the strict enforcement of the separation of academic disciplines, and the cult of ‘professionalism’ based on the self-acknowledgement of approved authorities, that is depleting the creative and imaginative power of the sciences. He passionately laments the loss of the capacity to wonder in a divided, money-driven world of big science. He rearticulates, in fact, Einstein's thought:

“The most beautiful thing we can experience is the mysterious. It is the source of all true art and science. He to whom the emotion is a stranger, who can not longer ōpause to wonder and stand wrapped in awe, is as good as dead – his eyes are closed.”

Paradigm Shift

Our whole world society appears to be following a distinct pattern that occurs very rarely in history, one that has led in the past to total reinventions of the world within very short periods of time. *In short, we are in the midst of a classic paradigm shift and are fast approaching the tipping point of the whole process.*

Michael Shacker (2013, p. 31.)

The present crises are connected by a mechanistic world view that has dominated for the past 300 years and that has endangered the environment and quality of life, societies and individuals. In a mechanistic world view, we all become parts of the machine and mere objects, reified, commodified. The fatal flaw of a mechanistic world view is eloquently elaborated by Michael Shacker (2013) in his work, *Global Awakening, New Science and the 21st Century Enlightenment*. Referring to William Barret's (1979), *Illusion of Technique*, he explains that the smooth operation of the machine becomes everything in the mind of the technician; and since there is no meaning that can be derived from a machine, life becomes meaningless.

Our whole mechanistic society now reflects this meaningless and purposeless world view. ... *The illusion of technique* helps us understand this fatal flaw of mechanistic dogma and how it fails to confront reality. In short, the lure of the machine outweighs the mounds of scientific data showing the fragile interconnections of Earth and its biosphere. Social, environmental and health concerns are swept under the rug and ignored. The mechanistic paradigm is thus dysfunctional at its core – so we find ourselves in the mechanistic dilemma (*Shacker, 2013, p. 29-30.*).

He continues by addressing the necessity of “more-than-ordinary” thinking and action to transcend the mechanistic dilemma to extract the planet and humanity from its current precarious situation.

The crisis is further exacerbated by the collusion between big business and increasingly self-defensive, nationalistic governments who, in order to maintain their power positions and monopolistic control of market forces, will not willingly relinquish their power positions. This is clearly seen in the increasing incidents of state violence by state sanctioned police forces against populations that have arisen to protest against economic and social inequalities resulting from the financial crisis and increasing economic consolidation of the 1%, as well as aspirations for a more democratic politics of participation.

What is common in the many ways the states and their authorities, and economic players react is their strong insistence on historic divided-ness and cultural differences as well as the complete lack or rejection of the holistic approach in dealing with grave social, political, economic, and ecological problems. Threatened in their existence and legitimacy, old institutions, interest groups and other powerful global, regional and national stakeholders are keen to entrench themselves and fight

one another to secure their interests and survival. The new wave of disintegration and self-isolation is a result of the failure of global and regional ‘caretaker’ or ‘guardian’ institutions such as the UN, the WTO, the World Bank, the IMF or the European Union. Instead of contributing globally and regionally to more democracy, equality, peace and human security, these institutions themselves contribute to the survival of the old paradigm of inequality and division, human vulnerability and insecurity. A new paradigmatic approach should ensure the acceptance and understanding of the inevitability of a holistic view of humankind, together with its self-created institutions, markets, nationstates and means of violence. The vision and practice of a *wisdom based society* that turns knowledge into organic and holistic practices has to gradually replace the old paradigm of a knowledge-based society that was established on the premise and special historical understanding of fragmentation and division. Awareness of increasing interdependence and interconnection in various spheres of our common existence is a slow process that needs to speed up to reflect a new planetary and species consciousness.

The Structure of Scientific Revolutions: Medieval, Mechanistic and Organic World Views

A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die....

Max Planck (1949, p. 33-34.)

Every world view needs to answer the fundamental questions of who we are, how we got where we are, and where we are going that is delivered in a new story or narrative frame. The current crisis of world view requires a paradigm shift which will move humanity into

a new world system and mind-set. Paradigm shifts or ‘flips’ have occurred before. Thomas Kuhn (1962) formulated the structure of scientific revolution as follows:

- Emergence of an anomaly that contradicts the old world view. Nature violates the expectations of normal sciences and answers have to be found outside the paradigm.
- The emergence of a new paradigm or way of thought. A revolutionary period upsets the stability of the normal science period.
- Crisis ensues and there is reconsideration of the old paradigm by new thinker(s) to explain anomalies and a new narrative emerges.
- Bitter struggle develops; there is resistance to the new from old scientists; paradigm wars are fought by the new world view with facts and by the old world view with ideology.
- The new paradigm wins the struggle, and a new normal science period begins with the new underlying analogy/model, new scientific methods, and a changed set of rules.

Since humanity has experienced this before, Michael Shacker has presented the evolution of historical paradigms in the following way. (Table 1 and 2)

I have adjusted Kuhn’s scientific revolution and incorporated Shacker’s paradigm shift into our contemporary period in the following:

- I. The Emergence of Anomalies, 1970s to the present
 - increase in the number of economic crises and market volatility,
 - increase in the number of manmade disasters,
 - population increases, as well as industrial material exploitation, put increased strain on the natural environment,

Table 1

Comparison of Medieval and Mechanistic World Views (Shacker, 2013, p. 36.)

Medieval World View	Mechanistic World View
God is responsible for all events on earth.	God or nature merely sets universe in motion, natural law determines the rest; clockwork universe of Newton.
God’s creation only 6000 years old.	Universe very old, Earth millions to billions years old, formed by natural forces.
Two sets of laws: one for Earth, one for heaven.	One set of natural laws governs Earth and the universe.
Geocentric universe: Earth does not move.	Helocentric solar system: Earth orbits the sun.
King and nobility have divine right to rule.	The right to govern derives from the people; kings are tyrants.
Medieval laws and value system designed to protect the lands and power of kings, the aristocracy and the church.	Laws and values designed to provide liberty and equality to all men, to protect the pursuit of happiness, and to derive power from the people in a democracy.

Table 2

Comparison of Mechanistic and Organic World Views (Shacker, 2013, p. 41.)

Mechanistic World View	Organic World View
Limited mechanistic models underlie traditional science and medicine and cannot explain living systems adequately; ecological, health and economic breakdowns.	Encompassing organic/biological models underlie new-paradigm sciences from physics to agriculture, medicine, technology, economics, and psychology.
Clockwork universe, no purpose assigned to humanity or universe; we live in a vast static cosmos.	Complexity-centered universe and evolution means we are always evolving to the next level.
Anthropocentric universe; planet Earth treated as a non-living thing to be exploited.	Complexity-centered universe: planet Earth shown to be a living system.
Newtonian physics limited to macroworld, non-living things only.	New physics studies sub-atomic realm; law of organics and other theories explain living systems.
Time and space quantified.	Life, evolution, consciousness quantified and given meaning.
Studies objects and things as separate parts.	Studies the relationship between objects and things
Old paradigm culture based on oil, ultranationalism and militarism; huge military budget, small foreign aid; top 1% owns 45% of wealth.	Counterculture based on transition from oil, world peace and sustainable development; increase foreign aid to \$50 billion to stop terrorism; new economics to eliminate poverty.
Laws and values designed to protect the rights of men, especially corporations and men with property.	Laws and values designed to protect the rights of all, from women to blacks, gays and all minorities, especially the poor and middle class.
Belief that war has always been a part of human nature.	War has been invented and can be transcended in a future world of peace.

- increased concentration of corporate global power (see the definitive study by Vitali – Glattfelder – Battiston, 2011),
- increased economic inequality within and between nations and regions.

II. The Backlash Phase, 1980-1995

- *conservative backlash*, fundamentalist revivals (but they begin to slowly break down because of internal divisions and corruption),
- rise of the New Right (Reagan and Thatcher – government is evil, free market is infallible),
- scandals pile up: bailouts (already in 1984, a Savings and Loan bailout for more than \$400 billion), arms deals, resisting end to apartheid, Lebanon invasion, rise of Saddam Hussein, AIDS and women's rights ignored,
- increasing environmental catastrophes: Chernobyl, Bhopal, Exxon Valdez, Fukushima – the mechanistic dilemma deepens. Recognition that the mechanistic world view can never solve the problems of its own making.

III. The Intensive Phase (1991-2011)

- regressive presidencies,

- corporate world domination (oil wars, GMOs),
- activist Millennial or Phoenix Generation (Dennis, 2015),
- integrative medicine,
- global education – the Future University ('Multi-versity'),
- regenerative regional planning (e.g., Kőszeg KRAFT project, see, Mislivetz et al., 2014).

IV. The Transformational Phase/ Existential Challenges (2012-2050)

- climate change, and exponential population growth repercussions and the development of alternative energy sources,
- the future of employment: technological unemployment; social versus market values,
- new economic models: prosperity without growth, green and blue economies, sharing economy and participatory economics, community capitalism, resource-based economy and the collaborative commons,
- reinventing governance, democracy and political participation,
- regenerative revolution: new economics, technological/social innovation will replace the macroe-

conomics machine models of today. It will be based on organic development and the interdependence of life processes. (see, e.g., www.GlobalRegen.net, www.kraftprojekt.hu).

A Tale of Two Cultures

A great poet is always timely. A great philosopher is an urgent need. There's no rush for Isaac Newton. We were quite happy with Aristotle's cosmos. Personally, I preferred it. Fifty-five crystal spheres geared to God's crankshaft is my idea of a satisfying universe. I can't think of anything more trivial than the speed of light. Quarks, quarsars – big bangs, black holes – who gives a shit? How did you people con us out of all that status? All that money? And why are you so pleased with yourselves? ... If knowledge isn't self-knowledge it isn't doing much, mate. Is the universe expanding? Is it contracting? ... Leave me out. I can expand my universe without you.

*From Tom Stoppard's play Arcadia (1993),
quoted in Jacobs (2014)*

The division of scientific disciplines is recognized as both old and new. Some authors (Dirks, 1996) trace the origins back to the ancient Greeks, and already in the 16th century scholars and philosophers complained about the fragmentation of knowledge (e.g., in the works of Sir Francis Bacon we clearly encounter the disruption of relations between science and social philosophy). At the base of this divergence was the rapid growth and expansion of the sciences.

For many years, Immanuel Wallerstein wrote about the two cultures of scholarship. But before we expand on Wallerstein's analysis, a brief discussion on the background of the debate is necessary. Wallerstein based his reasoning on both the lecture and publications of C.P. Snow (1959), on the topic of the two cultures, that is science and philosophy (*The Two Cultures and the Scientific Revolution*). This debate was actually introduced even earlier in the 1880s by Mathew Arnold in another Rede Lecture in 1882, entitled "Literature and Science," a clear precursor to Snow's later lecture, and in letters responding to Thomas Henry Huxley's advocacy of scientific endeavor over the study of humanities. Arnold's response takes a practical look at the education of young people, arguing "that while the study of the sciences could fill the mind with facts, the humanities could move the human spirit" (Jacobs, 2014). Arnold emphasized the need for culture to be protected in order to guide human conduct in the face of moral challenges presented by modern science. This could not be more relevant today considering the challenges facing

societies relating to, for example, genetic engineering, increasing weapons of mass destruction, and the underlying assumption that every problem we face has a technological solution.

What Snow later developed in his Rede Lecture in 1959 emphasized that because of the expansion of intellectual specialization in the 19th century, the sciences and humanities had become mutually incomprehensible to one another. The gulf between these two cultures of thought was deliberate and a clear product of 19th century thinking. Science was assigned the task of looking for 'truth'; while philosophy, and what became known more generally as the humanities (history, and later economics, sociology, and political science), was positioned to search for the 'good'. The progress of the last 200 years has tried to reunite the search for 'truth' and the search for the 'good' under the label of social science as established in the 19th century. In the 19th century, the disciplinary boundaries took shape at universities. After WW II, massive expansion and development of universities consisted of the formation of more and more disciplines and departments. One problem of the rapid growth of science was that there was too much information spread across the disciplines for any one person to handle. This has only been exacerbated in the 20th and 21st centuries with technological developments and the 24/7 provision of information to many researchers and academics.

Wallerstein observes, that rather than reunifying these two cultures, social science has itself been torn apart by the dissonance between the two distinct approaches to inquiry, or cultures of knowledge. But Wallerstein (1999) recognizes two remarkable intellectual developments of the last decades that perhaps provide evidence of a process of overcoming the split of the two cultures that points towards a more holistic approach to scientific analysis. The first is called 'complexity studies' in the natural sciences, and the other is called 'cultural studies' in the humanities. Complexity studies rejects the Newtonian science that assumed that there were simple underlying formulae that explained everything. Complexity studies, Wallerstein argues, reveals rather that formulae can at best reflect only partial reality, that may explicate the past, but never the future. This is a transformation that Ilya Prigogine (1996) called moving from a 'geometrical universe' to a 'narrative universe'. The universe is filled with structures that constantly evolve, and then reach points of inequilibrium that cannot be sustained, when bifurcation takes place and new paths are found and new structures and systems established. Although we do not know what, for example, a new world system or structure will look like, as individuals and collectives we can have more impact at these times, because we are not under the constraints

of the old or emerging new world system. Therefore, the age we live in is more open to human intervention and creativity (Wallerstein, 2000, p. 251-252.).

Cultural studies do not just study culture as such anymore, but rather how, when, why and in what forms culture is produced, and how cultural products are received by others, and for what reasons. Therefore, cultural studies has moved away from the traditional humanities into the realm of the social sciences and the explanation of reality as a constructed reality.

With the move of natural science towards social sciences via complexity studies, and the move of humanities towards the social sciences via cultural studies, we are in the process of overcoming the two cultures of knowledge by recognizing that reality is constructed. This gradual process of overcoming the artificial distinction between hard and separate disciplines, and moving towards the unification of scientific and human endeavor, provides the basis not only for holistic scientific enquiry, but for the basis of new, regenerative educational models, and 'multi-versities' as oppose to 'uni-versities'. Pinker (2014) declares that instead of science being the enemy of humanities, that they both share a common enemy which is an educational system that avoids addressing the complex and varied global challenges of our age. Real and exacting critical training in any field is essential in order to prepare young people today for the unexpected uncertainties and surprises they will face.

In academic scholarship (research as well as education), particularly in the social sciences, there is an increasing tendency to try to bridge the fragmentary nature of knowledge to create truly transdisciplinary methodologies. New methodology is needed that is not tied to compartmentalized disciplinary categories that reflect and reproduce a mechanistic world view. Knowledge produced through the cross-fertilization of tools, information and methodologies requires a new type of university that can aid in the production of a complex understanding of contemporary global challenges. A 'multiversity' needs to be different in fundamental ways from today's obsolete, out-of-touch, and petrified institutions. New institutions should be 'learning' and not just teaching institutions where the co-creation of knowledge is translated into programs that promote self-reflection and self-correction, in systems, policies and societies. This way new knowledge hubs can steadily reconfigure their own capacities to include new partners and methods to assess and address changing realities. The social and natural sciences, as well as technical innovations, should also be socially responsible. In the first place, the question needs to be asked: does the research serve the interests of societies and if so, in what ways will it be useful identifying and providing relevant alternatives for solutions to problems.

Integrative Cognitive Tools: Wholeness and the Implicate Order Revisited

...science itself is demanding a new, non-fragmentary world view, in the sense that the present approach of analysis of the world into independently existent parts does not work very well in modern physics. It is shown that both in relativity theory and quantum theory, notions implying the undivided wholeness of the universe would provide a much more orderly way of considering the general nature of reality.

David Bohm (1980, p. xiii.)

...Science is in transition to a new form of rationality based on complexity, one that moves beyond the rationality of determinism and therefore of a future that has already been decided. And the fact that the future is not given is a source of basic hope.

Immanuel Wallerstein (1999, p. 166-167.)

The main challenges are to overcome dogma, complacency and the neglect to reflect on scientific processes, 'objectivity' and underlying structures; at the same time enabling the synergistic exploration of trans-disciplinary research in order to imagine new worlds and new futures through a collective process of co-creation. This can take the form of the 'wisdom of crowds' approach by Surokiewicz (2004), Csermely (2015), among others. A brief summary of my own research is based on the inadequacy of current analytical models to assess and analyze the new methods and pervasiveness of social organization at the global level. Through the application of complexity theory and the study of the 'emergence' of new cultural forms, new narratives, and new networks under the surface of societies, a better framework is approached to account for the diversity and spread of new networks of social connectivity and activism. When initiatives emerge to the surface they can presage fundamental social and structural changes. I have found that the emergence of new 'order' in complex systems is prompted by small, singular events that result in small disorders that intensify and cause instability where the novelty emerges. If the new issues, methods, identities, structures and forms of protest are widely imitated, then what began as a singular innovation can spread within the protest system and transform it. This critical phase reflects the idea that, dependent on initial conditions, small causes can have large effects. The qualities of self-organization, networking, and synergy as emergent qualities can then be employed to construct a dynamic concept of contemporary protests.

Another application to our interconnected and interdependent planet emerges from ‘entanglement theory’ which describes how particles of energy or matter can become correlated to predictably interact with each other regardless of how far apart they are.

Quantum entanglement allows qubits [quantum bits] that are separated by incredible distances to interact with each other immediately, in a communication that is not limited to the speed of light. No matter how great the distance between the correlated particles, they will remain entangled as long as they are isolated (*Whatis.com, 2006*).

Einstein called quantum entanglement a „spooky action at a distance”, but it is a really existing phenomenon that has been demonstrated in experiments, although the mechanism behind it cannot be fully explained by any existing theory. One proposal suggests that all particles on earth were once compacted tightly together and, as a consequence, maintain a connectedness. This includes the particles that make up each one of us. Recent events certainly reinforce the one-ness of humanity and the crises we face together, and the need to meliorate current conflicts between each other, and between us and the planet. This kind of perspective could lead to a new understanding our place in the universe, informing the way we conduct our behaviour.

In my research, I am also interested in ‘entropy’ and the application of Social Entropy Theory (SET) and the Second Law of Thermodynamics to networks, societies and civilizations. Social entropy measures the natural decay within a social system. It can comprise the disintegration of social structures and social relations. Legal institutions, as well as political and educational/scientific institutions expend much energy maintaining structures to decrease systemic entropy to try and maintain the system. But the Second Law of Thermodynamics states that entropy production is irreversible and tends to increase over time in any naturally occurring process. ‘Anomie’ is the maximum state of social entropy, which can lead to the general breakdown of social networks, the fragmentation of social identities and the regulatory function of social values in societies over time. Cooperation is replaced with conflict and chaos.

This kind of analysis of social phenomenon through the use of theory from the natural and physical sciences is gaining momentum. The world’s problems are too complex, and interdependent to be defined within traditional disciplines. The challenge and responsibility of science today is to bring together people with different backgrounds and experience since no one has all the information required to deal with the gravity of issues we are facing.

The kinds of networks of which we are part of today appear to have deeply innovative qualities of density, temporality, spontaneity, and de-territorialization, crossing time as well as space. Recently, the Japanese government has decided to phase out the social sciences and humanities, claiming that they are no longer relevant to today’s world and today’s problems (Sawa, 2015). This action may be a bit extreme, but it does emphasize the challenge for the social sciences and humanities to become more relevant when addressing global issues. If we are condemned to live in extraordinary times, where all known ‘truths’ are being disputed, and where the certainties that have operated until now have evaporated, where does this leave the social sciences?

New management of the social sciences, connecting them with the natural sciences, is more important now than ever, and can become more relevant at times like these. In a complex world, the social sciences can act as the conscience and critique of societies and institutions. As social scientists, we engage in critical analysis that moves beyond the accumulation of data, to reflect, inform, and provide future alternatives and ways out of crisis. In contrast to journalists, politicians, and pundits, who are satisfied with soundbites, responsible social scientists accept the complexity of the age and refuse, for example, to see contemporary conflicts in the framework of a ‘clash of civilizations’, which inspired disastrous foreign policies for which both global peripheries and traditional centers are now paying a high price in terms of migration and terrorism. Relevant social sciences must challenge simplistic and black-and-white thinking that reduces the hopes of hundreds of millions of people into simple contrasts between good and evil. Critical social scientists insist on the complexity of the world, and that there is nothing inevitable about neo-liberal capitalism, and that the withdrawal of the state from society and from its responsibilities is not a necessity, but a political choice. The perceived breakdown of basic civility, the return of nationalism and extremism in Europe, has more complex causes than the challenges of new migrations and immigrants. This may be out of step with the requirements of one type of contemporary reality, for example, reflected in the media, that performs an unrelenting ‘social acceleration’ where there is no time for detail, subtlety, balance and complex thinking, but it is crucial.

Another example can be taken from the management or rather mis-management of the financial crisis. When it came, and in its aftermath, it became clear that existing economic and financial models were seriously limited, oversimplistic and overconfident and actually helped to create the crisis in the first place. This is reflected in a combination of opinions not only from people who are skeptical of the neo-liberal, unregulated, post-Bretton

Woods global capitalist system, but from people who actually worked at the heart of finance. All expressed concern that we do not understand the complexity or interdependence of the economic systems that drive our modern societies. We are, in fact, surrounded by systems made up of many interconnected and interacting parts like swarms of birds or fish, ecosystems, even brains, and this includes financial markets. Complexity theory tells us that what looks like complex behavior from the outside is actually the result of a few simple rules of interaction. So in order to begin to understand a system you need to look at the interactions.

Complex systems have a unique characteristic that is called 'emergence' which means that a system as a whole cannot be understood or predicted by examining the components of the system, because the system as a whole starts to reveal a particular behavior. *Therefore, the whole is literally more than the sum of individual parts.* Networks also represent complex systems and the nodes in a network are its components and the links are the interactions.

Applying this analysis to economic networks (but also to social and political networks) is new and reveals a surprising gap in the literature and analysis. In a definitive study Vitali, Glattfelder, Battiston (2011) present, for example, the extent of trans-national company (TNC) control of global wealth and finances. The TNC network they analyzed was structured with a periphery and a center. The center contained about 75% of all players, and in the center there was a tiny but dominant core of highly interconnected companies. Although they only make up 36% of total TNCs, they control 95% of the total operating revenue of all TNCs.

After computing network control with 600,000 nodes of interconnections, they found that the top 737 shareholders (making up 0.123%) have the potential to collectively control 80% of all TNC value. What are the implications of this high connection in the core of global finance? First of all, the high degree of control is extreme; and second, the high degree of interconnectivity of the top players in the core poses a significant systemic risk to the global economy, because any disruption in the core will quickly spread through the entire system. The study concludes that the network is probably the result of self-organization which is an emergent property and that the network depends on the rules of interaction in the system.

The realization that crisis is the new normal state of affairs requires radical and innovative rethinking, and not just palliatives. For example, we need to see the market as an aspect of human existence that cannot be divorced from the rest of life, yet the possibility that we should stop and rethink the market simply does not arise. Karl Polányi (2001) in *The Great Transfor-*

mation, presented a set of interrelated and intertwined phenomena. With extraordinary prescience, he warned that crisis would come. He rejected the idea that the market is 'self-regulating' and can correct itself. There is no 'invisible hand' such as the market fundamentalists maintain, so there is nothing inevitable or 'natural' about the way markets work: *they are always shaped by political decisions and powerful private interests.* These observations and propositions were for the most part rather neglected during the past decades and by the explicit or tacit consensus of both social scientists and political analysts. In most cases analysts deal with each crisis as separate, isolated phenomena. This negligence and restricted perception (based upon the paradigm of the sovereign nation state and doctrine of independent academic disciplines) is greatly responsible for the present global turmoil which is at its heart a civilizational crisis. One of the major negative results is the lack of responsibility-taking for global or transnational disasters by the dominant players and stakeholders – from national and regional political leaders and institutions via institutions of knowledge creation and distribution including eminent social scientists.

This institutionalised irresponsibility and indifference surrounded by a tacit consensus about dividedness as an unchangeable given is to a significant degree responsible for undermining and emptying out democracies as well as for endangering the future of human existence on the planet. The recent return of the nation state and accompanying nationalistic clichés and prejudices within Europe and all around its borders resulted in the rise of rightwing and religious extremism, populism and an increasing rejection of multiculturalism. Xenophobia, racism and anti-semitism has been growing not only in the peripheries but also in the core countries of established democracies of affluent societies. This will only increase with the influx of refugees and migrants and the threat of new terrorist attacks, like in Paris, unless the inter-, cross-, multi-disciplinary 'wisdom of the crowd' can be leveraged to envision better possible futures.

The critical approach that is needed also leads to questions about the university itself, and about the research industry in which we are all embedded. The economic crisis became a pretext for profound transformations in how knowledge is produced and what kind of knowledge matters that we need to be aware of. We live in a complex, inter-dependent world where, on the one hand, governments say they need to downsize, open markets, and foster personal responsibility, while, at the same time they bail out banks and regulate our lives in increasingly invasive forms of controls over employment, personal conduct and appearance, and through surveillance. This also determines the nature

of the research that is conducted. A creative, innovative and responsible approach to the social sciences and research entails a much greater engagement and deeper involvement in being a producer of ideas, a critic of society, and a member of intellectual networks where new ideas and new visions emerge for possible futures.

The social sciences needs to embrace uncertainty because "... uncertainty is wondrous, and [if] certainty were to be real, would be moral death. If we were certain of the future, there would be no moral compulsion to do anything ... If everything is uncertain, then the future is open to creativity, not merely human creativity, but the creativity of all nature" (Wallerstein, 1999, p. 4).

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SUSTAINABLE BUSINESS MODELS – WHAT DO MANAGEMENT THEORIES SAY?

Literature describing the notion and practice of business models has grown considerably over the last few years. Innovative business models appear in every sector of the economy challenging traditional ways of creating and capturing value. However, research describing the theoretical foundations of the field is scarce and many questions still remain. This article examines business models promoting various aspects of sustainable development and tests the explanatory power of two theoretical approaches, namely the resource based view of the firm and transaction cost theory regarding their emergence and successful market performance. Through the examples of industrial ecology and the sharing economy the author shows that a sharp reduction of transaction costs (e.g. in the form of internet based systems) coupled with resources widely available but not utilised before may result in fast growing new markets. This research also provides evidence regarding the notion that these two theoretical approaches can complement each other in explaining corporate behaviour.

Keywords: innovative business model, corporate sustainability, industrial ecology, sharing economy, transaction costs, resource based view

Interest in the topic of business models has shown a significant increase over the last few years. Casadesus-Masanell and Zhu point out the importance of the notion in both managerial practice and academic literature as a result of an “increasing number of opportunities for business model configurations enabled by technological progress, new customer preferences, and deregulation” (Casadesus-Masanell – Zhu, 2013, p. 464).

Regarding the practical use of the notion, Amit and Zott cited several surveys conducted among senior managers and came to the conclusion that there are several reasons why business model innovation is more appealing to company management than more traditional product and process innovations: first, new business models represent often underutilized sources of future value; second, the imitation or replication of an entire novel activity system is more difficult than a single product or process; and third, because business model innovation can be a potentially powerful competitive tool (Amit – Zott, 2012).

According to Johnson et al. a new business model can facilitate a novel technology, especially when an entirely new group of customers is addressed. The authors also note the role of new business models when an established company faces a disruptor on the market (Johnson et al., 2008).

Studies demonstrating practical experiences also provide evidence of the growing importance of business models. According to Johnson et al. (2008, p. 10.) “in the USA, 40% of the 27 companies founded over the last 25 years, that grew their way into the Fortune 500 over the past 10 years, did so through business model innovation”. A recent study surveying the ratio of small and medium enterprises (SMEs), which have undertaken business model innovation by country and by sector, provides evidence that in some countries 8-10% of SMEs undertake some form of business model innovation (although in some counties, as in Hungary this may be as low as 1-2%) (Empirica and FHNW, 2014).

Parallel to practical developments, scientific interest has also increased towards emerging business models. A Scopus search for the term “business model” amongst article titles, abstracts and keywords since October, 2015 revealed 3,909 articles in the “Social Sciences and Humanities” subject area. Of these, 2,457 have been published between 2010 and 2015. Looking at the top management journals, Scopus can locate 43 articles up to and including 2009 and 26 articles since 2010. Two scientific journals, namely Strategic Management Journal and Management Science, have each published 12 articles over the whole period related to “business models”, while 45 articles were published in practice-oriented journals, Harvard Business Review leading with 29 articles.

Definitions, components and design of business models

While the literature with regard to business models is growing fast, a widely accepted definition still does not exist.

Business models can be interpreted as “stories that explain how enterprises work” (Magretta, 2002, p. 4.), but several other definitions have been created over the years with different purposes in mind. Morris et al. defines a business model as a “concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets” (Morris et al., 2005, p. 727.)

Zott and Amit focus on the embedded nature of any given business organization in an ecosystem of other organizations when defining a business model as a “system of interdependent activities that transcends the focal firm and spans its boundaries” (Zott – Amit, 2010, p. 216.). “A business model is a bundle of specific activities — an activity system — conducted to satisfy the perceived needs of the market, along with the specification of which parties (a company or its partners) conduct which activities, and how these activities are linked to each other” (Amit – Zott, 2012).

Additionally, Casadesus-Masanell and Ricart (2010) argue that a clear distinction between ‘business model’, ‘strategy’ and ‘tactics’ is needed in order to enhance the contribution of scientific literature with regard to the topic. They define a business model as a reflection of a firm’s realized strategy and note that while every business has a business model, i.e. it makes choices that have consequences, not every organization has a strategy (Casadesus-Masanell – Ricart, 2010).

Discussing the characteristics of internet based business models, Moricz (2007) points out that while strategies define the relationships of businesses with their competitive environment, business models take a system perspective by defining the crucial elements of businesses and the match between them.

Concentrating on the elements of business models, Timmers provides the following definition: “an architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues” (Timmers, 1998, p. 2.).

Other authors also focus on the different components of business models. Morris et al. (2005) defines these elements as value propositions, customers, internal processes/competencies, external positioning, economic models, and personal/investor factors. Johnson et al. (2008), on the other hand, identifies customer

value propositions, profit formulae, key resources, and key processes as the most important building blocks of business models.

A popular practical guide to creating and assessing new business models by Osterwalder and Pigneur (2010) defines nine building blocks of a business model within their ‘business model canvas’ framework: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure.

Practical literature on business modelling places an emphasis on the process of business model generation, as well as the analysis and further development of existing business models.

Osterwalder and Pigneur, for example, identify six different business model design techniques: customer insights, ideation, visual thinking, prototyping, storytelling and scenarios. They also list methods they used to forward their own project of the business model canvas including environmental scanning, customer empathy maps, co-creation, open design processes, etc. (Osterwalder – Pigneur, 2010).

Chesbrough points out the necessity of such processes as experimentation, effectuation (which places an emphasis on taking actions over analysis and using information resulting from these actions) and leading change in organisations (Chesbrough, 2010).

While some of the tools to be used for successful business model innovation seem to be rather simple, several barriers hinder implementation in many organisations. It is generally assumed that small organisations, especially start-ups, are more apt to undertake the processes required to succeed in implementing new models of operation, but many other factors also influence business model innovation.

Chesbrough (2010) argues that a new technological solution, without the appropriate business model, may be less valuable than an inferior solution with a matching business model. He cites the example of Xerox and spin-off companies who have successfully marketed products originally developed by the company. In such cases, when the innovator is not able to design a suitable business model, others who have left the organisation may succeed by experimenting with different business models (Chesbrough, 2010).

Regarding the barriers to business model innovations, the author asks the question why organizations are not experimenting with new solutions before the market renders their traditional business model redundant?

Chesbrough – after analysing the work of Amit and Zott and Christensen – points out the cognitive barriers to business model innovation: “the success of estab-

lished business models strongly influences the information that subsequently gets routed into or filtered out of corporate decision processes” (Chesbrough, 2010, p. 358.). Another issue to tackle is the organizational problem caused by the co-existence between current and new business models (Chesbrough, 2010).

Sustainable business models

Pivotal environmental and social issues call for more radical changes than offered by many current corporate practices, e.g. pollution prevention, environmental management systems, etc. Proponents of sustainable development realised long ago the potential benefits of a number of new, innovative business models, e.g. solutions offered by the sharing economy, industrial symbiosis, product-service systems, social enterprises, etc., but a systematic analysis of their environmental and social performances is still lacking.

Schaltegger et al. assert that the notion of business models can provide a useful framework to analyse disruptive change in business operations from a sustainable development point of view since it illuminates the value creation logic of an organization, its effects and allows for new forms of governance (Schaltegger et al., 2015).

Boons and Lüdeke-Freund (2013) look at business models as market devices, which allow for the unfolding of the assumed sustainability potential of a certain innovation. In this context, business models are successful if they can overcome the barriers posed by institutionalised organizational memory and the external business environment.

After reviewing the literature on business models, they propose some normative requirements that business models should meet in order to support sustainable innovation (Boons – Lüdeke-Freund, 2013):

- the value proposition should provide measurable ecological and/or social value,
- suppliers should take responsibility for their own and their suppliers’ stakeholders,
- customers should be motivated to take responsibility for their consumption and for the stakeholders of the companies involved in the supply chain,
- economic costs and benefits should be distributed appropriately among actors and should account for the company’s ecological and social impacts.

SustainAbility, a think tank and strategic advisory firm identifies a number of different business models with potential benefits to the environment and society and classifies them into five separate groups as follows:

1. Business models with a potential positive impact on the environment:
 - Closed-Loop Production,
 - the replacement of physical infrastructure with virtual services,
 - produce on demand,
 - rematerialization (using waste as raw material, creation of new products).
2. Business models aiming at social innovation:
 - using the profits earned from the sale of a product/service to donate a similar product/service to those in need,
 - cooperative ownership,
 - inclusive sourcing (supporting the suppliers of products and services).
3. Base of the pyramid business models:
 - building new markets in innovative and socially responsible ways,
 - differential pricing (charging more for those who can afford it to subsidize those who cannot),
 - microfinancing to low income borrowers,
 - microfranchising (to help the poor to start their own businesses).
4. Innovative financing models:
 - crowdfunding,
 - offering a free product and charging for premium services (freemium),
 - innovative product financing (leasing or renting instead of buying),
 - employing performance-based contracting,
 - subscription model.
5. Business models with diverse impacts on sustainability:
 - alternative marketplace using a new type of transaction,
 - changing customer behaviour to reduce consumption,
 - product as a service,
 - shared resource/product.

Machiba (2012) explores the economic, social/cultural and environmental benefits of various sustainability-oriented business models. Table 1 shows the direct benefits (first-order value criteria), but the authors also uncover a number of wider, systematic effects, e.g. greener markets, reduced footprints, GHG emission reductions, resource use optimisations and savings, etc.

Table 1

The sustainability benefits of various business models (Machiba, 2012)

Business model types	Core value propositions	First-order value creation		
		Economic	Social/cultural	Environmental
Green value-added products	<i>Products with better performance, savings</i>	Savings and better performance for customers Profit for focal company and its suppliers	Green image	
Waste regeneration systems	<i>Revenue from waste valorisation, alternative products</i>	Revenue from waste valorisation, alternative products	Green image/ bio brand	Minimisation of the impact of waste
Renewable energy-based systems	<i>Cheaper & cleaner energy</i>	Cheaper energy for customers Profit for focal company	Green image	Minimisation of the reliance on fossil fuels
Efficiency optimisation by ICT	<i>Economic savings due to more efficient management of resources</i>	Profit for focal company		
Functional sales	<i>More efficient services</i>	Savings for customers	Convenience	
Innovative financing	<i>Resource savings</i>	Profit for focal company	Convenience	
Sustainable mobility systems	<i>Flexibility, savings for customers</i>	Savings for customers Profit for focal company	Flexibility	
Industrial symbiosis	<i>Resource savings, higher efficiencies</i>	Resource savings	Learning	Waste and emission reductions
Eco-cities	<i>Improved quality of life, convenience</i>	Improved quality of life Green image	Improved environment	

A theoretical perspective on business models

Initial optimism surrounding sustainable business models with regard to their positive impact on environmental and social processes is slowly giving way to a more sophisticated understanding of their potential benefits and drawbacks. This is essential since policy-makers currently lack reliable information regarding their overall, long term impacts on society – as demonstrated, for example, by the ongoing debate about the legal regulations of car-sharing services in several European countries or the market consequences (e.g. on realty prices) of the rapid growth of apartment sharing businesses.

While some practical experience has already been accumulated, little effort has been put into investigating the theoretical underpinnings of such business models. For

this reason, the following section will introduce two popular theoretical approaches, namely the resource-based view of the firm (RBV) and transaction cost economics (TCE). These theories have been widely used to explain a host of phenomena in organizations and while they may not fully explain innovative business models, they can add to our understanding about them.

We propose that these two theoretical approaches can contribute to our understanding of new, sustainable business models: 1) the rapid emergence of new business models is – at least to a certain extent – a result of identifying and integrating resources into company operations, which have not been utilised before, and 2) the utilisation of new types of resources is made possible by a reduction of transaction costs – often through advances in information technology (IT). The first part of

our proposal demonstrates the explanatory power of the resource-based view of the firm, while the second part tests the role transaction costs play in the emergence of new business models.

To further explore our propositions, in the following sections we introduce the most relevant aspects of these two theoretical approaches followed by a section, which demonstrates their roles in the emergence of sustainable business models.

The resource-based view of the firm (RBV)

Wernerfelt, in one of his first articles describing the *resource-based view of the firm*, examines different types of resources and looks for the circumstances under which a resource will lead to high returns over longer periods of time (Wernerfelt, 1984). By ‘resource’ he means any strength or weakness of a firm, including both tangible and intangible resources. By comparing the resource-based view of the firm to strategy approaches based on products such as Porter’s five competitive forces (Porter, 1980), Wernerfelt concludes that “optimal management of a resource portfolio is in theory the same as optimal management of a product portfolio, but the two frameworks may highlight different growth avenues” (Wernerfelt, 1984, p. 178.).

Barney demonstrated that no firm can enjoy a sustained competitive advantage if resources are homogeneous and perfectly mobile. He also illuminated the fact that for first-mover advantages to exist in an industry, firms in that industry should be heterogeneous in terms of resources they control. Furthermore, he argues that barriers to entry or mobility are only possible if firms are heterogeneous regarding their resources and if these resources are not perfectly mobile (Barney, 1991).

With these premises, Barney builds a model, according to which for a resource to be able to sustain a competitive advantage (a) it must be valuable, in the sense that it exploits opportunities and/or neutralizes threats in a firm’s environment, (b) must be rare among a firm’s current and potential competition, (c) must be imperfectly imitable, and (d) there cannot be strategically equivalent substitutes for this resource that are valuable but neither rare nor imperfectly imitable” (Barney, 1991, p. 105-106.).

Barney classifies resources into three major categories: physical capital resources, human capital resources and organizational capital resources (Barney, 1991). Physical capital resources include the physical technology used in a firm, while human capital resources relate to the knowledge and skills of individual managers and other employees of a firm. Based on an earlier work by Tomer (1987), by organizational capital resources Barney means “a firm’s formal reporting structure, its

formal and informal planning, controlling and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment” (Barney, 1991).

Further elaborating on the different types of resources, Tomer later concentrates on distinguishing between human capital (HC) and intangible capital (IC), defining the latter as a much broader category than human capital: embodied in individuals, in groups of individuals or in the relationships among individuals and their groups (Tomer, 2012). As such, intangible capital also includes social capital, the formal and informal relationships between groups and individuals. Tomer notes that often adaptation and learning is needed on the part of individuals to realize the full potential of social networks and structures, which he calls hybrid investment or hybrid social capital.

A specific resource, which has received attention in the literature is trust between organisations and organisation and their different stakeholders. Rousseau et al. (1998) provided an overview of issues related to trust in order to work out a cross-disciplinary view and found consensus in the literature regarding the role of trust: it may enable cooperative behaviour, promote adaptive organizational forms (e.g. networks), reduce harmful conflict, decrease transaction costs, facilitate the formulation of work groups and promote responses to crisis (Rousseau et al., 1998).

Transaction cost economics (TCE)

Another dominating idea explaining the existence of the firm and searching for its boundaries, namely *transaction cost theory*, has been elaborated on by Coase and further developed by Williamson.

Coase considered the firm as an alternative to organizing production through market transactions: “within the firm individual bargains between the various co-operating factors of production are eliminated and a market transaction is substituted for an administrative decision” (Coase, 1960, p. 16.). He argues that the differences in transaction costs between markets and hierarchies are primarily responsible for the decisions to internalize some business operations and use markets for others (Coase, 1937).

Among transaction costs, Coase mentions the cost of discovering potential partners, the flow of information between partners, the cost of negotiations leading to a bargain, the finalisation of contracts, and the inspection of whether or not the terms of the contract are being observed by the parties (Coase, 1960). These costs can be grouped into three categories, namely search and information costs, bargaining costs, and policing and enforcement costs.

TCE explains the existence of the firm by the existence of transaction costs and the ability of firms to minimize them in certain transactions.

Further elaborating on the idea, Williamson notes that “TCE examines alternative forms of economic organization with reference to their capacity to economize on bounded rationality while simultaneously safeguarding the transactions in question against the hazards of opportunism” (Williamson, 1996, p. 174.).

According to Williamson (1985) three characteristics of transactions are vital: frequency, uncertainty and asset specificity. A higher level of each of these characteristics will in all likelihood lead to the adoption of internal governance.

Since its early descriptions by Coase and Williamson, transaction cost theory has been used to study various economic phenomena such as vertical and lateral integration, transfer pricing, marketing, the organization of work, franchising, regulations, multinational corporations amongst others (Shelanski et al., 1995).

Recently, TCE has also been used to provide theoretical underpinnings for the spread of internet-based businesses (see, e.g. Teo and Yu (2005) on online buying behaviour and Susarla et al. (2009) on the ‘software as a service’ business model) and the rapidly evolving topic of business sustainability (see, e.g. Zilahy (2007) regarding new, sustainable forms of cooperation between organizations; Acquier et al. (2015) relating to strategic CSR policies in global value chains; Henten and Windekilde (2016) on the role of transaction costs in the emergence of the sharing economy).

Regarding the relationship between the resource-based view and transaction cost theory, Mahoney argues that “market frictions (with asset specificity and small numbers being prominent examples) are the critical concepts of both resource-based theory and transaction cost theory” (Mahoney, 2001, p. 655.). He also notes that the theories can be viewed as being complementary since the resource-based theory is a theory of firm rents, while transaction cost theory is a theory of the existence of the firm: “the two theories can be connected in the following way: resource-based theory seeks to delineate the set of market frictions that would lead to firm growth and sustainable rents, while transaction cost theory seeks to delineate the set of market frictions that explain the existence of the firm” (Mahoney, 2001, p. 655.).

By exploring the explanatory strength of the two theoretical approaches in a specific setting, McIvor (2009) comes to the conclusion that neither transaction cost economics nor the resource-based view can fully explain the complexities of outsourcing decisions. By developing a prescriptive outsourcing framework he demonstrates the utility (and limitations) of integrating the two approaches.

By taking a business model approach, DaSilva and Trkman come to the conclusion that “by studying the roots of the terms and building upon the RBV and TCE, we argue the core of a business model is defined as a combination of resources which through transactions generate value for the company and its customers” (DaSilva – Trkman, 2014, p. 13.).

Sustainable business models in light of RBV and TCE

The following section will introduce two archetypes of business models, namely the sharing economy and industrial symbiosis in order to illustrate the strengths of the theoretical approaches introduced above. Common in these two models is the fact that they have been expected to significantly contribute to the implementation of sustainable development and that experiences with regard to their practical implementation have been accumulating rapidly over the last few years.

Illustration 1: The sharing economy

The sharing economy is a notion, which has emerged as a promising, sustainable alternative to more traditional ways of doing business in many industries, being most prevalent in mobility (e.g. bike- and car-sharing services) and tourism (e.g. community-based internet services), but also present in other sectors (e.g. household appliances and even clothing) where ownership is replaced by renting and sharing.

The original idea of sharing products and resources is not new, but the extensive use of innovative technological platforms (i.e. internet and mobile devices) and the rapid growth of businesses providing them promise significant potential in the industry (see, e.g. Belk, 2014). According to a recent report 44% of the American adult population is familiar with the idea of the sharing economy and 19% of the population has actually engaged in a sharing economy transaction (PWC, 2015a).

The rapid development of the sharing economy is facilitated by technological developments, an increasing scarcity of resources, rapid urbanisation, and demographic and social changes (PWC, 2015a). Looking at the different manifestations of the sharing economy, Benkler suggests that “the highly distributed capital structure of the contemporary communications and computation systems is largely responsible for the increased salience of social sharing as a modality of economic production in those environments” (Benkler, 2004, p. 278.).

As a result, in industry sectors, where ideas of the sharing economy are most popular, the total turnover from sharing-economy services will increase from 15

billion to 335 billion US dollars between 2015 and 2025 and thus will provide half of the whole turnover of the industry in these sectors (PWC, 2015b).

While providing various benefits to its users – and probably to society as a whole – the sharing economy poses important questions for established businesses trying to avoid disruption, new entrants who wish to lure away clients and policy makers who try to regulate and manage the market. One example of the latter is that participants in the sharing economy often exhibit tax-avoiding behaviour, which is hard to uncover for tax authorities. Furthermore, the sharing economy is a broad concept, which can cover businesses with – at least partially – different business models.

By making an effort to identify the main characteristics of goods, which are fit for sharing, Benkler (2004) claims that such goods and resources are “(1) technically “lumpy” and (2) of “mid-grained” granularity” (Benkler, 2004, p. 276.). By “lumpy” he means that these goods provide functionality in discrete packages rather than in a smooth flow. By “granularity” he seeks to capture the “(1) technical characteristics of the functionality-producing goods, (2) the shape of demand for the functionality in a given society, and (3) the amount and distribution of wealth in that society” (Benkler, 2004, p. 277.). A “mid-grained” good is then defined as one with relatively widespread private ownership, which exhibits slack capacity in relation to the demand of their owners.

By taking a resource-based view with regard to the sharing economy, the sustainability debate mainly concentrates on the physical aspects of these new types of businesses (expecting a significant decrease in resource use), but often neglects their impacts on social relationships. However, the sharing economy does not only build on previously underutilised resources such as empty seats in a car, spare apartment space, additional workforce and available time, which are invested in the provision of such services, but also on the trust relationships facilitated by innovative service providers.

Owners and users of resources such as apartment space, empty car seats and underutilised equipment also invest time and effort in transactions, as well as bear a risk inherent in the activities they engage in. Those taking advantage of the services offered also have to trust the providers of services and spend time on engaging with them and the platform providers, e.g. registration, filling in surveys, etc. Time and effort invested in such activities is in excess of that required by traditional operators, e.g. registration is not needed to flag down a cab on the street. Both parties also provide information to platform operators during the course of the transaction and afterwards, which is utilised as a key resource by them later on.

Since physical resources traded in the sharing economy are not owned by platform providers, however

valuable they might be, they alone cannot provide a sustained competitive advantage. On the other hand, by constructing scoring schemes and making them available to their customers, sharing economy platforms capitalise on a resource created by the community and provided for the platform free of charge ‘to assist other users in their decisions’. As a result, this ‘trust bank’ turns into private capital – a very effective source of sustained competitive advantage. Practical experience seems to support this logic as the main differences between platform operators are founded in the number of network members and the ‘trust bank’ built on these and not in their underlying business models or IT solutions they use. As a result, early movers in an industry – assuming that they do not make significant management mistakes – can develop their businesses rather fast and achieve a strong, safe position, which is hard to challenge later.

Thus, by considering the perspective of the resource-based view of the firm, providers of sharing economy solutions, which charge a market-based fee for their services, i.e. the provision of a platform for the actors to locate each other and network, are just like other, more traditional businesses, capitalising on a valuable, rare and hard to imitate/substitute resource: the ‘trust bank’ they created with the free contribution of their users. (This is not to say that other resources are not important for these businesses: apart from the database they build up and can utilize in many ways, their continuously developing applications, which show the characteristics of artificial intelligence, the organizational capital working behind the scenes and lawyers and lobbyist also play important roles in the success of these businesses.) From the point of view of these platform providers, resources actually shared are of less importance as long as they are abundant and users are willing to share them; their quality, price and other attributes play a secondary role. The better utilisation of resources – as expected from these solutions from a sustainability point of view – is also only a by-product – a by-product, which generates goodwill and is often used for marketing purposes.

The role of trust in the sharing economy has recently generated some interest in the literature. An article by Yang et al. (2016) examines Airbnb, the prime accommodation sharing business and the trust built up between its customers and the company, as well as the hosts offering accommodation through its internet based application. Taking an integrated perspective of attachment theory and the trust building model (TBM) they seek to provide a research model that describes trust gaining on-line. The authors argue that Airbnb deals with both informative and social interaction through its website, which thus has cognitive features (e.g. relating to quali-

ty and security) and affective characteristics (e.g. direct communication and real-time responses) and propose a research agenda to show – among others – that cognitive factors influence customer-Airbnb trust, while affect-based factors have a positive influence on customer-host relationships (Yang et al., 2016).

Early schemes of sharing resources, e.g. car sharing systems operated in schools by students, utilised simple technologies, e.g. a billboard to offer free rides, which even if operated effectively, did not reach large crowds of participants, i.e. only students studying in a certain college. The rapid advance of the Internet and mobile devices capable of running simple applications paved the way for the sharing economy by reaching individuals otherwise unconnected and thus providing a critical mass of users making it possible to realise profit in these new markets. Thus, internet-based platforms have become the backbones of the sharing economy.

Henten and Windekilde (2016) analyse the sharing economy from the point of view of transaction cost theory and claim that new digital platforms change the substitutability of traditional services, e.g. offered by a hotel or car rental company, by offering alternative private rooms and car seats. While traditionally these latter goods are more difficult to find and are less standardised thus involving more uncertainty, the use of internet-based services can mitigate many of these shortcomings and the degree of substitution will increase (Henten and Windekilde, 2016).

Using the classification of transaction costs by Coase, the sharing economy benefits from developed internet platforms that help partners discover each other (by using sophisticated search engines, often based on location), communicate with each other and finalize a contract (e.g. a rental agreement). Further, the payment for the provided service is also often made very simple by organizing financial transactions over the internet (sometime even automated, like in the case of Uber).

A closer look at various sharing economy businesses illustrates that both RBV and TCE can explain some of their important aspects even though other factors also play a role in their success.

Illustration 2: Industrial symbiosis

The utilisation of wastes as raw materials has obvious environmental benefits as proposed by many supporters of recycling schemes and more complex industrial ecology (industrial symbioses) solutions.

By mimicking natural ecosystems, industrial ecology aims at the large-scale utilisation of wastes produced by one process as a raw material of another process within or outside firm boundaries. One of the seminal

articles of industrial ecology by Frosch and Gallopoulos (1989) introduced the benefits of an integrated approach to industrial operations necessitated by resource scarcity, increasing consumption patterns and the ever more pressing problem of wastes. They conclude that in order to maintain our high standard of living, both producers and consumers should change their behaviour (Frosch – Gallopoulos, 1989).

While simple recycling activities abound in the developed world, more complex industrial symbiosis networks are still scarce. An often cited example is the Kalundborg industrial symbiosis (see, e.g. Ehrenfeld et al., 1997), but a similar network has been uncovered in Styria, Austria as well (Steiner et al., 2006) – both results of spontaneous processes rather than deliberate planning.

The major motivation behind these schemes is to generate financial gains (savings) and to find environmentally sound solutions to the management of waste through the utilisation of by-products.

If this occurs across the boundaries of the firm, utilisation requires the cooperation of at least two players, but often the engagement of other stakeholders is also needed. For example, industrial park organisations and local governments may have a facilitating role by providing information services, or by adjusting regulations to fit the requirements of the schemes. Industrial park organisations can also influence the composition of the parks (type and number of organisations) and thus have a profound effect on potential relationships between their tenants.

From a resource-based point of view, industrial ecosystems turn worthless (even costly) by-products into valuable resources, which create a market for these resources. Industrial ecosystems provide a double dividend for participating organisations by increasing efficiency and decreasing harmful emissions. Thus, they also create a win-win situation from a sustainability perspective by improving the state of the environment while generating profit.

By-products handed over/traded substitute resources purchased on the market. They may be specific to a certain process or generic, i.e. used by many producers on the market. Wastes, which are homogenous, i.e. generated of a standard quantity and quality, are easier to utilise by other processes.

Industrial ecology solutions concentrating on the utilisation of by-products without taking a more holistic view with regard to production processes may generate benefits, but since resources can often be sourced easily from their primary markets, only deeper, lasting relationships involving the optimisation of processes across different organisations can bring about a sustained competitive advantage. A distinction between

core processes and auxiliary materials is also of interest here, since organisations may be more willing to engage in relationships that concentrate on less important resources than those central to their operations (see, e.g. Halme et al. (2007) for a survey of material efficiency services).

Physical resources circulating in the economy may or may not fulfil the requirements of sustained competitive advantage as set up by Barney (1991) and introduced earlier. Waste paper may be an important, strategic resource for a paper company producing packaging paper, thus it will even build up its own infrastructure to collect waste. On the other hand, other companies, which may source raw materials easily on the market, may not be as interested in engaging in industrial ecosystems (the resource is not rare neither imperfectly imitable).

The establishment of relationships between organizations requires a considerable amount of time and effort, and trust should be built between participating organisations. The scientific literature realised this implementation gap: namely the difference between expected and actually realised levels of industrial symbiosis and identified a number of implementation barriers – many of which relate to the costs of transactions between potential partners as identified by TCE. Barriers most often identified include:

1. The identification of potential partners may take considerable effort because of the specific characteristics of by-products to be utilised. Potential partners may not operate in the same industry and thus have little information about the possibilities.
2. Information regarding the amount, composition and other characteristics of by-products is essential to be able to engage in a transaction.
3. The continuity in the supply (amount, timing, etc.) of by-products plays an important role since supply should meet demand.
4. Geographical proximity is required to reduce transportation costs.
5. Trust between organisations should be developed, which guarantees that by-products will be available/utilised for at least a certain amount of time, so that uncertainties in production can be reduced.

As a result of understanding the required effort and time needed to tackle such a wide array of barriers, organisations are often reluctant to engage in industrial symbiosis relationships and consequently invest their resources elsewhere – as found by Notarnicola et al. in the Italian industrial district of Taranto: “additional uses of the current waste are seen as a diversion of human resources and capital” (Notarnicola et al., 2016, p. 1).

Conclusions

The two introduced case studies, namely the case of the sharing economy and that of industrial symbiosis demonstrate the explanatory power of the resource-based view of the firm and illustrate the role played by transaction costs in the emergence of the two innovative business models.

Both new business models utilise resources, which have been left idle before and thus contribute to a more sustainable economy. There is a difference, however, regarding the resources providing a sustained competitive advantage for their owners. In the case of the sharing economy, a competitive advantage is provided by a resource freely made available by service users (namely the trust-based scoring system, or ‘trust bank’) and resources actually shared are of secondary importance for platform providers. On the other hand, resources shared in an industrial symbiosis scheme are central to the partnership and provide a competitive advantage as long as collaboration and resulting optimisation does not remain at a superficial level.

In both cases, transaction costs play an important role, but while in the case of the sharing economy state-of-the-art information technologies can already reduce these costs to a level, which allows for the widespread use of sharing economy platforms, in the case of industrial symbiosis, transaction costs are often still high, even though some solutions aim to mitigate them, e.g. waste exchanges, electronic platforms, etc. As a result, industrial symbiosis is not as widespread and its future development is still dubious.

Our analysis supported the two propositions we put forward and contributed to the understanding of two emerging business models. We found that resources play a key role in their existence and that transaction costs have an important mediating effect on their market penetration. These findings are in line with other attempts in the literature to combine the resource-based view with transaction cost theory.

Our results are not only useful for researchers in search of the characteristics of emerging business models, but also for policy-makers, who want to better understand them and their impacts on sustainability in order to facilitate positive change in society.

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KISVÁROSOK RENESZÁNSZA: A KŐSZEGI PÉLDA

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How many factors can determine the quality of life in a small or middle-sized (under 100.000 inhabitants) Central European town during the second decade of the 21st century? What should be the short, middle and long term strategies of national governments and municipal leaderships concerning the development of various types of settlements? Should the dwellers of the evergrowing metropoli be encouraged to move out to suburbs and smaller towns and villages or the incentives should serve the opposite aim: to invite more and more people to the big towns. Does the future belong not even to metropoli but gigantopoli or the sustainability of our globe with its limited capacities calls for stopping the process of the concentration of populations in gigantic centres? These are far from being abstract academic dilemmas but burning social, economic and cultural issues. Trying to find good answers, reasonable and feasible solutions to these questions is not possible without a deeply analytical, scholarly approach. Successful research in today's world needs well-structured, well-funded institutions that can properly combine basic and applied research on various levels. Namely, planning the future of small towns in the heart of Europe is not possible without looking into the main global tendencies of demographic development, without estimating the number and destinations of migrations, without dealing with limits and possibilities of employment in various branches of the economy.

The small town of Kőszeg with 12.000 inhabitants at the Austrian-Hungarian border, very close to Slovakia, Slovenia and Croatia houses now a unique institution that deals with the theory and practice of the integrated regional development, the idea of creative cities as well as particular Hungarian and international examples of the implementation of respective strategic development concepts. During the last half a decade it has developed a most ambitious and very productive

research project under the name Creative Cities - Sustainable Development. The acronym for the project (based on the Hungarian name and referring to the German word meaning strength) is KRAFT and by now has become a well known concept among the experts of urban and regional planning. The roots of the KRAFT concept go back to the experiences of the inhabitants of Kőszeg and another closeby town, Szombathely after the vanishing of the Iron Curtain following the collapse of the Soviet bloc. Their region suffered due to its location at the border of the Eastern and Western worlds during the Cold War and hoped to transform this disadvantage into an advantage after 1989-90. The hopes turned out to be unfounded and the optimistic enthusiasm of the very early 1990s quickly gave way to disappointments and pessimism. Why? How could this be the case in spite of the substantial European development programs that were to help the catching up process of underdeveloped regions in the countries of the former Soviet bloc? The research and higher education institutions brought into life in Kőszeg and Szombathely as a result of the persistent, hard work of the internationally well-known Hungarian social scientist, Ferenc Mislivetz, editor of the present book, have been trying to explore the unutilised potential, the boundless opportunities along the Austrian-Hungarian border for the last quarter of the century. With the creation of the new 'knowledge hub', the Institute of Advanced Study Kőszeg (acronym: IASK) in early 2016, the institutional development reached a new level and gave a great impetus to KRAFT research. The volume under review is the second book product of the project in Hungarian (in addition to several publications in English) and was first presented at the Second International KRAFT conference in Kőszeg on September 17, 2016. Under the title: *The Renaissance of Small Towns. The Kőszeg Example*, it includes 10 studies by 11 scholars.

Divided into two parts, *How and with Whom?, What and Why?*, it analyses Kőszeg practices and makes suggestions for Kőszeg in a very broad context. The authors and editors of the book include all generations from the early 20s to the late 60s. All of them have a university background, share a thorough knowledge of respective theoretical and methodological literature and lots of practical experiences. Most of them were supported during the time of their respective research by the scholarship fund New Central Europe, that was operated by the Pannon University, the strategic partner of IASK in the large scale regional development project of Western Transdanubia in western Hungary. Neither the research nor the publication of book would have been possible without the cooperation of municipal self-governments, university professors and civil organizations.

Four studies in the more than 460 page book deal with issues related to the preservation and utilization of tangible and intangible cultural heritage. Anna Szemző and Andrea Tönkő present a number of good practices that, different as they are, are connected by exploiting the 'three Ts': technology, talent and tolerance. The example of Endhoven, the home of Philips shows how in spite of the desindustrialization process the municipal leaders, based on the triple helix of education, research and entrepreneurship developed a new strategy for keeping the town attractive. Based on the soft components of everyday life, under the motto of *Sense and Simplicity*, they have developed design-related activities as the key component of their development strategy. The second example, Szczecin at the German-Polish border is trying to exploit the advantages of its border and seaside position. The brand it is developing is that of an open, close to nature but urban settlement building 'floating gardens' with canals, small islands, huge green territories. North Italy's Reggio Emilia is trying to profit from a large-scale immigration. In 2011 17.7 % of the slightly more than 140.000 population were foreign citizens and they made this peculiarity a town brand: Reggio Emilia became well known as the Center of Intercultural Dialogue. Péter Bokányi makes a very concrete suggestion for Kőszeg, describing how the literary legacy of the town and of its immediate environment can be transformed into a brand.

A frequently neglected issue in connection with the development of tourism brands is the carrying capacity of historical towns. Tamás Fejérdy devotes an extensive analysis to this problem with numerous carefully selected case-studies where the right proportion of preservation and utilisation were implemented. Ildikó Ernst describes a tourism concept that might be especially appealing to Kőszeg, that of a 'slow town' based on high quality accommodation and

food offers resulting in more extended stays. Ildikó Ernst also points out an issue that is based on lots of empirical investigations: most travel related decisions, especially on the higher quality level, are made by women. László Karvalics and Tamás Fejérdy elaborate in great detail on the resilience capabilities of small and middle sized towns. We are not always aware of the fact that about 60 per cent of European people live in these communities with less than 100.000 inhabitants. In Hungary this figure is 65 percent. Based on data from numerous towns the authors argue that the major difference among these settlements lies not so much in their vulnerabilities but rather in their capabilities for resilience. This capability can be developed by preventive adjustment, i.e. identifying possibilities for the unfolding of potentials as waterside locations or the successful management of both tangible and intangible cultural heritage. A remarkable observation of the study is that the cult of famous personalities can be as important a contribution to increasing resilience capabilities as the revitalization of emblematic buildings. The authors recommend that towns with a rich heritage hire CKOs, that is Chief Knowledge Officers, who with their expertise can help the work of public administrators. Two pieces in the book deal with innovative business models that focus not only on profits but also integrate ecological and human-social factors into the decision making processes. This strategy can pay off not only in terms of environmental protection but even in financial profits as a number of 3M solutions, for example in selective garbage management, prove. Lajos Szabó describes in great detail how development projects can integrate sustainability, Gyula Zilahy explains how new forms of cooperation can help both sellers and buyers. Depending on products, location and customer types various patterns of 'unbundling' (separation of product innovation, customer relations and infrastructure management into independent enterprises) or 'long tail' (integrating all these activities into one company) can be applied. One possible, more and more spreading solution is selling services instead of products.

Three essays address specific Kőszeg issues. Katalin Lőrincz examines how a representative group of Kőszeg citizens evaluate the quality of life in their town. Her methodology includes comparisons of the Kőszeg experience to car makes, animals and plants, a most interesting way to figure out the 'soul' of a town. Petra Gyurácz-Németh deals with the experiences of tourists at hotels and restaurants of the town, suggesting that the cooperation of the suppliers of these services can benefit both themselves and their customers more than simple competition. András Kiss lists the possible ways of making the offers of the town more visible in

the world of the Internet. Small towns comparable to Kőszeg both outside and inside Hungary could profit from the methodologies of these articles.

This last remark takes us to the target readership of this volume. Leaders of all types of municipalities, decision makers on regional development and, of course, the civil society of smaller and medium-sized settlements might find the volume useful when pondering

about problems of their communities. To use Mihály Polányi's terminology: the explicit knowledge in the volume can be the basis of specific tacit knowledge for other communities as well, namely by adding that peculiar local knowledge that we have to be aware of but can not simply learn from books or at school. An English version is in the making.

Pók, Attila

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VEZETÉSTUDOMÁNY

CIKKEK MAGYAR NYELVŰ ÖSSZEFOGLALÓI

Szabó Lajos

Fenntarthatóság, innováció és kreativitás szerepe a projektmenedzsmentben – Modellfejlesztés a szervezet teljesítményét meghatározó projektek értékelésére

Napjainkban számos tanulmány foglalkozik a stratégia készítésének kérdéskörével, elsősorban azt vizsgálva, hogy stratégiájuk megvalósításával a szervezetek hogyan járulnak hozzá a helyi és regionális fejlődéshez. Szintén több tudományos publikáció foglalkozik a projektsiker témakörével, beazonosítva a sikerkritériumokat és az azokat meghatározó sikertényezőket. Jelen cikk ismerteti a projekt-orientált stratégia fejlesztés modelljét és bemutatja, hogy a szervezeti projektek hogyan járulnak hozzá a helyi és regionális fejlődéshez, továbbá megadja ezen megközelítésnek a regionális versenyképesség modelljével, valamint a KRAFT koncepcióval való kapcsolódási pontjait.

Szintén számos tanulmány foglalkozik a fenntarthatóság témakörével, kiemelve e kérdéskörnek az üzleti életben betöltött növekvő szerepét. A klasszikus Project Excellence modell a projektek értékelésének egyik elterjedt eszköze, azonban nem a fenntarthatóság kérdését állítja a középpontba. A GPM P5 Standard a projektek fenntarthatóságának elemzésére fókuszál, azonban inkább szervezeti szintű elveket és rendszereket vizsgálva. A Project Sustainability Excellence Model (PSEM) az egyedi projektek fenntarthatósági szempontú elemzését teszi lehetővé. A cikk kis- és nagyvállalatok, valamint egy non-profit szervezet példáján keresztül mutatja be a modell alkalmazását.

Tóth-Kaszás Nikoletta – Fehérvölgyi Beáta

Készen állsz egy pályázatra? – A szervezeti projekt menedzsment érettség vizsgálata az osztrák-magyar határ menti régióban

Az 1990-es évektől kezdődően az Európai Unió mind nagyobb figyelmet fordított a határon átnyúló fejlesztések támogatására. A különböző finanszírozási forrásból származó támogatások, különösen azok, amelyek az együttműködést és a vidékfejlesztést támogatják, rendkívül fontosak lehetnek a határ menti területeken; s a fejlődés motorjává válhatnak. Kutatásunkban az Ausz-

ria-Magyarország Határon Átnyúló Együttműködési Program 2007-2013 (AT-HU) keretében megvalósult projekteket lebonyolító szervezetek projekt menedzsment érettségét vizsgáljuk. Ezen szervezetek vizsgálata azért fontos, mert az új pályázati felhívások 2016-ban nyíltak meg, így a tanulmány eredményei egyfajta önértékelési lehetőséget is kínálhatnak azon intézményeknek, akik saját érettségüket szeretnék megvizsgálni: készen állnak-e egy pályázatra? A kutatás célja kettős. Elsőként azon tényezőket azonosítottuk, amelyek az AT-HU programban projektet megvalósító szervezetek projekt menedzsment érettségének mérésére szolgálhatnak. Az empirikus kutatás alapján ezen tényezők a szervezet által felhalmozott projekt tapasztalat, a belső folyamatok működése és a szakmai háttér. Másodsorban azon tényezőket tárjuk fel, amelyek képesek befolyásolni ezen projekt menedzsment érettséget. Kutatásunkban öt ilyen meghatározó területet azonosítottunk: szervezeti struktúra, szervezeti kultúra, projektmenedzsment motivációja, jellemző és fontosnak ítélt kompetenciák köre.

Háry András

A jövő ipari fejlődésének lehetőségei és társadalmi kihívásai, adaptációs követelményei

A cikk az iparban zajló technológiai váltás témakörével foglalkozik. Elsőként röviden áttekintésre kerülnek az ipari fejlődést befolyásoló globális trendek, majd ezek kapcsán az egyre nagyobb teret nyerő intelligens technológiák és azok rendszerei. Az elemzés részletesen foglalkozik az Ipar 4.0 koncepcióval, annak fő technológiai aspektusaival. Az összeállítás végén az ipari technológiák átalakulásához kapcsolódó társadalmi vonatkozások és kiemelten a generációs konklúziók bemutatása következik. A cikk célja egyes aspektusok és megfontolások felvetése a témában.

Birkner Zoltán – Máhr Tivadar

Az innováció értelmezése – egy másik út

Az innováció segít a jövő gazdasági- és társadalmi lehetőségeinek a feltárásában. Ennek megfelelően felértékelődik az innovációs folyamatok megismerése, az

újításban érintettek feltérképezése, a kapcsolatok és befolyásoló tényezők vizsgálata. Egy önkormányzati felkérés alapján három magyarországi közép- és kisvárosban végeztek a szerzők innovációs felméréseket az intelligens szakosodás stratégiai programban érintett vállalatok körében. A vizsgálat során a hagyományos innovációs területek mellett a térségi egyetem szerepe és a társadalmi innovációban érintett szervezetek és a vizsgált cégek kapcsolatai is előkerültek. Az eredmények alapján mind a három térség vállalkozóinak innovációs teljesítménye - a kis különbségek ellenére - a magyar átlag körül van. A térségi egyetem jelenléte érzékelhető, azonban a vállalkozások innovációs képességére nem gyakorol jelentős hatást. Szintén a hagyományos kamarai kapcsolatokon kívül más civil szereplő nem került elő a tudásteremtési folyamatokban, a kapcsolatok szorossága is inkább gyenge, esetleg közepes. Ezen eredmények tükrében a szerzők konkrét javaslatokat fogalmaztak meg annak érdekében, hogy az érintett térség gazdasági- és társadalmi lehetőségei javuljanak az innovatív környezet kialakítása által.

Jody Jensen

Egy új szerep a menedzsment számára a társadalomtudományokban a komplexitás korában

Napjainkra a modern tudományban egyféle „tudományos világnézet” vált uralkodóvá, meghatározóvá és sikeressé. A tudomány és a technika fejlődése következtében másként látjuk magunkat, saját társadalmunkat és helyünket is a kozmoszban. Bár úgy tűnik, hogy a tudomány és a technika elérte a fejlődése csúcsát, és ereje teljében van, nem várt problémák mégis belülről bomlasztják a tudományt. Ez a tudományos kutatás eddig még fel nem tárt, mélyebb és sokkal komolyabb problé-

máira utal. A tudomány fejlődését visszafogják azok az előfeltevések, amelyek dogmákká váltak, és közülük a legrosszabb, amelyik azt állítja, hogy a tudomány minden lényeges kérdésre ismeri a válaszokat, már csak a részleteket kell kimunkálni. A paradigmának olyan átalakítására van szükség, amelyik a mechanikus világnézetet olyan szerves világnézetté transzformálja, amelyik alkalmasabb az ezredforduló kihívásaira megfelelőbb válaszokat adni.

Zilahy Gyula

Fenntartható üzleti modellek – Mit mondanak a menedzsmentelméletek?

Az új, innovatív üzleti modellek a gazdaság minden ágában egyre gyakoribbá válnak és ezáltal növekvő kihívást jelentenek a hagyományos modell szerint működő vállalkozások számára. Bár a gyakorlati tapasztalatokkal kapcsolatban egyre több szakcikk jelenik meg, a terület elméleti megalapozása még várat magára. A szerző jelen cikkében azon üzleti modelleket veszi szemügyre, melyek elősegítik a fenntartható fejlődés gyakorlati megvalósítását és két elméleti irányzat, nevezetesen az erőforrás-alapú megközelítés és a tranzakciós költségek elméletének a magyarázó erejét vizsgálja ezen üzleti modellek piaci megjelenésével és sikerével kapcsolatban.

Az ipari ökológia és a közösségi gazdaság példáján keresztül megmutatja, hogy a tranzakciós költségek jelentős csökkenése (pl. az interneten alapuló rendszerek segítségével) a piacon eddig meg nem jelenő, de széles körben elérhető erőforrásokkal kombinálva új, gyorsan növekvő piacok kialakulásához vezethet. Kutatása bizonyítékkal szolgál azzal kapcsolatban is, hogy a két elméleti megközelítés hogyan egészítheti ki egymást a vállalati magatartás magyarázatában.

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FELHÍVÁS A VEZETÉSTUDOMÁNY KVALITATÍV SZÁMÁHOZ

Az új, innovatív látásmód a jó kutató és vezető alapvető készsége. Képes-e olyan problémákat meglátni, amelyek mellett mások elmennek, vagy képes-e a már ismert problémákra másként tekinteni? Az új látásmód gyakran megkívánja a kvalitatív módszerek használatát, legyen szó valamilyen speciális vezetési vagy kutatási problémáról, ilyenkor ugyanis a standard, más helyzetben kiválóan működő technikák csődöt mondhatnak. A megoldást gyakran a különféle diszciplínák összekapcsolása eredményezi.

A Vezetéstudomány kvalitatív számához olyan cikkeket keresünk, amelyek kvalitatív technikát használnak, és amelyek módszerei vagy eredményei jól használhatók vezetők vagy gyakorló kutatók számára. A szám célja az interdiszciplináris együtt-gondolkodás és párbeszéd elősegítése, emiatt ösztönözzük más tudományterületek jó gyakorlatának megismertetését is.

Néhány lehetséges témakör:

- tudományfilozófiai írás a kvalitatív kutatások helyéről, szerepéről, öndefiníciós problémáiról,
- új kvalitatív módszertant vagy módszertant újszerűen bemutató cikk,
- kvalitatív módszertant használó, és eredményeiben vagy felhasználási módjában újszerű cikk,
- kvalitatív kutatás során átélt problémák és azok megoldását bemutató cikk.

A beküldött absztraktok, valamint az ennek alapján megírt cikkek a Vezetéstudomány standardjai alapján kerülnek elbírálás alá.

A legfontosabb dátumok az alábbiak:

Absztrakt beküldése	2016.10.25.
Értesítés az absztrakt elfogadásáról	2016.10.30.
Cikk beküldése	2016.11.30.
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Az absztraktokat és a cikkeket az alábbi címre szeretnénk kérni: veztud.kvalitativ@gmail.com

Vezetéstudomány honlapja: <http://www.vezetestudomany.hu>

Formai követelmények: <http://gazdalkodastudomany.uni-corvinus.hu/index.php?id=58904>

Üdvözlettel:
Horváth Dóra és Mitev Ariel
Vezetéstudomány kvalitatív szám
vendég-szerkesztői

SZERZŐINKNEK

A Vezetéstudomány a Budapesti Corvinus Egyetem Gazdálkodástudományi Karának havi folyóirata. A lapban a vezetési és gazdálkodási tudományterületekhez kapcsolódó témakörök elméleti és gyakorlati kérdéseit elemző és vizsgáló írások jelennek meg. A szerkesztőség (vezetestudomany@uni-corvinus.hu) elektronikus formában kéri az írásokat. A cikkeket elektronikus levélben (docx fájl formátumban) lehet a szerkesztőséghez eljuttatni.

A lap tudományos folyóirat, ezért szövegekői forráshivatkozások és ezek jegyzéke nélküli írásokat nem jelentet meg. A Vezetéstudományban megjelentetni szándékozott kéziratok szerzőitől az alábbi követelmények figyelembevételét kérjük:

A cikkek szokásos terjedelme a hivatkozásokkal, ábrákkal és táblázatokkal együtt 20-24 oldal, 1,5-es sortávolsággal (12-es betűméret, Times New Roman betűtípus). A cikkek első oldalának alján tüntessék fel a szerző foglalkozását, munkahelyét és beosztását, elektronikus levelezési címét, a tanulmány elkészítésével kapcsolatos információkat és az esetleges köszönetnyilvánításokat.

A kézírathoz csatolandó egy magyar nyelvű és egy angol nyelvű rövid összefoglaló (200 szót nem meghaladó terjedelemben), valamint a cikk fő témaköreit megnevező kulcsszavak jegyzéke.

Kiemeléshez dőlt betű használható, aláhúzás és félkövér nem. Jegyzeteket lehetőleg ne használjanak, amennyiben azok feltétlenül szükségesek, szövegvégi jegyzetként adják meg.

A táblázatoknak és ábráknak legyen sorszáma és címe, valamint - átvett forrás esetén - pontos hivatkozása. Az ábrákat és a táblázatokat a kézirat végén, külön oldalakon, sorszámmal és címmel ellátva kérjük csatolni, helyüket a szövegben egyértelműen jelölve (pl. „Kérem az 1. táblázatot kb. itt elhelyezni!”).

A szövegekői bibliográfiai hivatkozásokat zárójelben, a vezetéknev és az évszám feltüntetésével kérjük jelölni: pl. (Veress, 1999); szó szerinti, idézőjeles hivatkozás esetén kiegészítve az oldal(ak) számával (pl. Prahalad - Hamel, 1990, p. 85.). Amennyiben egy hivatkozott szerzőnek több bibliográfiai tétele van ugyanazon évben, ezeket 1999a, 1999b stb. módon

kell megkülönböztetni. A felhasznált források cikk végén elhelyezett jegyzékét ábécérendben kérjük, a következő formában:

Szerző (évszám): Cím. kiadás helye: kiadó; illetve forrás. 1. példa (könyv): Porter, M. E. (1980): Competitive Strategy. New York: The Free Press. 2. példa (folyóiratcikk): Prahalad, C. K. – Hamel, G. (1990): The Core Competence of the Corporation. Harvard Business Review, május-június, p. 79-91.

A formai követelmények fentiekben érvényesített, ún. „Harvard” rendszeréről (más néven „szerző/év” vagy „név/dátum” hivatkozási módszerről) részletes tájékoztatást nyújtanak az alábbi WEB-címeken elérhető források.

Az elektronikus forrásokra való hivatkozás aktuális probléma. Az Internet Library for Librarians egyik polca (www.itcompany.com/inforetriever/inetcite.htm) kilenc helyet gyűjtött össze e témával kapcsolatban.

Az angolszász országokban több elterjedt formája van a bibliográfiai hivatkozásnak. Ezek a formák több folyóiratban is használatosak. Közülük az ún. Harvard-stílusú bibliográfiai hivatkozások vonatkozásában ad hasznos tanácsokat a Guide to Citing Internet Sources (www.bournemouth.ac.uk/service-depts/lis/LIS_Pub/harvardsystint.html).

A Modern Language Association of America (MLA) - egyébként szintén sok helyütt alkalmazott - hivatkozási stílusával kapcsolatban ajánlható az MLA-Style Citations of Electronic Sources (www.cas.usf.edu/english/walker/mla.html).

Az APA Publication Manual Crib Sheet (www.gasou.edu/psychweb/tipsheet/apacrib.htm) az American Psychological Association (APA) idézési stílusával foglalkozó forrásokat gyűjti csokorba.

Havi folyóirat lévén és a megjelenés átfutási idejének csökkentése érdekében a Vezetéstudomány kefelevonatot nem küld, elfogadás előtt azonban a szerzőknek, ha kéri, egyeztetés céljából elküldi a cikk szerkesztett változatát.

2006. januárjától az új lapszámok cikkeit és 2004-ig visszamenőleg az összes korábbi kiadás publikációit – külön kívánságra – elektronikus változatban is hozzáférhetővé tesszük.