

Factors Hindering Smart City Developments in Medium-Sized Cities

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SUMMARY

The global phenomena of growing urbanization and ICT technological advancements enable the digital transformation and renewal of cities embodied in the ‘Smart Cities’ concept. A myriad of conceptualized models and frameworks have been proposed by multiple stakeholders; however, an easily adaptable, widely applicable and robust smart city model is not yet available, which leaves space for yet untapped fields of research. This article attempts to explore the factors hindering SC developments for European medium-sized cities based on a sample of Hungarian medium-sized cities. The study utilizes Porter's Five Forces Framework from the field of strategic management, which is currently rather neglected in the discussion of ‘Smart Cities’. Findings show that the main barriers are ‘Knowledge gaps’, ‘Availability and Quality of Data’, ‘Vendor Lock-in’, ‘Biased Approaches’ and the ‘Lack of Standards’.

Keywords: smart cities, Porter's 5 forces, ICT, sustainability, quality of life

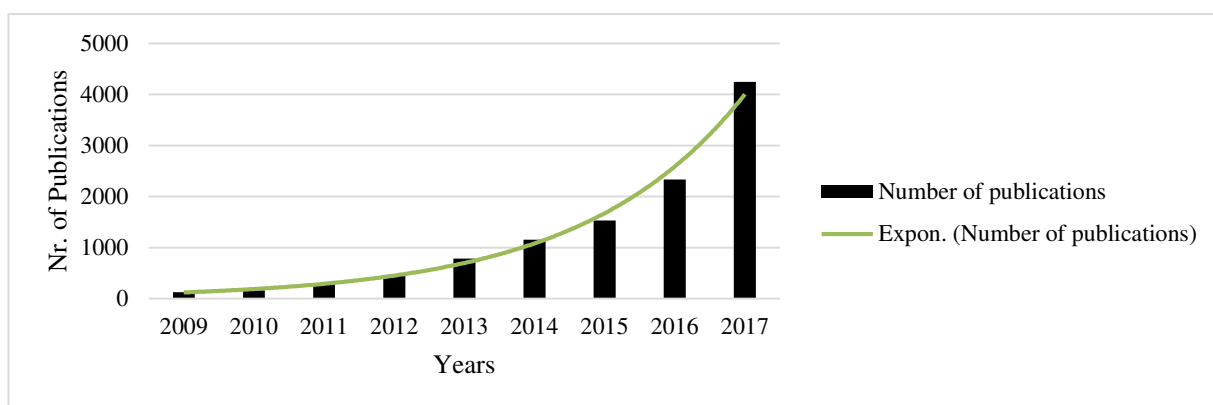
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INTRODUCTION

The concept of the Smart City (SC) is not a new phenomenon; however, it started to rapidly gain momentum in the academic literature in the last five years.

Based on a Scopus document search¹, the number of publications with the keywords “Smart City” and “Smart Cities” increased from 465 in 2012 to 4247 in 2017. (see Figure 1).



Source: Own edition based on Scopus Database. Search terms are ‘Smart City’ or ‘Smart Cities’ in the keywords of all types of documents

Figure 1. Number of publications with keywords Smart City or Smart Cities

¹ URL, Date of Search: 2018 May 20

At same time, not only academia considers SC an important topic, but also economic actors have great expectations, from startups to multinational companies, policy makers and governments. Wellington Webb, the former mayor of Denver and past president of the U.S. Conference of Mayors, once said: “The 19th century was a century of empires, the 20th century, a century of nation states. The 21st century will be a century of cities” (Eger 2016).

This popularity can also be expressed in the thriving environment of conferences, expos and other professional events with SC content. The reasons for this unprecedented popularity primarily originate from global urbanization growth trends. Today, humans are considered to be an urban race, as more than half of the globe’s population lives in an urban environment. This ratio is predicted to grow to 68.4% by 2050, which means that 6.67 billion people are expected to live in urban areas covering only 2% of the Earth’s surface (UN 2018). It is predicted that 27 megacities² will be formed by 2025. To put this into context, there were only two megacities in 1950, New York - Newark and Tokyo (UN 2014).

Another way to demonstrate the significance of cities is by looking at their economic weight compared to the number of inhabitants. Only 16% of France’s population lives in Paris, but 27% of its national GDP originates from the city. This is even more extreme in less developed countries: for instance, 13% of Congo Democratic Republic’s inhabitants live in the capital, while 85% of the GDP comes from there (Hawksworth et al. 2009). Besides economic context, environmental issues are also huge. 75% of the globe’s energy consumption and 80% of greenhouse gas emissions are in urban environments. Realizing these trends, the world’s governments are planning to invest 35 trillion USD in infrastructure and urban development in the next two decades (UN 2014). This amount exceeds the GDP of China by more than three times in 2016³.

The dynamic clustering of people, built environment, resources, capital and infrastructure poses new and even unknown challenges, therefore placing an enormous amount of stress on existing urban systems, creating a great demand for new ways and new approaches from researchers, policy makers, governments, company executives and the civil society itself.

LITERATURE REVIEW

There is no evidence for clear origins of the smart city concept in the scientific literature. Some say that its roots date back to the ‘cybernetically planned cities’ of the 1960s (Gabrys 2014), while some aspects of it have been present in proposals for networked cities since the 1980s. It is claimed the concept was introduced in 1994 (Dameri & Cocchia 2013). Despite the fact that Smart City is a buzzword, gaining increasingly high attention from multiple stakeholders of the urban development ecosystem, and although it has been present in the literature for quite a time, there is no clear and consistent understanding of its meaning. There are many definitions available, proposed by different stakeholders. Two types of focuses can be differentiated: (1) approaches that put the focus on technological advances (ICT mainly) and (2) approaches that highlight the role of the people and their quality of life (see Figure 2).

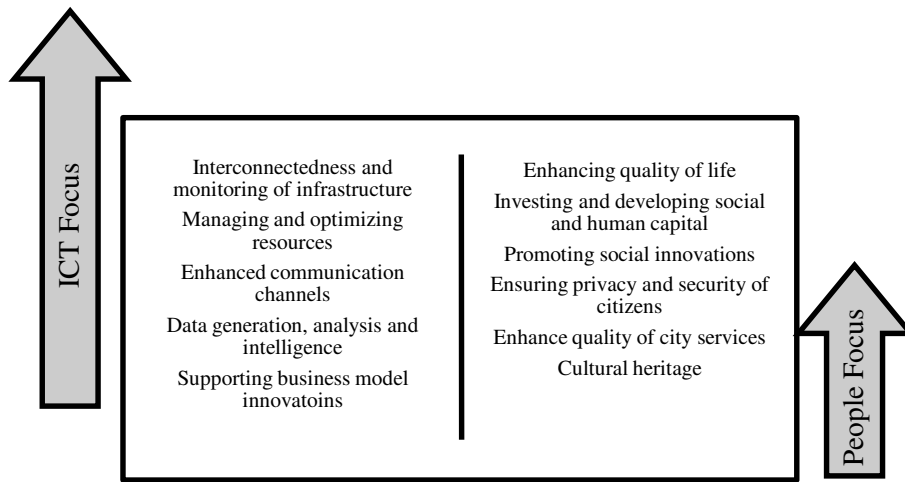
From the ICT point of view, five different approaches can be identified: (1) interconnectedness and monitoring of the infrastructure, (2) managing and optimizing resources, (3) enhancing communication channels and bringing different urban actors closer to each other, (4) data generation, analytics and deploying intelligence solutions (research about ‘Big Data’ in the urban context is more and more popular), and (5) supporting business model innovations (Hall 2000; Washburn et al. 2010; Harrison et al. 2010; Nam & Pardo 2011; Barrionuevo et al. 2012; Zygiaris 2013; Marsal-Llacuna et al. 2014; Albino et al. 2015).

Definitions focusing more on people are primarily concerned about five aspects, which are: (1) enhancing the quality of life of citizens (this seems to be the most widely used term when explaining the ultimate goal of Smart Cities), (2) investment and development of social capital and human capital, (3) promoting social innovations such as increased participation of citizens in governance, (4) enhancing the quality of city services and (5) promoting and preserving cultural heritage (Hall 2000; Caragliu et al. 2009; Giffinger et al. 2010; Thuzar 2011; Albino et al. 2015).

² According to the United Nations, megacities are “cities with more than 10 million inhabitants”.

³ Source: World Bank, URL:

https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2017&locations=CN&name_desc=false&start=2017&view=bar

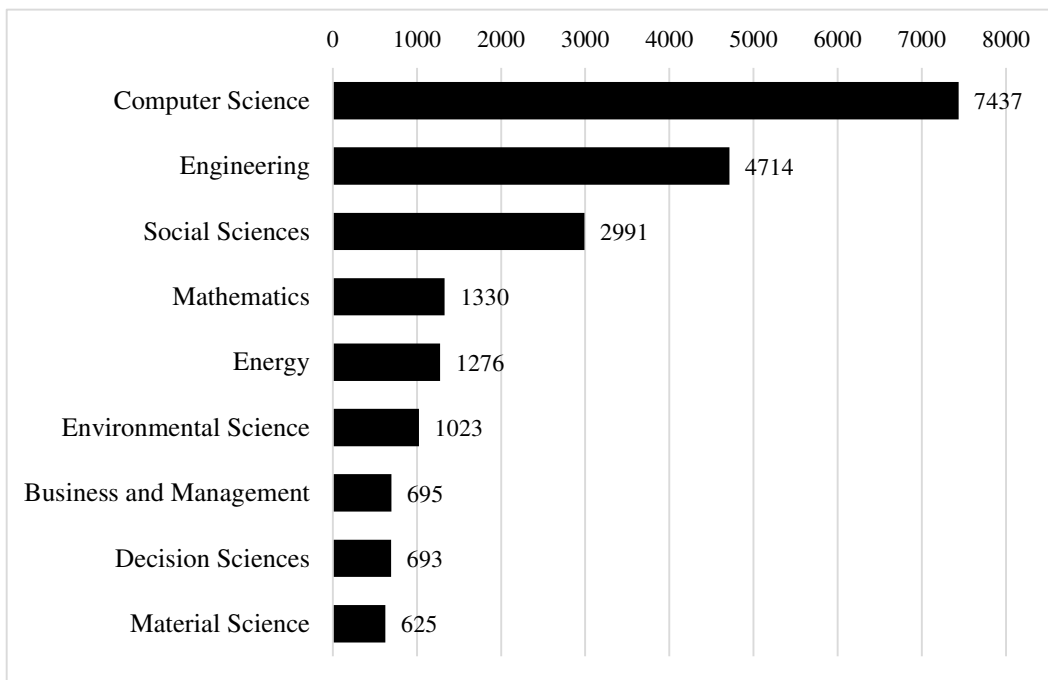


Source: Own edition based on Bibri & Krogstie (2017) and Albino et al. (2015)

Figure 2. Main focus areas of Smart City definitions

This technological dominance is also confirmed by the share of different subject areas of publications with keywords Smart City and Smart Cities: in the specific searching criteria, Computer Science and Engineering documents were four times as frequent as those in Social Sciences. The share of Business and Management publications is only marginal (see Figure 3).

It must be said that environmental and sustainability goals are also often occurring elements of the definitions; however, they are lacking the proper interpretation and context in most of the cases. Table 1 gives a quick overview of these definitions, with the interpretations suggested by the authors.



Source: Own edition based on Scopus Database. Search terms are the keywords 'Smart City' and 'Smart Cities' in all types of documents.

Figure 3. Distribution of publications from different academic fields

Table 1
Existing definition of Smart Cities with the author's interpretation

Interpretations of definitions	Author	Date
Use ICT to interconnect different domains to maximize the quality of life of citizens	Silva et al.	2018
Use ICT to optimize existing infrastructure, connect economic actors and deliver better services to citizens	Marsal-Llacuna et al.	2015
Use ICT to enhance and interconnect infrastructure, optimize resources and apply good management to deliver superior services to citizens	Kitchin	2014
Enhance the quality of life of citizens by social-economic and environmental factors, taking into account the local specifics of cities.	Neirotti et al.	2014
Network of technologies for sustainability, attractiveness and security	Lazaroiu & Roscia	2012
Use ICT technology for social and environmental purposes	Lombardi et al.	2012
Use ICT technology and optimize resources in an intelligent way for social and environmental purposes	Barrionuevo et al.	2012
Resilience to maximize quality of life for citizens	Guan	2012
Use ICT technology and highly efficient governance for quality of life for citizens and for the economy	Gabriel Cretu	2012
Optimizing available capital (e.g. human, social) by strategies for enhancing social, economic and environmental dimensions	Kourtit & Nijkamp	2012
High productivity and output oriented management for sustainability purposes	Kourtit et al.	2012
Excellent performance in the dimensions of environment, interconnectedness, ICT technology deployment, innovation and education.	Zygiaris	2012
Territories with excellent conditions for education and innovation, supported by technologies and good management	Komninos	2011
Availability to generate and to be attractive to talented people	Thite	2011
Optimize resources; invest in local capital and infrastructure to maximize quality of life and have sustainable economic development. Existence of targets for these activities	Thuzar	2011
Infrastructure for collective intelligence	Harrison et al.	2010
Use ICT technology to make services and infrastructure intelligent, interconnected and efficient	Washburn et al.	2010
Use ICT technology and optimize resources to maximize quality of life for citizens	Chen	2010
Invest in local capital and infrastructure to maximize quality of life and have sustainable economic development, together with civil participation and good management	Caragliu et al.	2009
Use ICT technology to be resilient in social and economic dimensions, relying on interconnectedness for maximizing quality of life for citizens	Eger	2009
Territories with excellent conditions for innovation and education supported by ICT technology for interconnectedness	Hollands	2008
Measure performance in specific domains, with civil participation and interconnectedness	Giffinger et al.	2007
Manage and optimize infrastructure for citizens	Hall	2000
Maximize citizens' quality of life by ICT technology	Mahizhnan	1999

Source: Own edition based on Albino et al., (2015, pp. 6–8) supplemented with Kitchin (2014) and Neirotti et al. (2014)

The most commonly occurring words in the definitions are Information, Infrastructure, Sustainable, Life, Social and Capital, while phrases are 'Quality of life', 'Social capital', 'Sustainable economic', 'Economic development', 'Using new technologies' and 'Investment in Human' (own analysis). The strong connection between

the deployment of advanced ICT solutions and social innovations – included in these proposed definitions – confirm the new innovation paradigms characterized by Balaton et al. (2016).

The most important purpose of all of this research is the outline of an easily adoptable, widely acceptable and

strong smart city model. This was the key challenge for academic endeavours in recent years, but the gap is still vacant, there is no such model at the moment. Bibri & Krogstie (2017) identified at least 19 existing gaps in the research within the field of smart sustainable cities, e.g. “There is a need for integrated models for spurring the practice of the development and deployment of smart sustainable cities” (p. 204) and “There is no comprehensive model for merging the informational and physical landscapes of smart sustainable cities” (p. 203).

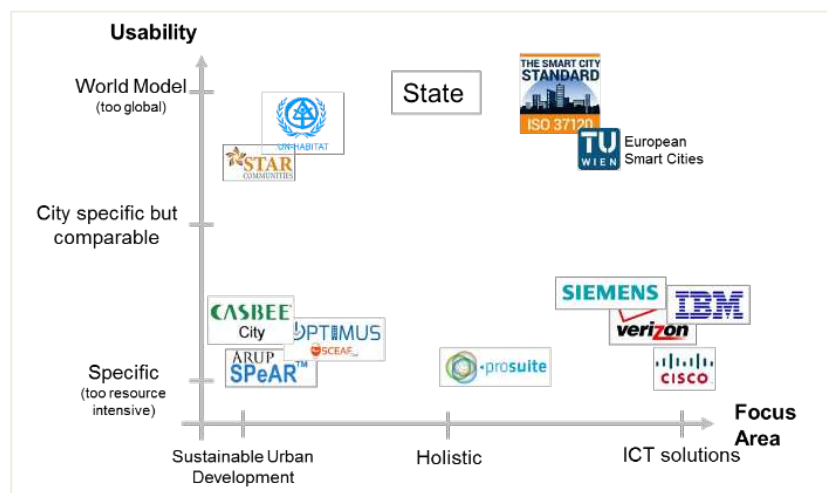
Besides definitions, the ‘Smartness’ of cities are measured by their performance in specific domains that identified by researchers. These assessments are similar to strategic assessments and audits, enabling benchmarking, comparisons and justifying urban strategies. As with the definitions, these models are also heterogeneous and none of them has become a standard, which actually leaves cities exposed to the uncontrolled influence of promoters of these models. Approaches that are city specific but comparable and holistic approaches are missing from the canvas of the models. The following graph illustrates the existing gaps in the research (and market viable solutions) in the field of SC models.

Besides the different approaches, geographical discrepancies are also present in Smart Cities research, policy maker’s attitude, company strategies and actual implementations as well. In this matter, this paper focuses on the European Union’s context. Narrowing down the field to the EU illustrates well the problem with ‘world

models’ or multinational companies using global strategies, while each city is different. The EU is already very highly urbanized (75%), the weight of megacities is rather low, and medium-sized cities dominate the urban landscape. For the sake of clarity, here the author adopts the definition of Giffinger et al, (2007) of medium-sized cities as those being between 100,000 and 500,000 inhabitants.

On the policy level, the European Union adopted an approach with six pillars in 2015⁵ (European Economic and Social Committee), which resembles the four pillars outline (Giffinger et al., 2010) and since then the number of studies and projects has grown rapidly. As a rising topic with vast areas of research potential, the author believes that it is yet an untapped field, and synthesizing methodological components, models, reasoning and concepts from enterprise strategic management theories and applying them to SC model research would bring great added value to the discussion.

This paper is intended to move this unsettled field forward with the experimentation and application of currently neglected scientific methodologies. Furthermore, current discussion rarely takes into consideration the diverse backgrounds of cities, their history, local conditions, environment, etc. This essay attempts to explore the factors hindering SC developments for European medium-sized cities, based on a sample of Hungarian medium-sized cities utilizing Porter’s Five Forces Framework.



Source: Own edition based on the SmartCEPS project’s⁴ working documents (2017)

Figure 4. Mapping of existing Smart and Sustainable City frameworks and models

⁴ See: <https://smartceps.com/> (Documents are unpublished)

⁵ Opinion of the European Economic and Social Committee on ‘Smart cities as drivers for development of a new European industrial policy’ (own-initiative opinion) (2015/C 383/05)

Table 2
Overview of sampled cities

City	Inhabitants	GDP/capita (EUR)	Industry tax per capita (EUR)	Higher education degree holders
IX District of Budapest	59,000	52,459	198	33.5%
XI District of Budapest	152,620	34,108	168	38.2%
VIII District of Budapest	76,811	19,298	156	25.3%
XVII District of Budapest	87,793	2,213	203	19.6%
XVIII District of Budapest	101,738	8,167	234	19.3%
Kaposvár	63,186	2,826	107	19%
Debrecen	203,059	5,016	136	22.2%
Győr	129,568	24,422	406	20.8%

Source: Own edition, based on data derived from TEIR database. Data extracted on 2018.04.28. Available here: <https://www.teir.hu/its/>

METHODOLOGY

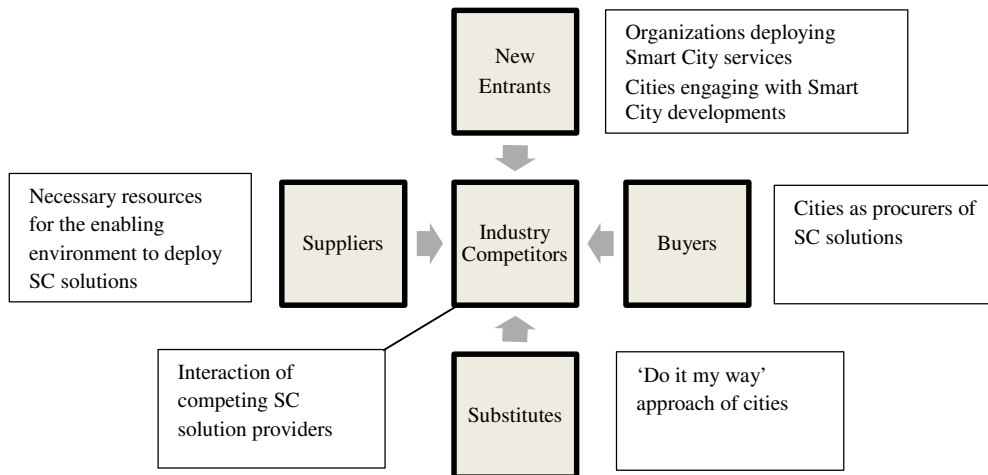
For experimentation of strategic management methodologies, the author utilizes the Porter Five Forces Framework to deepen our knowledge about European medium-sized cities regarding Smart City deployments and experience. The primary source of information is two focus groups with 15 people in total with 3 hour sessions in both cases. Senior representatives from Hungarian municipalities and public authorities responsible for Smart City developments in Hungary were invited. In focus of the questions was their attitude towards Smart Developments and experience with completed or ongoing projects. An interview with a representative of smaller Romanian settlements was also conducted. Table 2 describes the sampled cities or city districts. In focus groups insights were also gained from two consulting companies and two Smart City clusters, representing primarily suppliers and solution providers of SC services. Having a diverse sample is important because SC development affects multiple stakeholders and, as defined by many authors (Yin et al. 2015), participatory governance and social innovations are core parts of the whole concept.

The indicator 'Inhabitants' is a key data for segmenting cities. Giffinger et al. (2007) and others also use population size to create categories for research, while multinational companies use the same method to segment cities in their strategic assessments and business models, e.g. based on observation of Cisco SC projects, the company considers its target segment as cities with at least 250,000 inhabitants. GDP/capita suggests the city's role in the economy and the presence of multinational companies, which is a key driver for SC endeavours. The previously described geographical concentration of resources is clearly shown by this data; deviation is quite large between

territories, especially outside of the capital. Industry tax per capita is used with the assumption that it is a good indicator to measure the discretionary income of local governments that can be spent on SC initiatives. Considering the fact that investment can be financed from non-local sources, e.g. the European Regional Fund, central governmental sources or corporate investments, it is difficult to measure the financial capability of a city. Indicators like FDI flows, realized corporate investments or awarded subsidies are also possible metrics for measuring incomes of cities and predicting their financial capacities to invest in Smart City developments. The proportion of inhabitants holding college or university degrees is an indicator for measuring the available social capital, which was identified as a key driver factor.

PORTER'S FIVE FORCES FRAMEWORK

For empirical research about these cities, the author applies the Porter's Five Forces Framework to examine their maturity to deploying SC technologies, strategies and other initiatives and identify what are barriers that hinder them from becoming more mature. The scope of this analysis is highly focused on the solution providers entering this specific segment of 'medium-sized' cities. The five-factor model describes industrial structure as a determinant of profitability in the industry (Balaton & Hortoványi 2018). In this context the model is interpreted as a tool to identify barriers and enabling factors of 'Smart Cities' developments through the different drivers and channels of resources, stakeholders and transactions. This framework is a vehicle to structure and show empirical evidence found during qualitative research for the better understanding of hindering factors in medium-sized cities.



Source: Porter (1980)

Figure 5. Application of Porter's Five Forces Model on Smart Cities

Bargaining Power of Suppliers

Companies and organizations engaged in deploying 'Smart City' solutions are considered to be part of 'emerging industries', where employees face complex problems that can be solved only by higher and more general knowledge which fosters high-level innovation (Boda 2017). The most important inputs for these actions are experts and specialists with knowledge, an appropriate skillset and competences for solving problems and also for implementing the planned solutions. In sample cities these resources are not easily accessible, but of course capital regions are in a better position compared to cities in the country side, where human resources are harder to access. Talent and social capital is concentrated in Budapest, and primarily in the for-profit sector, so there is a huge demand for specialists and experts that can manage SC developments in smaller settlements, create knowledge within public bodies, etc.

Currently this topic is being neglected in Hungarian higher educational courses; however, examples abroad can be found, e.g. University College London (UCL) – MSc in Smart Cities and Urban Analytics (United Kingdom-London), Universidad Ramon Llull (URL) – Postgrado en Smart City (Spain-Barcelona), Aalborg University (AAU) – Master's Programme in Sustainable Cities (Denmark-Aalborg). SC experts have diverse competencies including engineering, economics and sustainability (García & Sisto 2015), so people coming from one specific sector and creating SC strategies for municipalities tends to result in a biased analysis: one of the cities in the sample has an energy-orientated strategy due to the background of the people responsible for the assessment. These biased analytics are a serious issue that probably originates from a lack of standards and the lack of governmental thresholds for creating such strategic documents.

Data is a key resource just as important as humans. Data is required in quantity, excellent quality, and must be

up to date, accessible and reliable. In sampled cities 'Data issues' are uniformly considered to be barriers of deploying SC services. Data available from statistical offices is usually outdated and highly inaccurate. Bad data distorts whole strategies, and this is a very relevant issue nowadays, so policymakers are encouraged to address this phenomenon. The few existing Hungarian studies also indicate how data availability can distort analysis (Nagy et al. 2016). The utilization of big data is welcomed in sample cities; however, the maturity of the data industry is quite low yet in Hungary and companies are focusing on Business Intelligence, and not on urban clients. Also, data about the cities is in many cases in the hand of external owners and providers, who are usually reluctant to provide data and offer limited cooperation with many mistakes. During interviews, it was mentioned that personal connections to these data owners (utility companies in many cases) or specific requests from higher political circles usually dissolve this barrier. It is clear that the policy framework for such requests and data provision is not adequately addressed by policymakers.

Bargaining Power of Buyers

In this context, SC solution providers are 'selling' their products and services to municipalities. For the sake of simplifying this special interaction between the sample cities and companies, the author narrows down the scope of the framework to 'switching costs', 'backward integration', and 'buyer information about supplier products'.

Switching costs are a key issue in SC development, not only in Hungary but all over Europe. Vendor lock-in is the phenomenon in which suppliers deploy technologies to cities (e.g. CCTV, energy grids, broadband networks, etc.), which are long lasting, capital intensive, and knowledge intensive, so that switching to another vendor would incur very high costs. This issue is very serious, considering that

there are still no standards, reliability of technology is a question and developments are rapid, so cities can be locked into out-dated and inefficient technologies. This also makes decision makers suspicious of suppliers and they are very hard to convince about deploying SC solutions. Vendors usually neglect to detail exactly how the proposed technologies can be integrated with existing systems in complex municipal environments. Only smaller projects are easily adopted, where smaller investments are required.

Backward integration is interpreted in this context as the cities taking control in their own hands. This is the make-or-buy decision: do-it-yourself or hire an external smart city expert. The study reveals, that the standard choice for Medium Hungarian cities, like Győr or the XI District in Budapest is to give the job to an external party. The buyer may also do the work themselves by setting up a staff or project team of local experts. One scenario is that the city establishes a publicly owned company, foundation or an internal office in its administration to do the job. This happened in Debrecen, for example, and signs are indicating that Budapest also plans to establish a competence centre company for this purpose. As we examine practical choices of cities, there can be an exponential trend noticed. According to our observation, the higher the city, the higher the chance that it will deploy its own capacities to deal with managerial and professional issues of Smart City Developments.

Another important issue is buyer information about supplier solutions. Decision makers in cities are not experts on every field in which suppliers approach them, so they need special channels and methods to present the value proposition for the city. These solutions are usually technological and hard to understand, city-specific challenges are rarely referenced, and there are concerns about transparency of the added value. Taking into account that the multinational companies in Hungary rarely commit resources to innovation in the country, rather mainly in their headquarters (Boda 2017), Hungarian cities have inferior conditions for having these ICT solutions adjusted to their local needs by solution providers. Also, vendors often neglect to explain how the financing and operating models are meant to work until much later on. Another interesting finding is that just like companies and scientific researchers, each city has its own 'definition' for Smart Cities, so in many cases their developments are biased and they do not continue developing because their perception is that they are already 'smart'.

It is also worth mentioning that if decision makers, e.g. the budgetary council, mayor or central government, have incentives for keeping down expenses or avoiding indebtedness, they will be more price sensitive to SC solutions. Take for example Hungary, where local governments can only be involved in debt generation if they are given permission from central government; this is a rather strict incentive for them (Lentner 2014). It is also a barrier that governments actually favour specific multinational supplier companies, therefore reducing the

freedom of choice for cities in Hungary and in Romania as well. This was mentioned by multiple respondents. Furthermore, the districts of Budapest have authority to some extent, but they are limited in their actions by the Mayor's Office. Generally, in other countries, keeping to the budget is a standard as we are talking about public money and the general public expenditure climate is yet to recover after the economic difficulties of the European Union.

New Entrants

Press releases on new entrants to the Hungarian Smart city market are daily phenomenon. From start-ups to large companies, including public and private market actors, a wide range of entities are becoming more and more engaged in the industry. The motivation and market driving force originate from a wide range of aspects. It seems that the overall benefits that companies perceive go beyond market barriers. In sample cities, supplier salespeople are daily approaching departments about SC technology solutions.

Economies of scale is a special attribute which differentiate medium-sized cities from larger ones, especially from megacities, which are in the focus of the largest and most competent multinational SC solution providers (e.g. IBM, Cisco). Smaller cities are neglected in the moment, mainly because of profitability and the shortage of local knowledge and capacities. This puts pressure on small and medium-sized cities. The above-mentioned barriers also reduce the attractiveness of smaller cities for larger suppliers. They have to rely on less innovative and less competent service providers. Product differentiation means that established firms have brand identification and customer loyalties, which stem from past advertising, customer service, product differences or simply being first into the industry (McNeill 2015). This differentiation creates high barriers for new entrants to spend heavily and overcome existing loyalties and increases vendor lock-in. Cities rely on external expertise on choosing their suppliers and personal connections or political incentives play significant role in the process. This aspect coincides with 'access to distribution channels'. Lobbying activities are very important; however, they distort strategical approaches and widen the already existing gaps between actual needs and implemented solutions, so policy guidance and political will to intervene is very desirable.

Industry Rivalry

Global market size is expected to significantly grow in the coming years (from 529.55 billion USD in 2017 to 1944.67 billion USD in 2023), with a Compound Annual Growth Rate of 24.21% (Orbis Research, 2018). In a rapid industry growth climate, market share competition is more volatile and financial and managerial resources are consumed by the expansion of the industry. Competing

firms have to keep up with each other and the industry as well. Very high growth rates are usually the result of increasing penetration or sales to new consumers and repeating sales to existing ones. In the Smart City solutions deployment market both are true, which partly explains high growth rates: ever more cities are requiring such services. The market growth phase itself leaves room for all businesses to grow.

The ability of consumers to differentiate market products from each other by tangible specifications has a high influence on rivalry. If products are highly diverse, then competitors have some kind of protection from rivalry, because consumers value those differences and choose based on them. This creates layers of insulation against competitive warfare because buyers have preferences and loyalties to particular sellers. On the other hand, if they perceive that products on the market are similar, that will enhance industry rivalry. Based on our observations in the Smart City market, we assume that service providers, especially multinational companies (e.g. T-Systems) are trying to use their leverage on governments and deliver their solutions in all the value chain. This is of course sometimes carried out by subcontractors, but the behavioural pattern is similar in several cities. The director of a municipality company in one of the sample cities mentioned that a successfully implemented public Wi-Fi solution by a smaller company was forcefully removed and implemented again by a multinational company with political support. From the point of view of consulting companies and other less technology related service providers, we can see that consultancies see very great potential in Smart Cities but they are not yet prepared and confident to enter the market; however, leaving it out of their portfolio is a sign of weakness on the market.

This also coincides with 'corporate stakes'. Rivalry in an industry can be intense if a portion of companies have high stakes in being successful. For example, diversified firms are forced to show success in particular industries to catch up with trends and market leaders. As megacities are estimated to be located in developing markets, leading multinational companies have to establish a strong position on these markets to build up global prestige and technological credibility. These expansionary companies are willing to sacrifice profitability in short terms to reach out their potential market share. The Hungarian market is also part of the 'greenfield' areas for expansion. As Smart City developments in Europe gain more and more public attention (Bibri & Krogstie 2017), smaller consultancy firms also have stakes at offering relevant services, even with little competence. Connections and political lobbying are also key attributes of successful consulting companies on the market.

The ease of understanding a product has an important effect on rivalry. Easier understanding of the product means a higher risk of competition. The Smart City concept is not yet well known to city officials and even if

they are familiar with the theme and have projects or concepts, that does not mean that their way of perception is correct or optimal in case of city development. This area of research, including business models (as there are no standards yet), is a soft field, therefore the author considers it hard to interpret, which lowers the risk of industry rivalry.

Substitutes

I differentiate two types of substitute cases. First one is when cities build their own capacities to deal with Smart City developments. They hire experts and specialists, or found a public company, owned by the municipality and assign every single related issue to this organization. It is not limited to be a company, it can be a project organization, a development agency, a department or a foundation as well. In Debrecen, a public company deals with investment promotion, enterprise development and smart city, called EDC (Debrecen Város- és Gazdaságfejlesztési Központ). In an other sample city, the responsibilities are assigned to a local development agency. Nevertheless, these centres are providing important capacities and targets for knowledge spill overs, but often fail to attract the fitting experts and operate under reduced scope without the appropriate authorization.

CONCLUSIONS

Applying the Five Forces Framework to identify barriers that hinder the deployment of Smart City solutions and better understand the special needs of medium-sized cities in the complex interactions of multiple stakeholders brought some novel insight to the discussion. The author believes the further utilization of corporate strategic management methodological components, models, reasoning and concepts can move forward the discussion on Smart City model development and the understanding of the complex environment of these actions. It is clear that the specific needs of each city have not yet been addressed by solution providers and that this also a neglected field in scientific research. As every company, cities are also unique entities, and thus global strategies of multinational suppliers and global models of smart cities assessment are not suitable for them. Eventually these 'local needs' are the needs of the citizens, so new types of approaches are needed for business models of solution provider companies as well, to demonstrate the added value of their service in context with the local population. The results achieved by this methodology were supported primarily by qualitative research techniques, including interviews and focus group exercises. Table 3 highlights some of the key identified barriers that hinder the development of SC solutions and undermine its ever growing maturity.

Table 3
Summary of identified barriers

	Industry Competition	New Entrants	Buyers	Substitutes	Suppliers
Identified barriers	Cherry-picked suppliers are favoured by governments	Information overload Cherry-picked suppliers are favoured by governments	Vendor lock-in Not transparent value proposition	Lower attractiveness for solution providers	Knowledge gaps
	Corruption	Corruption	No city-specific proposals	Biased interpretations, strategies	Shortage of experts
	No standards	Focus on Megacities	Biased performance indicators and targets		Access to data
	Dominance of big companies	Already established distribution channels	'Do it my way' approach		Quality of data
	SMEs neglected		No standards		No standards Policy immaturity

Source: Own edition

For further research, it is necessary to test these assumptions on other European cities by repeating the focus group research methodology in more cities, including local stakeholders in focus groups. Considering the multidimensional nature of Smart Cities, this way of research seems to be the most efficient one. Using this Framework definitely provided added value. In addition, the assessment of other models is necessary to further elaborate the discussion of Smart Cities from the strategic management point of view.

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Social Value Creation and Impact Measurement – What Do They Mean Exactly?

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SUMMARY

There is a strong need for social value creation in our life. More and more people have to face mental illness caused by our stressful life. Social entrepreneurship and social enterprises are approaches to deal with these challenges. They are managed with a business mind-set coupled with social sensitivity. The paper examines how social value creation is interpreted and how social impact is measured and reported by social entrepreneurs using multiple cases from the business and the public sphere. It was found that a comprehensive social value creation model could help social enterprises to manage these challenges and have a greater impact.

Keywords: social enterprise, labour market, non-profit, entrepreneurship, poverty

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INTRODUCTION

Nowadays, there is a growing interest in social entrepreneurship and social value creation. Going beyond the corporate social responsibility of organizations, social enterprises create value for the society by promoting and increasing social inclusion and sustainability. The improvement of the business attitude of social entrepreneurs is a key factor in order to maximise the social enterprises' social value generation capabilities.

This article summarises the key challenges for the social inclusion of disabled people in the labour market and discusses the theoretical background of social entrepreneurship and social value measurement. It collects several good practices from all around the world on how to create social value and how to measure and report it. It also reveals the thoughts of social entrepreneurs about social value creation based on in-depth interviews from business and public organizations. All of the interviewees have 10 or more years of professional experience in social value creation.

As a result, a summary of potential value creation and social impact for disabled people in the labour market is presented. Furthermore, the practices of social impact measurement and social value creation model (SVCMM) are introduced with the aim of fostering the sustainable operation of social enterprises.

THE NEED FOR SOCIAL VALUE CREATION: SOCIAL INCLUSION OF DISABLED PEOPLE IN THE LABOUR MARKET

Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions (WHO 2018). Although the national and international regulations in the ILO Convention on the Rights of Persons with Disabilities state that disabled people have the right to work on an equal basis with others, their contribution to the creation of GDP (gross domestic product) is significantly lower than that of the non-disabled (Stolarczyk 2016)

The social inclusion of disabled people is a major challenge of the society. According to Hoós (2004), the source of the problem is poverty. The development process the educational and healthcare systems with the aim of reduction of social exclusion is very important. The extent of social exclusion and worsening living conditions cause deep poverty, a stressful life and a high death rate around the world. The social sector and the social enterprises are alternative approaches to answer social challenges, but a significant level of social value creation and delivery to the targeted segments is needed.

Individuals, non-profit organisations, business enterprises and the government can also contribute to social value creation. Social value creation determines the behaviour of the enterprise, where profit orientation is a secondary-level goal (Sinkovics et al. 2014). Social value is a result of an activity with the aim of creating social inclusion and sustainability. Social value creation infers the specification of the business model of the enterprises (Sinkovics et al. 2015).

The third direction of the Europe 2020 strategy (with the aim of developing the social sector in the EU) is the enhancement of the employment rate, especially for disabled people, to reduce the extent of social exclusion and poverty (European Commission 2010). Despite this strategy, the current work environment is not well-established for disabled people and potential co-workers hold negative stereotypes that hinder the hiring of disabled applicants (Linden 2014). Through volunteer activities, the business-oriented and social directions can meet one another and social sensitivity of employees and employers can be enhanced (Briscoe et al. 2014).

The main causes of discrimination in the labour market are incomplete or inaccurate information about disabled employees, prejudices and preferences applied to employees and employers and legal regulations that lead to the formation of barriers in hiring people from specified social groups (Stolarczyk 2016).

The negative effects of the fear of disabled employees are the growth of poverty and the cost of healthcare, the reduction of the self-sufficiency of the disabled, the loss of tax revenue and the loss of resources like human capital and creativity (Reinhardt et al. 2016, 1-18)

The problem originates in poverty and family background. There is no useable established environment for addressing disabled people (Dees, 2007; Rios et al. 2016). Economic policy should reduce the poverty of the society by creating workplaces. Domicián (2014) suggests policymakers increase the degree of competition in the labour market. In this situation, disabled people would have better conditions to be hired (Domicián 2014).

Healthcare and psychological services are a must for disabled, mentally ill and disoriented people, but they are costly and not available for everyone. There is a lack of psychological services and mental development (Hawkings 2017).

The root of the dilemma is in healthcare. The recent trend shows that the young disabled employees get fewer opportunities to get hired in developing countries than in the developed countries. The final result of the Health Reform Monitoring Survey (HRMS), which had 2,740 survey respondents, is that Medicaid expansion may improve employment for people with disabilities. (Hall et al. 2017).

In summary, the literature suggests that imperfections in the labour market are caused by:

- the lack of supporting environment and proper healthcare services;

- lack of proper information about disabled people, prejudice,
- family background and poverty.

THE SOCIAL ENTREPRENEURIAL APPROACH TO INCREASE SOCIAL INCLUSION

Social Entrepreneurship and Enterprises

According to Dees (1998:1), “the idea of ‘social entrepreneurship’ [...] combines the passion of a social mission with an image of business-like discipline, innovation, and determination commonly associated with, for instance, the high-tech pioneers of Silicon Valley. The time is certainly ripe for entrepreneurial approaches to social problems.”

Social entrepreneurship, with its focus on the creation of new value with an emphasis on solving social problems, has been of increasing academic interest in the past decades (Austin et al. 2006). Petheő (2009) refers to the social enterprises as:

- being not-for-profit organisations;
- seeking to meet social aims by engaging in economic and trading activities;
- having legal structures which ensure that all assets and accumulated wealth are not in the ownership of individuals but are held in trust and for the benefit of those persons and/or areas that are the intended beneficiaries of the enterprise's social aims;
- having organisational structures in which full participation of members is encouraged on a co-operative basis with equal rights accorded to all members;
- encouraging mutual cooperation.

Fekete (2012) stated that social enterprises have consciously organised and managed their entrepreneurial activity in order to solve social challenges in an innovative way. Social enterprises are organisations with the aim of sharing profit with the society. Christopoulos & Vogel (2015) name three different roles of social enterprises: economic role, political role and civic role. The political role ensures the contribution of public agencies and cause economic actions on the community as a civic concept.

In the concept of Newbert (2014), these kinds of institutes generate producer surplus via the creation of positive externalities and reduction of negative externalities. So the determined two main directions of their existence are connected to externalities.

In the research of Chandra (2017), the change agents are institutional and social enterprises. The institutional entrepreneurs and social entrepreneurs create new practices in generating social and economic value for the society. The commonly accepted definition of the online site of the European Commission is that social enterprises are organisations (European Commission 2017, 1):

- those for which the social or societal objective of the common good is the reason for the commercial activity, often in the form of a high level of social innovation,
- those where profits are mainly reinvested with a view to achieving this social objective,
- and where the method of organisation or ownership system reflects their mission, using democratic or participatory principles or focusing on social justice.

The common parts of the definitions are the reinvested profit into the operation to sustain themselves, the social objectives, and the interest in social justice. The contrast of the aspects is the extended framework with social innovation and business-oriented operation.

Thus, social enterprises are members of the social market which have two purposes. The first one is the creation of social value and the second one is the ability to be financially sustainable, realise revenue and in some cases profit which could be reinvested into the operation. Social entrepreneurs have the opportunity to improve the skills of vulnerable people and with their activity they create social value through the reintegration to the market. More and more European Union projects aim to increase the numbers of the employees in the social market. One of the social missions is the expansion of the numbers of hired people with disabilities.

Public Service Organisations (PSOs) are responsible for ensuring different kinds of assistance for those social enterprises and for small-and medium sized enterprises which employ disabled people. These support can be financial assistance (public procurement, grants, hybrid finance), support of access to the market or tax reduction. The sustainable business practice of PSOs also refers to the sustainable development: the sustainability of public service delivery systems and their governance and the local communities and environment (Osborne et al. 2014).

Social Enterprises in Hungary

The estimated number of social enterprises of Hungary is between 300 and 400 (European Commission 2014). Most of them operate in the service sector, including the support of vulnerable social groups, providing mental hygiene services, labour market integration and promoting healthier food consumption and lifestyle.

In Hungary there are some advisory organisations with relationships at an international level that organise mentor programmes for entrepreneurs to adopt business skills from profit-oriented companies. The main target is to raise awareness about operation on the market and establish a transparent legal system and ecosystem for the social market. Through the courses, social entrepreneurs are becoming able to create their own business model, plan their competitive strategy and make a feasible financial plan. Social innovation is also an important topic which is crucial for developing the value creation (service/product) of the enterprises and increasing their competitiveness on the market (Interreg Europe 2017).

On the Hungarian market the Millennial Chestnut Social Cooperative, the Kockacsoki, the BOOKR Kids, the Down Association, the Unheard Foundation, the Hesztia Central Consultancy, the GIL ltd and the EGYMI are good examples to increase social inclusion.

Millennial Chestnut Social Cooperative, located in a former mining district which has been gradually declining and segregating since the democratic transition in the 1990s, sells roasted chestnuts in the city centre of Pécs and therefore generates income opportunities for the disadvantaged groups.

Kockacsoki, located in Budapest, is a chocolate manufactory offering high quality handmade chocolate products and chocolate-making workshops created by people with autism. Besides chocolate manufacturing, the social enterprise provides a complex portfolio of supporting services to people with autism, such as a coaching course to learn how to become more self-sufficient in their daily lives, making it possible to gain work experience in their trainee programme and provide permanent employment.

BOOKR Kids is an online publishing social enterprise that provides 170+ classical and modern interactive e-story/audio books and 300+ educational games for those children who have mental diseases accessible via mobile and tablet applications.

Down Association, a Budapest-based social enterprise, provides disabled people (mostly children, adults and elderly people suffering from Down's syndrome and other kinds of mental disabilities) with a complex rehabilitation programme and training including medical treatment, PR activities towards social inclusion, publishing activity with the topic of mental illness and nursing, rehabilitation of families and educational programmes.

The Unheard Foundation's mission is to develop innovative technological solutions in order to promote barrier-free access to information for the hearing impaired and their social inclusion by promoting the widespread use of sign language.

At Hesztia Central Consultancy, people get psychological services for their mental problems. The value proposition of the enterprise includes a child-rearing consultancy, family therapy and educational help for those children who have difficulties in school.

GIL Limited Company helps people who have mental problems. The psychological service provides services in the following topics: therapy about changing the way of life, special meditation training, handling bipolar disorder, emergency help line in the case of panic attract and prompt procurement of medication for patients with schizophrenia.

EGYMI Special Public School aims to reduce negative social discrimination, and improves the situation of those children who have moderate mental problems and who have moderate mental problems.

Social Value Creation for Disabled People

Disabled people are often excluded from society. A major source of this problem originates in poverty and family background. Steps are being taken to improve their situation. Social enterprises and NGOs can create social value according to the following steps: to develop and cooperate with another enterprise or association, using the existing resources to value creation and target the customers, and manage knowledge transfer and know-how procedures (Porter & Kramer, 1999).

On the other hand, the public sphere can also create social value through special schools for disabled children, such as in Thailand, where the government established a home-based service by the teachers of the special schools for those children who are not able to move or leave their home. With help of the teachers everybody has the opportunity to access the mental development process service (Wanarawichit et al. 2015).

In Hong Kong some Chinese social enterprises offer taxi services. Their special target groups are the elderly and physically disabled people. Through this service they get a chance to travel more easily in the currently insufficient infrastructure (Chandra 2017).

There are some initiatives in Hungary as well to employ disabled and excluded people, and to support their inclusion process. For example in a particular initiative in the first period, the employees produced and sold only potatoes. A year later the scale of the products was extended to other kinds of vegetables and fruits. In the poor regions of Hungary the people started to work on farms and could gain better living conditions (Mishra & Karunanithi, 2017).

The main source of social problems is global poverty.. Social enterprises are independent organisations from the public sphere and the enterprises of the social market have a flexible operation and use social innovation procedures in order to fight against poverty (Dees 2007).

Companies would not like to hire and teach or train the disabled people. The heads of the organisations have a negative stereotype such as the low level of work performance and time-consuming training for career entrants. However, this tendency has economic and psychosocial costs.

In some case, the approach of the leaders depends on their political attitude, the principle of their leadership methodology, communication skills and their behaviour with the employees. If someone is open to new opportunities and takes the risk to modify the structure of the company (Briscoe et al. 2014). Instead of profit-oriented leaders, social entrepreneurs have the ambition to hire disabled people. Social enterprises have an economic role through running the enterprise, a political role to achieve financial and non-financial support, and a civic role because their market operation has repercussions on the community (Christopoulos & Vogl 2015).

These days, the benefits of companies which hire disabled employees are not visible and not known enough.

The economic benefits for the companies are tax revenues, CSR activities, public relationships and lower staff costs with other guaranteed health services. The expected benefits for the employees are the sense of feeling productive, staying busy, having a relationship with co-workers, feeling important, increased income and having opportunities for continued growth (Burge et al. 2007). One of the numerous ways to work, telework, is relevant in the aspects of disabled employees (Linden, 2014).

In 2008, a new out-of-work benefit - the Employment and Support Allowance (ESA) - for disabled people was introduced in Britain as a replacement for the existing Incapacity Benefit (IB). These efforts are managed through an active labour market policy, the central element of which is the Work Programme (WP). The main purpose of the initiative is to ensure enough payment in time after entering the labour market (Grover 2015).

The created social value is important for both sides of the labour market. In order to fulfil employers' expectations, there is an increasing need for the psychological services and mental development of disabled people, because the number of patients is increasing around the world and more families will be in an ineffective situation without special support by the government and social enterprises (Hawkins 2017).

Nowadays, there is a higher tendency to focus on development of the social sector in the European Union and in Russia, too. There are social workers in Russia who are responsible for designing and optimising the improvement process, ensuring interactions with new clients, managing social services, applying new technologies and satisfying the needs of the disabled on the labour market (Nikitina et al. 2017).

According to Newbert, social enterprises need to adopt business operation from the profit oriented companies. The collected aspects from the different authors in the publication of Newbert have the direction of creating a new way of understanding the social enterprise phenomenon (Newbert 2014).

Currently, the European Union aims to solve social problems and tackle social challenges. The implementation of the numerous social goals is supported by social cohesion, which involves the common directions of the development of market stakeholders (Balaton et al. 2016). Several European Union projects tackle this topic. The main direction is to increase the number of the employees and mentoring youth employees to achieve the appropriate skills for their job in the future. The second popular direction is to increase the business attitude of social enterprises.

Social Impact Measurement

Non-profit organisations are under increasing pressure to demonstrate their social impact although the analysis of McKinsey (2011) shows the fact that almost half of the social enterprises (43%) do not measure their social impact.

Social impact measurement is needed for social enterprises to get feedback about their activities. Currently there is not one common methodology of social impact measurement but there are some good examples and benchmarks. Most common is that social enterprises have their own measurement system. Only 5% of the social enterprises use the Social Return on Investment (SROI) indicator (Mc Kinsey 2015).

Through the SROI measurement (the net present value of benefits divided by the net present value of investments) enterprise improves its cost effectiveness, gets information about the social, economic and environmental value of its activity and gets the net present value of the benefit. As an example, a ratio of 4:1 indicates that an investment of \$1 delivers \$4 in social value. The cost of achieving the benefit is \$1 and the created value is \$4 (Pearce & Kay 2008, cited in Gibbon & Dey 2011).

The Social Accounting & Audit (SAA) system is specially created for enterprises that create social value. The main concept is to encourage all of the organisations to document their activities, measure their social performance and make action plans for process intervention, if it is necessary to develop their value creation process. The real focus of SAA is to make the created social impact accountable to the stakeholders. The three steps of SAA are the following:

- Step One: Social, Environmental and Economic Planning
- Step Two: Social, Environmental and Economic Accounting
- Step Three: Social, Environmental and Economic Reporting and Audit.

The planning part involves the definition of the mission, values, objectives, activities, stakeholders and key stakeholders of the enterprise. In the accounting phases are deciding and managing the scope, agreeing on indicators, collecting quantitative and qualitative data, reporting on environmental and economic impacts, and creating and implementing a social accounting plan. Finally, through the reporting and audit part, the tasks of the entrepreneurs are to draft the social accounts, social audit panel, process of the social audit panel meeting and social audit statement, using the social accounts and disclosure (Pearce & Kay 2008, cited in Gibbon & Dey 2011).

The Social Cost-Benefit Analysis (SCBA) is a model with the two aims of planning and evaluating. It ensures the answers to the following questions:

- *“Has an intervention delivered the intended change for the amount of resources invested?”*
- *“Would it be possible to generate more benefits for the same resources if another approach was chosen?”*
- *“In the future, should we choose to improve an intervention’s approach or choose a different adaptation approach altogether?”* (Vardakoulias & Nicholles 2014,4)

Six steps of SCBA:

- Identification of outcomes: the definition of the required social impact and type of change.
- Quantification of gross outcomes: the quantitative analysis and scale of change that has occurred for each outcome separately, for example with the help of satisfactory survey.
- Measurement of contribution and counterfactual: measurement of the change which is attributed to the intervention. Counterfactual refers to those changes that are not connected to the intervention.
- Quantification of impact (net outcomes): The impact is equal to the gross change minus the percentage that can be attributed to other factors and actors.
- Monetisation of impacts: The transferring process of the created impacts into money (such as increases in income or production or the amount of the realised profit)
- Cash flow analysis and discounting: The discount table of all costs and benefits. It shows the net benefit present value of benefits minus the present value of costs (Vardakoulias & Nicholles 2014).

The Social Enterprise Balanced Scorecard (SEBS, or SBSC) focuses on financial sustainability, external market impact, operational performance and mission accomplishment. The evaluated financial aspects are revenue growth, diversification targets, fundraising targets, profitability, cost efficiency and earned income targets. The external market impact includes customer satisfaction, market share, brand equity, community impact and return on development investment. Operational performance is judged by labour productivity, quality targets, employee satisfaction and employee turnover rate. Mission accomplishment is evaluated on the basis of new skills/tools developed, new contracts, long-term job sustainability, reduced welfare dependency and improved operations (Ryan 2017).

According to Demény and Musinszki (2016), the creation of an well-functioning accounting system of social enterprises is connected to the adaptation strategy on the market. The main requirements of the accounting system are the following: processes in the organisation, key resources of the enterprise, realisation of management decisions and adaptation to the environment. These are those factors that have to be presented to the head of the enterprises (Balaton et al. 2016)

RESEARCH METHODOLOGY

Researching social entrepreneurship, and especially disabled people, is challenging and the research design needs to be adapted for this purpose (Rios et al. 2016). Entrepreneurship research either focuses on the outcomes, the process, or the context of entrepreneurship (Hortoványi 2012). Studying social entrepreneurship can be done at an individual, organisational, social market or at societal level. Table 1 summarises the main conceptual challenges in social entrepreneurship research.

Table 1
Conceptual challenges in Social Entrepreneurship Theory

Level of Analysis	Outcome	Process	Context	COMMON drivers
Individual	Unique characteristics of social entrepreneurs and disabled people as cause of performance	Actions required by the individuals to achieve social value and impact	Antecedents of the social entrepreneur and disabled people	Why some people and not others
Organisational	Social value creation and impact of an enterprise	Processes that lead to social value creation and impact	The role of industry norms and corporate culture	Successful enterprises as role models
Social market	The efficiency of social markets	Market mechanism	Market characteristics and the role of institutions	Pitfalls of the social market
Society	Engine of regional growth and inclusive society	Social embeddedness	Cultural differences in entrepreneurial inclination	Policy implications
VIEWED as...	Economic phenomenon	Social-behavioural phenomenon	Evolutionary phenomenon	

Source: adapted from Hortoványi (2012: 22)

The main focus of this study is to examine social value creation at different social enterprises. The public and the private sphere also contribute to the value creation in their own way. Besides, measuring performance and value creation is very difficult because the social goals of different types of organizations vary. Social enterprises can be either non-profit organisations or for-profit entities; therefore, the identification of these organizations is very complex.

The data comes from five 3-4 hours long semi-structured qualitative interviews that addressed research questions concerning how social entrepreneurs interpret social value creation and impact. Data was gathered from individuals that play key roles in creating social value in their organisation. The qualitative analysis was based on in-depth interviews with interviewees from two small business entities and one large-size from the public sphere. The answers of the interviewed Hungarian social entrepreneurs and the head of a special education institute were encoded with the NVivo qualitative data analysis software.

The reliability is defined as the extent to which multiple measurements using the same instrument will provide the same or similar results. Validity is defined as the extent to which the instrument measures what it is intended to measure. These two aspects are important to entrepreneurship research, as to all research, because in the absence of either measurement, error is introduced – jeopardising the results of statistical analyses (Kerlinger & Lee, 2000). In order to ensure reliability and validity, the

authors collected extra data to the interviews and made multiple case studies. The data from the in-depth interviews were triangulated with direct observation of the activities and publicly available information about the examined companies and individuals.

FINDINGS: HOW SOCIAL VALUE CREATION AND IMPACT INTERPRETED?

The Interpretation of Social Value Creation

Table 2 summarises how different spheres prepare themselves for different type of societal challenges. The business sphere can provide different kinds of solutions for social diseases. The value proposition of the examined social enterprises is the healing of addictions, depression, eating inconvenience, life crisis, panic attack and stressful life.

According to one of the social entrepreneurs from the business sphere: “My motto is to be rational and emotional at the same time. I need all of my skills through the therapy. My methodology has to be appropriate in every situation and I have to be able to provide treatment for every disease.”

The public sphere handles the problems of social environment, such as social discrimination or social exclusion.

Table 2
Social challenge readiness for the business and the public sphere

Social challenges	Business sphere	Public sphere
Social diseases	Addictions Depression Eating disorders Life crisis Panic attack Stressful life	
Disabilities	Autism Bipolar disorder Hearing impaired Schizophrenia	Children who have mild mental problems Children who have moderate mental problems Rearing of autistic children Handicapped children
Social environment		Social discrimination Social exclusion

Source: these categories emerged from the coding of the interviews

The head of the public institute said: “In our institute, one of the most important tasks is to organise special events, where children without disabilities have the opportunity to play with children who are autistic. Our aim is to decrease the prejudices of normal people.”

The common value proposition is the occurring disabilities. The special focus of the social enterprises in the study involve autism, bipolar disorder, raising children with disabilities, employment for people with disabilities, the hearing impaired and schizophrenia. The profiles of the public service are children who have mild mental problems, children who have moderate mental problems, rearing of autistic children and handicapped children.

Table 3 summarises the social value creation methodologies in the sampled organisations for both the public and the business sphere. The business side realises revenue and sometimes profit from the guaranteed services

but few social enterprises achieve profit. The current market is in an early development phase.

One of the social entrepreneur’s view is the following: “In the first years of my job, my service was very simple and the key word was mental therapy. After that, I started to widen my service and focused on the social environment. After a year and a half, my enterprise started to realise real revenue. In the initial phase the money was enough to cover my costs.”

The financial operation of the public organisations depends on the state. This institute has started to research the reasons and the solutions for the increasing number of disabled youths.

According to the head of the public institute, “the research was my idea, because I would like to provide better and better solutions for children and their parents. I think this was the first step in broadening our service portfolio.”

Table 3
Social value creation methodologies in the business and the public sphere

Social value creation methodologies	Business sphere	Public sphere
Prevention		Researching the reasons for autism because of increasing prevalence
Advice	Advice Coaching course Consultancy Counselling Telephone accessibility	
Education	Special meditation training Vocational training Training for meaningful jobs	Training for monotonous job (cook, gardener, IT specialist) Private courses at home Development of self-expression and self-sufficiency

Therapy	Therapy Psychotherapy Healing Immediate medication Complex rehabilitation programme	
Changing social environment	Income generation Using technology wisely (interactive e-story/audio books...)	Creation of comfortable atmosphere for children Holding shared events between disabled and non-disabled children Public employment and subsistence Collecting donations (clothes, toys, nutrition)

Source: own compilation

Social Impact Measurement Practices

All of the examined social enterprises were spending their money transparently. SAA methodology could be easily adapted to the examined social enterprises and the social institute, because all of the enterprises have to make their annual social report. However, they should determine their mission, value proposition, objectives, activities, stakeholders and key stakeholders more precisely.

They often use sheets to make financial statements and action plans. In Hungary a majority of social enterprises do not realise profit or even enough revenue to cover their operations and growth. Approximately half of them are able to cover their costs from the revenue. To solve the sustainability pitfall, business skills would be necessary for social entrepreneurs. Nowadays more and more business mentorship programmes are aiming to develop the social ecosystem in Hungary.

The Erste SEEDS programme provides mentor-mentee partners to accelerate social enterprises and endows them with business skills, such as business modelling, marketing skills, financial management and strategic thinking. Corvinus University of Budapest is also active in supporting social enterprises and teaches social entrepreneurs by launching 30-40 joint projects yearly.

Approximately 60% of the Hungarian social enterprises are based on public financial resources, like grants, donations, public procurements and European Union funds. For the development of the social market, there is a need for private funding. Erste Bank started to establish own social banking system, which offers low interest loan to social enterprises. The main conclusion of the situation of the market is the need for a comprehensive social value creation model.

Social Value Creation Model

Based on the literature review and the qualitative study, the authors developed a Social Value Creation Model (SVCVM). SVCVM is a comprehensive methodology for

making social enterprises and organisations sustainable on the market. The six steps of the model are the following:

- Definition of all of the stakeholders.
- Determination of the Value Proposition (social value creation) for all the stakeholders.
- Creating a Business Model Canvas, including the ‘triple bottom line’ and the collection of all of the investment and resources needed.
- Evaluation and accounting of the costs and benefits of value creation.
- If the balance sheet is negative, business model innovation is necessary.
- Measurement of progress: transparency (SAA, SEBS, SIMPLE) and effectiveness (SROI).

Social entrepreneurs should have more competence in strategic thinking, financial and operations management. With the help of the SVCVM model, they can summarise all of the assets and resources of the organisation. They define their customer segment, key partners (government, European Commission, suppliers, other social enterprises, SMEs, mainstream companies or accelerator institutes) and internal stakeholders. After that, they can evaluate the amount and extent of the created value for the customer base and the society. They can map and collect the financial and human resources to implement their plan. The report gives information about the social performance of the enterprise with exact data of revenue and costs. As feedback, if the result is negative, they should readjust their business model. As the social enterprise is operating they should maintain social impact measurement from the aspects of effectiveness and transparency.

SVCVM can act as a comprehensive tool for business development. It can be used by practitioners (social entrepreneurs, consultants, brand managers) or academics to assess an organisation.

CONCLUSIONS AND IMPLICATIONS

Disabled people, disoriented people, and people who have mental problems or do not have the opportunity to recover on their own are less likely to realise sufficient

income. Through their development, social value creation could be achieved. Developments include, but not limited to advice, education and therapy (see Table 3 for more details). Besides, negative stereotypes of society should also be managed. It is also important to research the sources and causes of disabilities, disorientation and mental illnesses.

The problem of social exclusion of disabled, disoriented and mentally ill people from the workplace is well-known in Europe, and there are different kinds of initiatives to establish a common legal procedure to ensure equal opportunities on the labour market. Main participants of the supply side of the social market are social enterprises and public development institutes. Currently their visibility is low, and their solutions are not creating enough impact.

The main barrier is the low level of business mind-set within social enterprises. Using SVCM they could enhance their visibility and impact. SVCM also helps to understand themselves better by identifying their strategy, value proposition, activities, strengths, skills and competencies. It also helps them to understand complementary skill, competences and activities that can enhance their mission fulfilment. They usually have limited resources, and resource gaps fosters them to co-operate with one another and with other entities. Social organisations have the opportunity to think in a strategic way and they could develop themselves with the innovation of their services. The social impact measurement methodology is key to becoming more professional.

The government should also rethink the distribution of funds. Only those organisations should be subsidised that are using transparent and effective management. The use of SVCM could be a minimum criterion for them. In addition, social banking development and intense collaboration with business schools could be one of the best solutions for the market to change its operation toward a more business-like way of thinking.

SUMMARY

The paper examined why we need social value creation and social impact measurement, and what they mean. In order to answer these questions the authors reviewed the contemporary literature on the social inclusion challenge of disabled people in the labour market, the value creation of social enterprises, and impact measurement of social enterprises

The researchers also collected research data from Hungarian practitioners to understand the contemporary practices and possible interpretations of social value creation and impact. Although the research has limitations, because the empirical research was focusing on the practices of 2 small private organisations and 1 public organisation in Hungary, the results show new theoretical contribution.

They found that private organisations are more capable of handling social diseases while public organisations are more oriented towards developing the social environment of the disabled people. Both are capable of developing certain disabilities. While the examined public organisation is more capable for researching the causes of mental disorders, private organisations are ready to make a sustainable business around their services.

Based on the literature review and empirical investigation, the authors concluded that disabled people are excluded from the labour market; however, their inclusion would benefit the whole society. The main sources of the challenge are poverty, mental diseases and the lack of proper healthcare. The authors collected some best practices to show good examples for social value creation and impact.

Transparency and efficiency are crucial to maximise social value creation and impact. SAA, SEBS, SIMPLE, SROI are useful tools to achieve them. The more comprehensive SVCM model could serve as a reference for practitioners and academicians to improve the transparency and the performance of social enterprises.

Social enterprises need to develop a professional business manner in order to maximise their sustainability, social value creation capabilities and social impact. This will help them tackle the challenges related to disabled people and social exclusion.

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The Effects of Hofstede's Cultural Dimensions on Pro-Environmental Behaviour: How Culture Influences Environmentally Conscious Behaviour

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SUMMARY

The need for a more sustainable lifestyle is a key focus for several countries. Using a questionnaire survey conducted in Hungary, this paper examines how culture influences environmentally conscious behaviour. Having investigated the direct impact of Hofstede's cultural dimensions on pro-environmental behaviour, we found that the culture of a country hardly affects actual environmentally conscious behaviour. The findings indicate that only individualism and power distance have a significant but weak negative impact on pro-environmental behaviour. Based on the findings, we can state that a positive change in culture is a necessary but not sufficient condition for making a country greener.

Keywords: pro-environmental behavior, culture, Hofstede's cultural dimensions, Hungary, individualism, power distance

Journal of Economic Literature (JEL) codes: M31, P27, Q01, Q50, Z13

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INTRODUCTION

Our world is overwhelmed with environmental and social problems. Air pollution, climate change, deforestation, extinction of species, soil degradation, chemicals and waste are regarded as the most crucial environmental issues (UNEP, 2016). Culture influences behavioural patterns of individuals, including pro-environmental behaviour, to a large extent through socialization; therefore, analysis of the effects of culture on environmentally conscious behaviour is indispensable. The starting point of our investigation is that different cultures are based on different dominant core values. Those core values determine to what extent people will behave in an environmentally conscious way and whether environmental friendly products will be accepted in a society, and if so, to what extent consumers will demand them. We assume if a culture is based on a dominant set of values that are positively correlated with pro-environmental behaviour, that is, if environmental-related values are important in a society, it will have a positive impact on the general level of pro-environmental behaviour and the demand for environmental friendly

products. Our research objective was to analyse how culture influences pro-environmental behaviour.

LITERATURE REVIEW

Although many researchers have addressed the negative consequences of individual behaviour behind environmental issues (Boldero 1995; Oskamp 2000; Nordlund & Garvill 2002; Ojala 2008; Klöckner & Oppedal 2011; Swami et al. 2011; Guerrero et al. 2013; Marshall & Farahbakhsh 2013), previous works failed to investigate the effects of Hofstede's cultural dimensions on pro-environmental behaviour. However, understanding and predicting forces influencing pro-environmental behaviour would be highly significant, as previous studies (Nagy 2005, 2012; Hofmeister-Tóth et al. 2011) suggest that the level of environmentally conscious behaviour is rather low in Hungary. Szakály et al. 2015 found that the size of environmentally conscious LOHAS (Lifestyle of Health and Sustainability) customer segment in Hungary was only 8.7 percent.

Pro-environmental behaviour is defined by Steg and Vlek (2009, p. 309) to mean "behavior that harms the environment as little as possible, or even benefits the

environment”. Tylor (1871) was probably the first one to define culture as “the complex whole which includes knowledge, beliefs, arts, morals, law, customs, and any other capabilities and habits acquired by [a human] as a member of society.” According to Hofstede (2011) culture is “the collective programming of the mind which distinguishes the members of one group or category of people from another.” Hofstede states that we can distinguish three levels in programming the mind, which are:

- universal human nature (inherited)
- group specific culture (learned)
- personality (inherited and learned)

The aim of Hofstede’s early research (1980) was to globally analyse the differences in employee values. He collected data concerning culture from more than forty countries in the world, then he analysed them using statistical methods. Culture and the personality traits of the individuals are interrelated; they mutually and greatly affect each other. In the 1980s Hofstede identified four dimensions of culture as follows:

- power distance (PDI),
- uncertainty avoidance (UAI).
- individualism – collectivism (IND)
- masculinity – femininity (MAS)

Later he added a fifth dimension to his model (Hofstede & Bond 1988), which was called long term orientation (LTO), then he introduced the sixth dimension, which is indulgence – restraint (Hofstede et al. 2010). This is the development of the 6D model of national culture, which is Hofstede’s latest model for exploring the similarities and differences across national cultures (Hofstede 2017). The relative positions of the countries involved in the model on these six dimensions are expressed in a score on a 0-to-100-point scale. The higher value is intended to represent the stronger presence of the given dimension in the given country.

Power distance (PDI) refers to the opinion about inequality among people and the modes of handling the problem: how much the members of a society who are excluded from power accept and expect the unequal distribution of power. In societies with high power distance not only the leaders but people who are excluded from power also support the system. In those countries the support of autocratic or oligarchic leadership is significant: power is concentrated in a narrow circle, paternalistic leadership style is expected, children are taught to obey and give respect at school and in the family. In contrast with this, low power distance societies (i.e. Scandinavian countries) show a democratic system in practice, they have pluralist governance, privileges are not accepted; children are considered to be equal in the family and at school as well (Hofstede et al. 1998). Based on the fact that Scandinavian countries are performing exceptionally well in sustainability rankings, i.e. Finland, Iceland, Sweden and Denmark are the four best performers in 2016 EPI rankings (Hsu et al. 2016), *it can be assumed that low*

power distance has a positive impact on environmentally conscious behaviour (Hypothesis 1).

Uncertainty Avoidance Index (UAI) expresses the level of stress that unknown situations can cause in a society. It refers to how much people feel uncomfortable with uncertainty and ambiguity. Avoiding uncertainty is not the same as avoiding risk, since uncertainty avoidance means how a society tolerates ambiguous situations. In cultures exhibiting strong uncertainty avoidance (Latin America, Mediterranean countries and Japan) written rules, laws of behaviour are very important, the level of risk taking is low and conflict avoidance behaviour is typical. On the other hand, in cultures where the degree of uncertainty avoidance is low, uncertainty is regarded as a natural inherent of life and people consider unusual situations as opportunities rather than threats.

The individualism versus collectivism (IND) dimension of culture refers to how much individuals integrate into the primary groups, to what extent they care about only themselves and/or their close family. It expresses how responsible people feel for the members of a wider community (for example relatives), who also expect support in return. In individualist cultures (e.g. the USA, Hungary, etc.) the degree of emotional attachment to groups is low, self-reliance, diversity and self-centredness are highly important. Everyone cares for himself/herself or the immediate family. Members of collective societies (e.g. South Asia, Korea, Japan and China) are fully identified with their community from their birth. Relationships within the community are strong, cohesion is high. Loyalty toward the extended family (i.e. grandparents and relatives), which protects its members in return, is unquestionable.

Masculinity versus femininity (MAS) dimension refers to the emotional roles between men and women, as well as role-sharing of genders. In masculine societies (e.g. Hungary) masculine and feminine roles are clearly distinguished. In masculine societies “we live to work”, so focusing on work and its exaggerated form, workaholicism, is typical. The most important goals for people are to make achievements and to make money. The most important values in those countries are related to money and career. It is common for people to show their high status in society by owning recognised brands and luxury goods, which is in contrast with environmentally conscious behaviour. In feminine societies with modest, caring features (i.e. Scandinavian countries) protecting the environment and nature, caring for others, solidarity, the need for better quality of life and nurturing human relations are crucial (Hofstede and Arrindell 1998). *For all these reasons we suppose that masculinisation of a society is against environmentally conscious behaviour (Hypothesis 2).*

Long-term orientation versus short term normative orientation dimension (LTO) signals that the focus of human behaviour is placed on the future or present/past. In this context, it is referred to as “(short term) normative versus (long term) pragmatic” (PRA). In the academic context, the terminology Monumentalism versus

Flexhumility can also be used (Hofstede 2017). The most important distinguishing features of high level long term orientation, which is typical of China, Korea, Japan and some other Asian countries, are persistence, saving and shaming those who do not fulfil duties. People with such an attitude think that the most important events of life have not happened yet, they will occur in the future. The ability to change is important for them. It means that a "good" person adapts to the circumstances. This is true for traditions as well. Traditions must be adjusted to the circumstances. Such cultures are characterised by learning from others. In contrast, in western societies with short term orientation, people tend to think that the most important things are happening now or have already happened. Such cultures have sacred and inviolable traditions. People are proud of their own nation and do not want to change their traditions. Learning from others is not typical for them (Hofstede and Bond 1988).

The indulgence (IND) versus restraint dimension focuses on how people satisfy or control the basic human drive for an enjoyable life. In societies exhibiting strong indulgence people are allowed to freely satisfy their desires in connection with enjoying life and having fun. On the other hand, in societies where the level of restraint is high, strict social norms regulate the gratification of needs. In restrained societies only a few people are happy; many of them feel they are vulnerable because things just happen to them. Spare time and comfort are not priorities in restrained countries. Fewer people do sports, sexual norms are stricter, the birth rate is lower but there are also fewer obese people than in cultures permitting an enjoyable life (Hofstede et al. 2010).

Onel and Mukherjee (2013) investigated the effects of national culture and human development on environmental health. Using multiple linear regression models, they found that cultural dimensions of individualism and uncertainty avoidance, as well as human development components of life expectancy at birth, education, and income, significantly influence environmental health performance.

Cho et al. (2013) investigated the relationship between collectivism versus individualism as a cultural dimension and environmentally conscious behaviour by using the value-belief-norm model. They found that both horizontal collectivism – when the individual is the part of the group and there are no differences among the individuals within the group - and vertical individualism – when the individual is autonomous, independent and accepts differences - are important influential factors of perceived consumer effectiveness, which has a positive effect on environmental attitudes and finally results in higher levels of environmentally conscious commitment.

Once and Almagtome (2014) made a cross-cultural comparison of the effect of national culture values on corporate environmental disclosure (CED). They found that two of Hofstede's national culture dimensions were linked to a higher degree of corporate environmental disclosure. In particular, a nation's high degree of

individualism and long-term orientation were linked to high levels of corporate environmental disclosure. On the other hand, they found that one of Hofstede's national culture dimensions were related to a low degree of corporate environmental disclosure.

DATA AND METHODS

In order to investigate pro-environmental behaviour an online survey was conducted in Hungary in 2017. A total of 442 respondents aged over 18 were included in the convenience sample with the snowball method. This means a 4.66% confidence interval at the 95% confidence level. As the original sample was not a representative sample, we used a commonly applied correction technique, the weighting adjustment, to make our sample representative according to variables such as sex and age.

To explore the impact of culture on pro-environmental behaviour, we investigated the relationships between Hofstede's cultural dimensions (HCD) and environmentally conscious behaviour. In an attempt to measure pro-environmental behaviour, we used a revised version of the General Ecological Behaviour scale. The original measuring tool involves thirty-eight items in two sections representing different types of ecological and pro-social behaviour (Kaiser et al. 1999). Since we did not intend to investigate pro-social behaviour and some of the pro-environmental items proved to be irrelevant or outdated (Nagy, 2012), we deliberately left out eight variables concerning prosocial behaviour and three variables regarding ecological behaviour from the revised version of the GEB scale. However, we added ten ecological behaviour items, therefore the resulting pro-environmental behaviour scale (PEB scale) consists of thirty-seven items (Appendix 1).

We measured the actual behaviour instead of behaviour intention by using dichotomous questions (yes/no responses). Negative behaviour items (item No: 5, 7, 10, 11, 12, 13, 16, 19, 21, 22, 23, 30, 35 and 36) were reversed in coding. Missing values were handled as 'no' responses. Behaviour difficulty of each PEB item was calculated by dividing the number of people behaving in an environmentally conscious way by the total number of respondents. We also considered the respondents' tendency to behave ecologically by considering the number of ecological behaviours they have carried out. In order to measure pro-environmental behaviour of individuals, we calculated the weighted sum of each item on the revised GEB scale. Difficulty parameters of pro-environmental behaviour items were used as weights. Then we divided the weighted sums by the total sum of difficulty parameters to transform it into a 0-1 scale of pro-environmental behaviour. Zero (0) score expresses that the individual does not behave environmentally consciously at all. On the contrary, if someone's behaviour is a hundred percent environmentally conscious, the PEB score will be the maximum (1).

Table 1
The relationship between Hofstede's cultural dimensions and pro- environmental behaviour

Cultural Dimension	Operationalization	Short Form	Means (\bar{x}) (1-5 scale)	Pearson correlation (r)	Relationship with Pro Environmental Behaviour
Masculinity Versus Femininity	Competition, success and performance are more important than caring for others and the quality of life.	MAS	1.67	-0.084	not significant
Uncertainty Avoidance Index	Change and unknown situations always involve a lot more threats than opportunities.	UAI	2.31	0.020	not significant
Power Distance Index	Power is distributed unequally in the society, i.e. there are the rich and the poor, and it is completely acceptable for me.	PDI	2.43	-.156**	weak, negative
Indulgence Versus Restraint	Social norms and expectations must always be met and we must control our desires, even if it makes our life less enjoyable.	IND	2.55	-0.062	not significant
Individualism Versus Collectivism	Everyone has to take care of themselves, we cannot expect help from others.	IDV	2.73	-.163**	weak, negative
Long Term Orientation Versus Short Term Normative Orientation	We must rely on the past only to the extent that it serves the interests of the future.	LTO	3.24	-0.069	not significant

Notes: ** Correlation is significant at 0.01 level (2-tale)

Source: Authors' own research

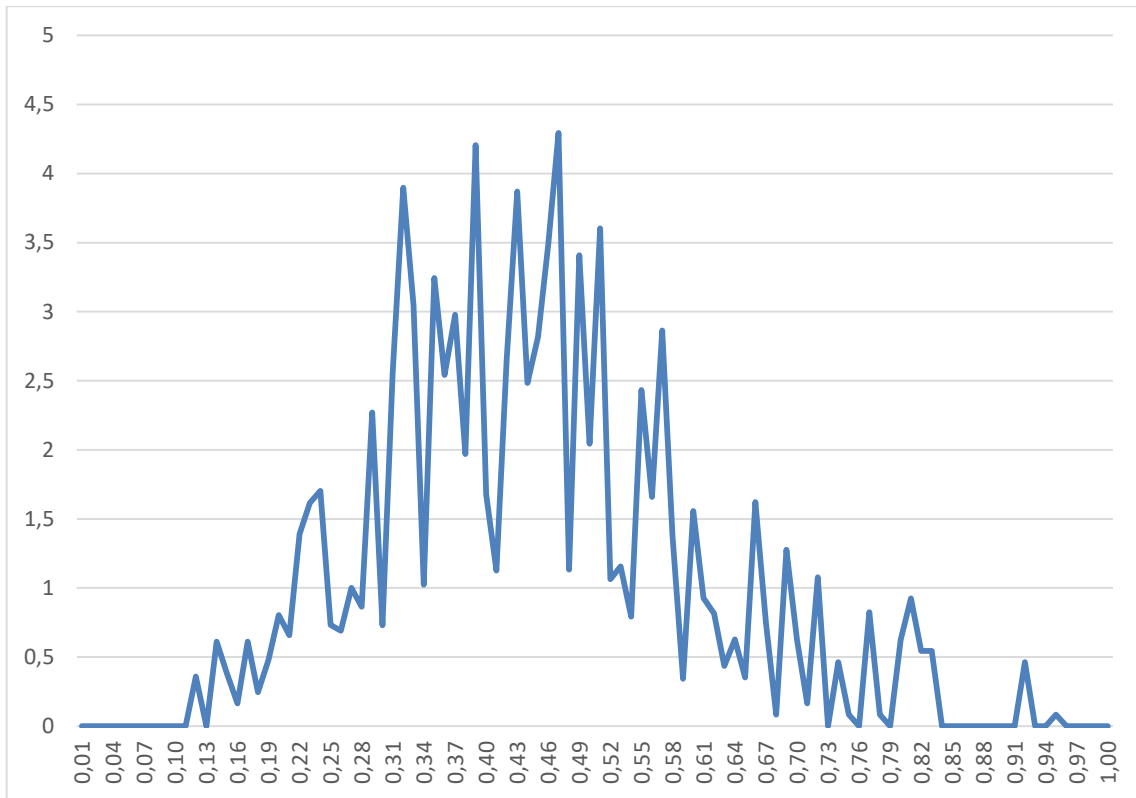
Since the multidimensional measuring scale of Hofstede's cultural dimensions was not available to us, we used a simplified, one-dimensional measurement approach, therefore we measured each cultural dimension with only one variable. We used Likert's five-level scale to measure Hofstede's cultural dimensions. We asked respondents to express to what extent they agree with the statements that can be seen in the "operationalization" column in Table 1. The lowest score (1) on the Likert scale signals that the respondent did not agree with the given statement at all, while the highest score (5) indicates that (s)he completely agreed.

Then we transformed the scores that we measured on the Likert scale to a 0-100 scale to make them comparable with Hofstede's scores as the relative positions of the countries on all cultural dimensions are expressed in a score on a 0-to-100-point scale in Hofstede's 6D model. Scores below 50 points indicate the dominance of one of the values, whereas scores above 50 points refer to the dominance of the opposite value. Uncertainty resulting from this measurement transformation can be considered as a limitation of our study. Application of a scale between 0 and 100 points to measure Hofstede's cultural

dimensions in future research can reduce this kind of measurement error. Because of the limitations discussed above, our results require further investigations in the future.

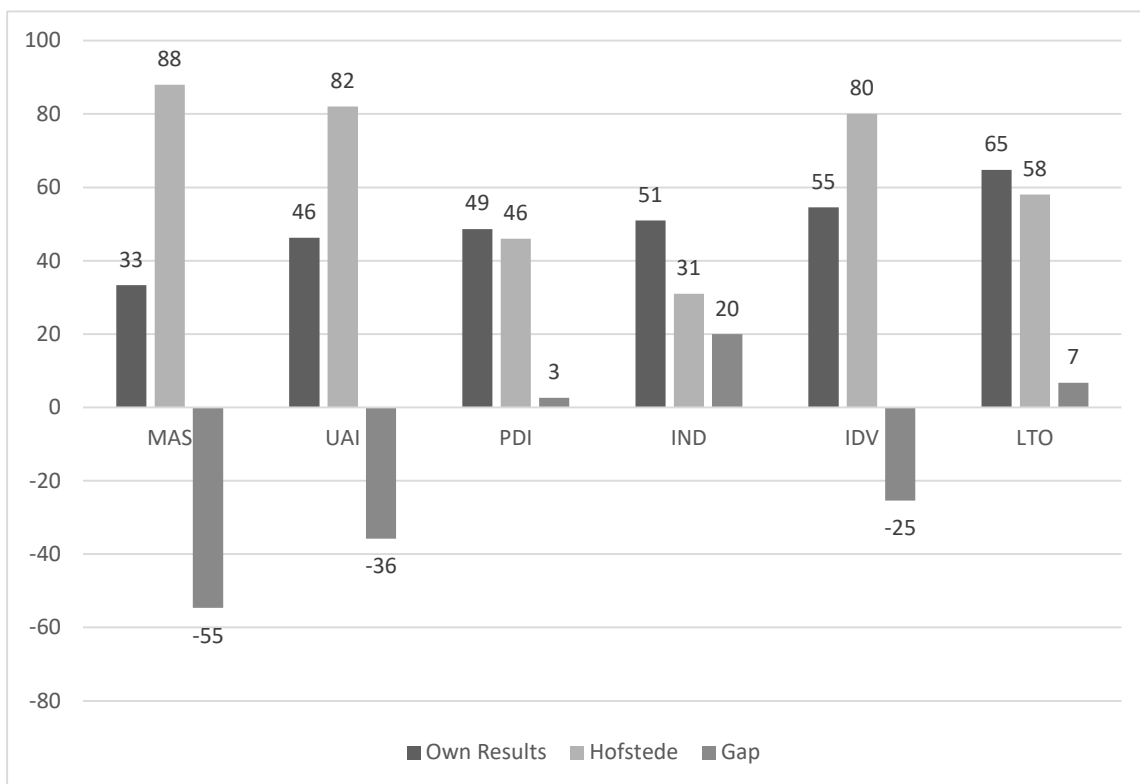
RESULTS & DISCUSSION

As a result of our investigations on pro-environmental behaviour, we found that most Hungarians do not behave environmentally consciously at all, i.e. they do not consider the environmental consequences of their behaviour. Figure 1 shows the percentage distribution of the population in Hungary in terms of the level of pro-environmental behaviour. Axis x shows the level of PEB, while we can see the percentage distribution of respondents on axis y. The mean of PEB in Hungary is only 0.445 on the 0-1 PEB scale, therefore it can be concluded that the level of pro-environmental behaviour is moderately low. Our result confirms previous findings in the literature (Hofmeister-Tóth et al. 2011; Nagy 2005, 2012) that pro-environmental behaviour is not typical of Hungarians.



Source: Authors' own research

Figure 1. Percentage distribution of pro-environmental behaviour (PEB) in Hungary



Source: Authors' own research based on Hofstede (2017)

Figure 2. Hofstede's scores, our results and the gap between them for Hofstede's cultural dimensions in Hungary

Figure 2 highlights the gap between the country scores of Hungary in Hofstede's 6D model and our results. Hofstede's scores suggest that Hungary is an extremely masculine country (MAS=88), characterized by a high degree of uncertainty avoidance (UAI=82) and high level of individualism (IDV=80). The relatively high score of long term orientation (LTO=58) suggests that the Hungarian society is rather pragmatic. Power distance index (PDI=46) is relatively low, which indicates that people in Hungary are slightly against the unequal distribution of the power. Since the value of indulgence (IND=31) is very low, we can conclude that restraint is characteristic of Hungarians to a large extent. It means that many of them may think that fulfilling their desires is against social norms and an enjoyable life is "something wrong".

The most important gap – 55 points – between our results and Hofstede's scores was found in terms of the masculinity-femininity dimension, where our score (MAS=33) was significantly lower than Hofstede's score (MAS=88). Our result suggests that Hungary is a feminine country where taking care of others and quality of life are dominant values. In feminine societies a focus on quality of life is top priority and only very few people want to stand out from the crowd. While in masculine countries people are driven to be the best, in feminine cultures it is important for people to like what they do and find it interesting.

The second greatest gap (36 points) was found in terms of the uncertainty avoidance index. We measured only 46 points in contrast to Hofstede's 82 points. Another study by Neumann-Bódi et al. (2008) yielded a score of 64 points. When the UAI score is below 50 points, people are not afraid of changes and these are seen as opportunities rather than threats. In countries with low uncertainty avoidance, people feel they can shape the future to some extent and it does not just happen to them. In societies accepting uncertainty there is a willingness to accept new ideas, to try new products and entrepreneurial spirit of people is also higher. These cultures require fewer rules and people show their emotions less expressively.

The third largest gap (25 points) occurred in terms of individualism (IDV). We measured only 55 points instead of the 80 points that can be found in the 6D model. It means that Hungarian society is less individualist according to our results. Our findings are not in line with those of Neumann-Bódi et al. (2008), who found a very high level of individualism in Hungary.

However, it must be highlighted that our result is consistent with that of Hofstede's in regard to the finding that the Hungarian society is not collectivist. In Hungary, people take care of their immediate family and only loose social ties exist. Self-centredness is also characteristic in

individualist societies. People need a private sphere and relationships are based on obtaining mutual benefits.

As far as indulgence and restraint are concerned, we measured much higher scores (51 points) than Hofstede did (31 points). It means that Hungarians are not so restrained as it would appear based on Hofstede's scores. We enjoy our life much more and we live it more impulsively and people do not tend to be so cynical and pessimistic.

As for the other dimensions, no significant differences can be found between our results and those of Hofstede's. The Long Term Orientation score that we measured (65 points) was only slightly higher than Hofstede's 58 points. The above results suggest that Hungary is a pragmatic country where people are convinced that truth largely depends on the specific situation, context and time. In Hungary traditions are transformed according to the changing situations and people fight persistently to achieve results.

As for Power Distance Index (PDI), the difference was insignificant, only 3 points, as we measured 49 points instead of 46 points that can be found in the 6D model. Moderately low scores for power distance mean that Hungarians tend to favour independence and do not like subordination and control. The majority of Hungarians believe in equal rights.

To test our hypotheses and to investigate the impact of Hofstede's cultural dimensions (HCD) on pro-environmental behaviour (PEB), we used the Pearson correlation. The results of the significance analysis as well as the correlation coefficients suggest that only two cultural dimensions have a significant impact on environmentally conscious behaviour. However, in both cases the relationship is only weak. *A higher level of individualism, i.e. the individualisation of the society, is slightly against pro-environmental behaviour ($r=-0.163$) and so is the higher level of power distance ($r=-0.156$).* We also found that the other cultural dimensions in Hofstede's 6D model have no significant effect on environmentally conscious behaviour (Table 1).

The results of stepwise linear regression support that *Hofstede's cultural dimensions have only a very weak direct influence on pro-environmental behaviour.* It can be assumed that HCD affects PEB indirectly through other factors (i.e. personal values and attitudes) as the regression model has only very low explanatory power (Table 2). With model 2, only 3.4 percent of the variation in the dependent variable (pro-environmental behaviour) can be explained using the independent variables (Individualism and Power Distance Index).

Table 2
Regression model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.167 ^a	.028	.026	.14516
2	.197 ^b	.039	.034	.14452

a. Predictors: (Constant), IDV

b. Predictors: (Constant), IDV, PDI

Source: Authors' own research

Table 3
ANOVA table

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Significance
1	Regression	.269	1	.269	12.749	.000 ^b
	Residual	9.313	442	.021		
	Total	9.582	443			
2	Regression	.371	2	.185	8.881	.000 ^c
	Residual	9.211	441	.021		
	Total	9.582	443			

a. Dependent Variable: PEB (0-1)

b. Predictors: (Constant), IDV

c. Predictors: (Constant), IDV, PDI

Source: Authors' own research

Table 4
Regression - Coefficients

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.495	.018		27.412	.000
	IDV	-.021	.006	-.167	-3.571	.000
2	(Constant)	.513	.020		26.042	.000
	IDV	-.016	.006	-.126	-2.513	.012
	PDI	-.013	.006	-.111	-2.214	.027

a. Dependent Variable: PEB (0-1)

Source: Authors' own research

Significance values in Table 3 indicate that both models are significant.

As Table 4 shows, individualism has a weak negative effect on pro-environmental behaviour ($\beta=-0.126$), while higher Power Distance is also against pro-environmental behaviour ($\beta=-0.111$). B scores in Table 4 suggest that respondents who score 1 point higher on Individualism will – on average – score 0.16 points lower on the PEB scale, while people who score 1 point higher on Power Distance Index will - on average - score 0.13 points lower on the PEB scale.

Based on the above findings, it can be concluded that in collectivist societies with low power distance the

probability of pro-environmental behaviour is higher. Both the results of Pearson correlation and the linear regression support our first hypothesis, as we found that high power distance index has a negative impact on pro-environmental behaviour. However, the second hypothesis is not supported, since we found no significant relationship between the feminine/masculine nature of a society and the level of PEB.

CONCLUSIONS

This research was carried out in order to analyse how culture influences pro-environmental behaviour. Firstly,

we investigated the level of environmental consciousness in Hungary. We measured actual behaviour instead of behaviour intention and found that the level of pro-environmental behaviour is moderately low. This means that corrective actions are needed to increase environmentally consciousness. However, changing the culture of the country would not be sufficient, as the evidence from this study suggests that Hofstede's cultural dimensions only slightly influence pro-environmental behaviour. Among the significant cultural dimensions, only individualism and power distance have a weak negative impact on environmentally conscious behaviour. Yet, for these reasons, if we intend to make a country greener, collectivization of the society – or at least significant moderation of the level of individualism – and/or lowering the level of power distance are required. The results also suggest that people living in countries with low individualism and power distance index (e.g. Costa Rica) will behave in a more environmentally conscious way. The 2014 Global Green Economy Index also confirms this interpretation, as Costa Rica recorded an impressive result, ranking 3rd behind Sweden and Norway

on performance and in the top 15 for perceptions overall (GGEI, 2014).

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Appendix 1

Pro-environmental scale items

1. After meals, I dispose of leftovers in the toilet.*
2. For shopping, I prefer paper bags to plastic ones.
3. I am a member of an environmental organization.
4. I bring empty bottles to a recycling bin.
5. I buy a lot of products made of recycled materials.
6. I collect and recycle used paper.
7. I do not buy anything from companies being not socially or environmentally responsible.
8. I do not buy products tested on animals.
9. I do not change anything just because it is out of fashion.
10. I often talk with friends about problems related to the environment.
11. I prefer local products and foods to those transported from faraway areas.
12. I prefer to shower rather than to take a bath.
13. I put dead batteries in the garbage.*
14. I put unused medicine in the dustbin.
15. I sometimes contribute financially to environmental organizations.
16. I travel by air at least once or twice a year.*
17. I use a chemical air freshener in my bathroom.*
18. I use alternatives (e.g. washing nuts) for washing instead of detergents.
19. I use an oven-cleaning spray to clean my oven.*
20. I use chemical toilet-cleaners.*
21. I use fabric softener with my laundry.*
22. I usually buy environmentally-friendly products or organic foods.
23. I usually buy milk in returnable bottles.
24. I usually drive on motorways at speeds under 100 km/h.
25. I wait until I have a full load before doing my laundry.
26. I wash dirty clothes without prewashing.
27. I eat meat at every meal*
28. If I am offered a plastic bag in a store I will always take it.*
29. If there are insects in my apartment I kill them with a chemical insecticide.*
30. In the past, I have pointed out to someone his or her unecological behaviour.
31. In the winter, I keep the heat on so that I do not have to wear a sweater.*
32. In the winter, I leave the windows open for long periods of time to let in fresh air.*
33. Sometimes I buy beverages in cans.*
34. There is significantly less waste in my household than a year ago.
35. Usually I do not drive my automobile in the city.
36. When buying a new household device, I always prefer the more energy efficient versions.
37. When possible within short distances, I use public transportation or ride a bike.

* Negative behaviour items.

Challenges to Economic Upgrading of Iranian Economy

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SUMMARY

The main purpose of the paper is to summarize the challenges that the Iranian economy will face in the economic upgrading process and to provide possible solutions for the Iranian economy to move up in the global value chain. To achieve these goals, the data related to the global competitiveness index were studied to gain insight into the current situation of the Iranian economy. Findings reveal that despite the immense revenue source of Iran from exporting gas and oil, the Iranian economy is not competitive globally, and Iran is confronted with serious shortcomings in the globalization path. Data show that the performance of Iran in different factors of competitiveness (institutions, macroeconomic environment, labor market efficiency, goods market efficiency, financial market efficiency and innovation) is poor. Since Iran has many benefits from potential capabilities such as a young workforce and plentiful natural resources, it is recommended that Iranian government consider a functional and process upgrading strategy to improve the performance of Iran in global competitiveness. It is also important to focus on research and development processes for moving along the global value chain curve, in order to move towards the higher value creating activities. These internal development processes are very important for the country to maintain the upgrading process even under the unfavorable international political circumstances.

Keywords: Iranian economy, global value chain, global competitiveness index

Journal of Economic Literature (JEL) codes: O30, O40, P50

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INTRODUCTION

The position of a country in the global value chain can explain its economic growth and its position in the developing process (Gereffi and Fernandez-Stark 2016). The amount of the created value in each stage of the value chain is different. More value-adding process will generate higher revenues and better customer satisfaction. Therefore, economists are seeking solutions to improve the processes of the global value chain (GVC) so as to make a dynamic proactive economy rather than an economy in which the lowest value is created. The transition to a more value created economy stimulates governments to dedicate a great deal of money to criteria assisting them in moving up the GVC.

On the other hand, the global value chain is a concept which has resulted from globalization. The advancement in technology and improved communication networks have facilitated the exchange of goods and services, resources, and ideas irrespective of geographical location; therefore, advanced technologies have led economics

toward globalization. Globalization is defined as a process by which businesses or other organizations develop international influence or start operating on an international scale. The globalization of markets, products, production and institutions has resulted in the growth of world trade and foreign direct investment. It also increased imports as the perceived distances were reduced due to advances in transportation and telecommunications technology (Hill 2007). Yip (1988) stated that competition, economic development, market, and environment are the main driving factors of globalization.

Globalization is a complicated issue. On one hand, its proponents say globalization represents free trade, which promotes global economic growth, creates jobs, makes companies more competitive, and reduces prices for consumers. On the other hand, its opponents say globalization is destroying the culture and heritage of countries and their ethnic groups, the Western world dominates the entire world and destroys national characteristics under the shadow of globalization. Writers on global strategy, including Porter (1990), Prahalad and

Doz (1986), Yip (1989), and Stonehouse et al. (2004) have argued that in international business there are significant advantages to be gained from the global scope. Measuring globalization – because of its many faces and fields – is another important challenge for economists. There are different indices and methods introduced by different authors, e.g. Fischer (2003), Dreher (2006), Dreher et al. (2008), and Chang and Lee (2010). In addition, there are commonly used suggestions for measuring by the OECD or the World Economic Forum. Based on the OECD's suggestion, globalization is measured in different fields: 1) globalization of trade and investment (trade of goods and services, Foreign Direct Investment, portfolio investment), 2) globalization of technology and knowledge (internationalization of science and technology, internationalization of highly skilled human capital), 3) Multinational Enterprises (MNEs) and globalization (importance and characteristics of MNEs, MNEs and R&D activities), and 4) Global Value Chains (OECD 2010).

According to the Iran 2025 vision, the government's attempts are directed towards achieving the first position in the areas of economy, science, and technology in the Western South Asia region (which includes Central Asia, Kyrgyz regions, the Middle East, and neighboring countries), with an emphasis on high-tech knowledge production, fast and continuous economic growth, relative growth of per capita income level, and achievement of full employment (Iran Data Portal 2018).

Entering the global market may bring advantages for national economy in different fields:

- Foreign Direct Investment (FDI) (Mah 2002), which in turn, could reinforce technology transfer and assist the global companies to growth,
- Technological Innovation (Archibugi and Iammarino 2002), which may result in growth in FDI and help to improve economic output,
- Economies of Scale (Levitt 1993), which may reduce costs and prices.

Nevertheless, the Iranian economy is isolated at present, against its will, due to different economic sanctions imposed by world political and economic bodies. Despite the sanctions, there is an immense tendency in the Iranian economy to be present at the international (global) market. However, for Iran, entering this globalization movement and taking advantage of its benefits will require much preparation, strong intentions, and many measures and changes in the external environmental factors (mostly political, economic and social). There are two aspects to becoming an internationalized/globalized economy: the first aspect shows how the economy can be successful in competition with other economies while the second aspect shows how the economy is ready to cope with the consequences of opening its doors to other economies.

The ability of a country to move toward higher value activities in the global value chain (GVC) and capture more value is called economic upgrading (Gereffi 2005). For this upgrading, various methods are recommended in the international literature. Ye et al. (2015) argue that

depending on government policies, corporate strategies, technologies, institutions and human skills, a country can select the most appropriate approach for economic upgrading based on its own strengths and weaknesses.

Our study was conducted to examine the current position of the Iranian economy in the global value chain and to outline some possible approaches to economic upgrading. In other words, the main objective of the current study is to provide proposals for improving the competitiveness of Iran in the smile curve of the global value chain. The "smile curve" depicts the value chain by a graph with a Y-axis for value-added and an X-axis for the value chain itself. The two ends of the curve represent high added value and the activities at both ends are intensive in knowledge and creativity, i.e. basic and applied R&D, design, commercialization are at the beginning, while marketing, advertising & brand management, specialized logistics, after-sales services are at the end of the chain. The middle part of the value chain represents production (manufacturing and standardized services) with low value-added. Therefore, the curve appears like a smile (Mudambi 2008). The curve also represents the relationship between developed and developing countries in the creation and distribution of value-added in GVC. Developing countries are generally locked into the low end of GVC and development policies are needed which might help them to move up from the low end to high end of the smile curve (Ye et al. 2015).

The current situation of the Iranian economy was analyzed using the Global Competitiveness Index (GCI) of the World Economic Forum, by which is able to assess the competitiveness of the economy regarding globalization issues. Based on the research results some proposals are put forth for upgrading the Iranian economy along the GVC.

RESEARCH BACKGROUND

In the context of internationalization and globalization, the value chain elaborates all activities carried out globally in inter-firm networks to turn out a product, from a conception to end use and beyond (Gereffi and Fernandez-Stark 2016). GVC consists of activities such as research and development (R&D), design, production, marketing, distribution and support to the final consumer. GVC provides a holistic view of global industries because it concentrates on both tangible and intangible value-adding activities, from conception and production to end use.

Value chain activities are categorized into three categories: the upstream (input), the middle-stream, and the downstream (output or market) activities (Mudambi 2007, 2008). Upstream activities include design, basic and applied R&D. Middle-stream activities include manufacturing, assembly and other repetitive processes in which commercialized prototypes are implemented on a mass scale. Finally, marketing activities, distribution, brand management and after-sales services are called

downstream activities (Shin et al. 2012). Higher value can be created by both upstream and downstream firms.

Ye et al. (2015) argue that rich countries tend to focus on high-end activities such as R&D, design, and brand building in the pre-fabrication stages and on after-sales services or marketing activities in the post-fabrication stages. They also argued that the manufacturing jobs are offshored to low-technology, low-wage nations and the poor nations are more engaged in low-end activities such as manufacturing and assembly. Many of the highest value activities are in pre- and post-production manufacturing services, which may form challenges for the host countries in developing appropriate workforce development strategies to supply these services at the local level (Gereffi and Fernandez-Stark 2016). If a value chain includes steps like the idea creation step (R&D), design, purchase, production, logistics, marketing, and after-sale services, then the steps adding the most value are in R&D and after-sale services. In these steps, there is high knowledge and expertise and high salary which makes the curve smile more. On the other hand, the lowest value adding step is production, where there are just labor and low wages (see Figure 1).

METHODOLOGY

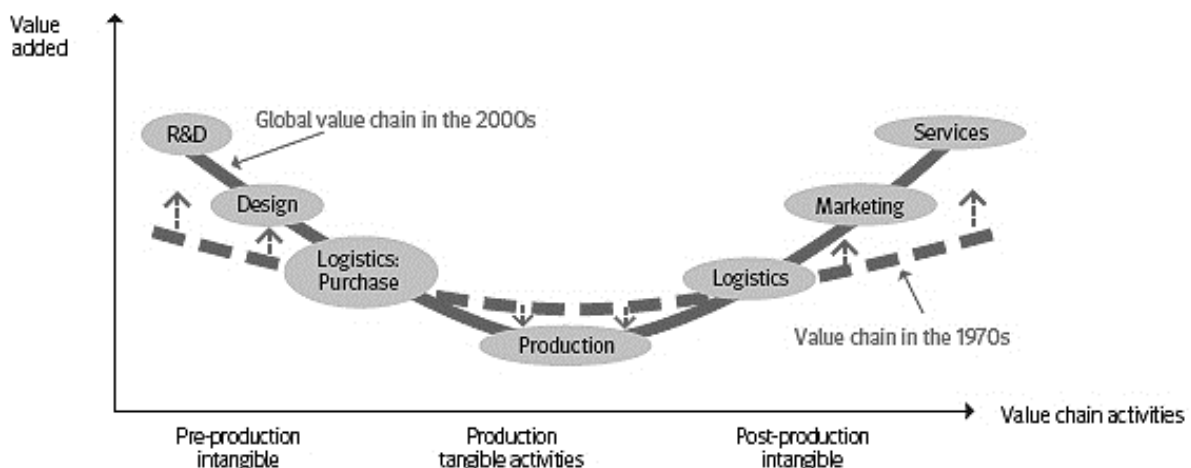
This paper is based on a wide literature review and collecting secondary data from the Iranian Data Portal and Iranian Center of Statistics. The researchers also used the secondary data of the Global Competitiveness Index (GCI). The GCI is composed of three sub-index groups: basic requirements, efficiency enhancers, and innovation and sophistication of an economy. The GCI contributes to

an understanding of the key factors that determine economic growth, helps to explain why some countries are more successful than others, and offers policymakers and business leaders a tool in the formulation of improved economic policies and institutional reforms (Sekliuckienė 2014).

Global Competitiveness Index

The World Economic Forum (WEF) is a Swiss nonprofit foundation, based in Cologny, Geneva, Switzerland. Its mission is cited as “committed to improving the state of the world by engaging business, political, academic, and other leaders of society to shape global, regional, and industry agendas” (WEF 2012, p. 1.). This foundation annually releases the “Global Competitiveness Index (GCI)” report (Schwab 2016, 2017). GCI clarifies how powerful the world economies (countries) are in global competitions. The Global Competitiveness Report, published since 1979, serves as a neutral and objective tool for governments, the private sector, and also for the civil society. To evaluate the GCI, the WEF has considered three main criteria which are basic requirements, efficiency enhancers, and innovation and sophistication factors. In order to assess the criteria of an economy, WEF has considered sub-indices for each criterion. The main indicators and their sub-indices (pillars) are the following (Schwab 2017):

- Basic requirements:
 - Pillar 1: institutions,
 - Pillar 2: infrastructure,
 - Pillar 3: macroeconomic environment,
 - Pillar 4: health and primary education.



Source: http://oecdobserver.org/news/fullstory.php/aid/4227/Who_92s_smiling_now_.html

Figure 1. Value distribution along the Global Value Chain

- Efficiency enhancers:
 - Pillar 5: higher education and training,
 - Pillar 6: goods market efficiency,
 - Pillar 7: labor market efficiency,
 - Pillar 8: financial market development,
 - Pillar 9: technology readiness,
 - Pillar 10: market size.
- Innovation and sophistication of an economy:
 - Pillar 11: business sophistication,
 - Pillar 12: innovation.

The WEF uses numbers to show the status of each economy in each 12 pillars. The value that an economy can acquire in each these pillars is between 1 to 7, where 1 represents the lowest performance and 7 is the highest value that can be gained for an economy. It is worth mentioning that the WEF evaluated 140 countries in 2015, 138 countries in 2016, and 137 countries in the last report (in 2017). Although this index has turned into an index that many governments also use (Xia et al. 2012), it has its critics. Lall (2001), for instance, criticized the analyses, methodology, and the quantitative approach GCI uses. On the other hand, Xia et al. (2012) believe this index is not stable, as the ranks of some countries have not been stable over years and there is a remarkable change in the rank of some countries after one year. In addition, Van Stel et al. (2005) argue that GCI is not able to predict economic growth and it uses past growth as the dependent variable.

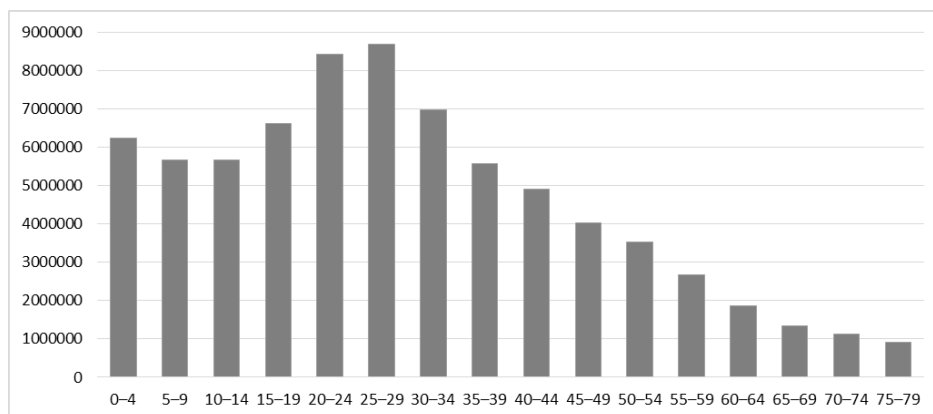
IRANIAN ECONOMY: INTRODUCTION

Iran is the second largest country in the Middle East, with a population of 81 million people (The World

Factbook 2018), its GDP (PPP) per capita was estimated at USD 19,050 in 2017 (The World Factbook 2018). Iran's economy is characterized by the hydrocarbon sector, agriculture and service sectors, and there is a noticeable state presence in manufacturing and financial services. Iran ranks second in the world in natural gas reserves and fourth in proven crude oil reserves. Economic activities and government revenues still depend largely on oil revenues and therefore remain volatile (Financial Tribune, 2018); meanwhile, tax income does not play a determining role in government income (Nili and Amid 1999). The export of crude oil and gas condensate were nearly 1 billion barrels in 2017 (Financial Tribune, 2018). Despite the fact that Iran is the fourth biggest oil producer, the produced oil in Iran is ranked 14th in terms of quality and the market share of Iran for high quality oil is only 2% (Assareh et al. 2010).

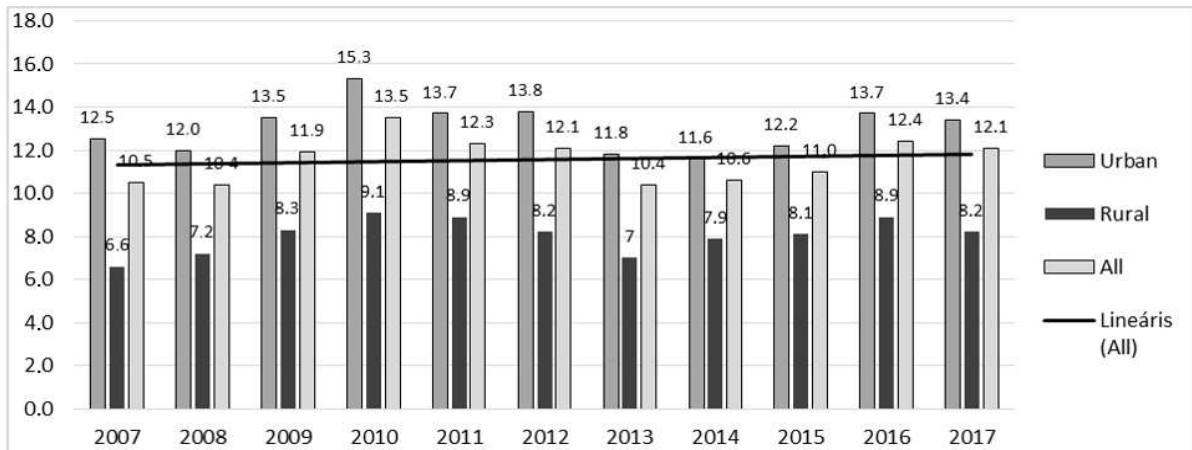
As was mentioned above, the population of Iran is 81 million and as depicted in Figure 2, it is a young population (Iranian Center of Statistics, 2018). Figure 2 looks like a shoe, which implies that Iran's human resources can work and be productive. As the Figure 2 illustrates, the population of Iran is quite young, and almost half of the population are under 30 years old with decades of work ahead of them. Hence, the government policies should be formulated in order to take advantage of such competencies.

The unemployment rate in 2017 was 12.1%, and this rate is higher among the urban residents (13.4%). The black line in Figure 3 represents the trend of the unemployment rate in Iran. As can be seen, the unemployment rate showed a slight increase in the past 10 years (Iranian Center of Statistics 2018).



Source: own compilation based on Iranian Center of Statistics (2018) data.

Figure 2. Distribution of Iran's population by age groups



Source: own compilation based on Iranian Center of Statistics (2018) data

Figure 3. Unemployment rate in Iran, 2007–2017

According to the Iranian Center of Statistics (2018), 56,727,738 Iranian citizens are literate and 1,927,721 of them have a master's and PhD degrees. In comparison, the number of illiterate Iranians (older than 10 years) is 8,657,675 (Table 1). The number of males and females older than 10 years is almost equal (32,616,864 males and 32,768,549 females). The number of Iranian males and females with high school diplomas and bachelor's degrees is also almost similar (see Table 1). The number of males with a master's degree is 0.37% higher than females, and the number of men with a PhD degree is 60% higher than of women (Iranian Center of Statistics, 2018). These numbers imply that there is a stable literate population who are open to further education, employment and – if

political and economic circumstances allow – they can use their knowledge and experience for further development.

On the other hand, taking a close look at the discrepancy between genders and employment, in Table 1, reveals that there is a remarkable difference between genders and employment among the population in Iran, especially among those without higher education. The number of employed men with a high school diploma is almost eight times higher than the women with a high school diploma. The number of employed men with a bachelor's degree is twice higher than the women's. Since if the advantages of women workers are harnessed, this could greatly aid in development.

Table 1
Cross-tabulation of the status of education and employment in Iran based on gender

Explanation	Literate					Illiterate	All
	High School Diploma	Bachelor	Master	Ph.D.	Sum of literate		
Male (more than 10 yrs old)	6 642 928	3 708 487	1 026 385	92 849	29 735 106	2 881 757	32 616 864
Female (more than 10 yrs old)	6 369 228	3 885 387	750 132	58 355	26 992 631	5 775 917	32 768 549
All (more than 10 yrs old)	13 012 156	7 593 875	1 776 517	151 204	56 727 738	8 657 675	65 385 413
Male - Employed	4 439 966	2 082 139	694 118	71 124	17 309 306	1 397 941	18 707 247
Female - Employed	598 472	1 041 824	313 834	29 580	3 345 445	535 359	3 880 804
All employed	5 038 439	3 123 963	1 007 952	100 704	20 654 752	1 933 300	22 588 052
Male - Unemployed	594 208	387 282	88 396	1 945	2 108 412	83 155	2 191 568
Female - Unemployed	179 647	527 019	115 652	2 903	1 002 525	9 304	1 011 830
All unemployed	773 855	914 301	204 049	4 848	3 110 938	92 460	3 203 398

Source: own compilation based on Iranian Center of Statistics (2018) data

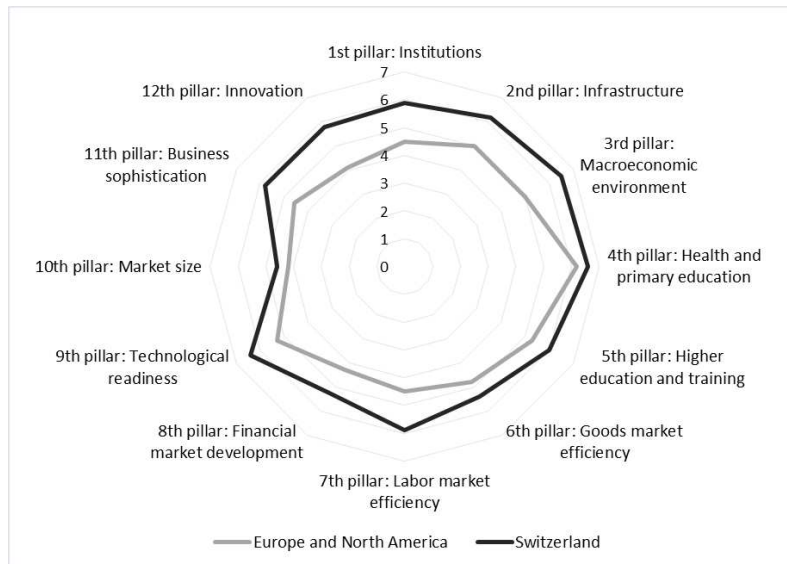
THE GLOBAL COMPETITIVENESS INDEX (GCI) OF IRAN

Competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy (WEF 2013). Switzerland, Singapore and the United States are top-ranked economies in the GCI.

The first place is for Switzerland, meaning that Switzerland had the most global competitiveness power among the 138 countries measured in 2016 (Figure 4). The average score of Switzerland in basic requirements is 6.3, in efficiency enhancers is 5.6 and in innovation and sophistication is 5.8 (Schwab 2016). The graph of the Swiss economy shows a nearly circular shaped picture,

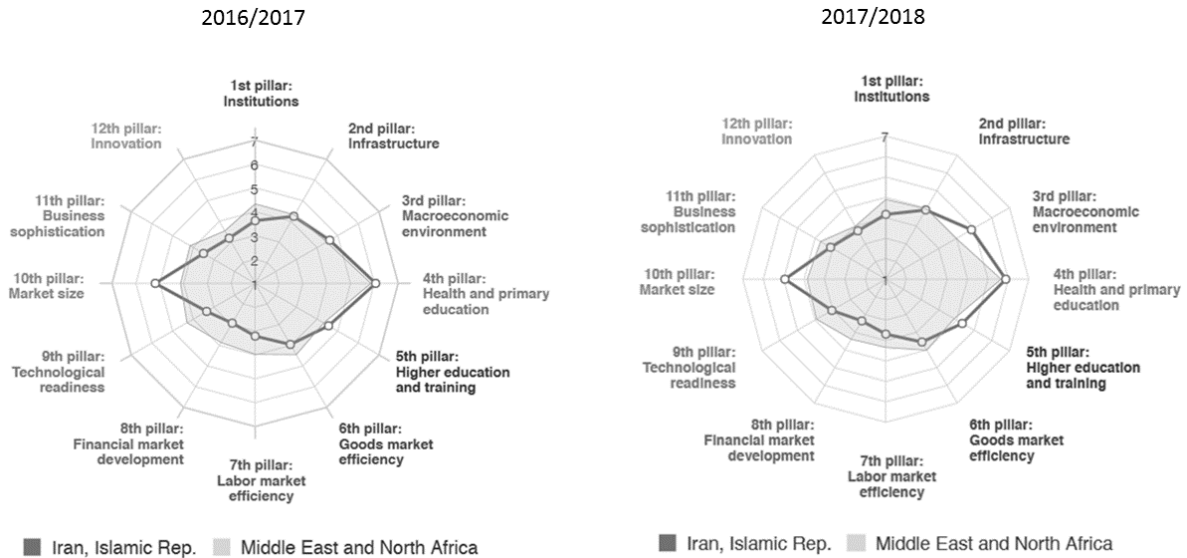
which implies the equal performance of the country in all aspects (cf. Fig. 5).

When analyzing Iran, it is clear that despite the huge income of Iran from exporting oil and gas, the economy of Iran was ranked 76th among 138 countries in 2016 and 69th among 137 countries in 2017 based on its global competitiveness, according to the WEF. The GCI score of Iran was 4.1 in 2016 and 4.3 in 2017 (Schwab 2016, 2017) and no meaningful changes have occurred in the past 2 years. Deeper study on the details of GCI score of Iran reveals that the score of Iran in basic requirements was 4.6 (2016) and 4.8 (2017), in efficiency enhancers 3.9 (2016) and 4.0 (2017), and in innovation and sophistication factors 3.3 (2016) and 3.5 (2017) (Schwab 2016, 2017). It is clear that although Iran possesses the basic requirements to be competitiveness, it suffers from the lack of effective enablers and the innovation necessities to improve its competitiveness. The details of the 12 pillars of GCI are summarized in Fig. 5.



Source: Schwab (2016)

Figure 4. The details of GCI score of Switzerland (2016/2017)



Source: own compilation based on Schwab 2016 p. 206 and 2017 p. 150.

Figure 5. The Global Competitiveness Index of Economy of Iran 2016/2017 and 2017/2018

Table 2
GCI and index components for Iran in 2016/2017 and 2017/2018

Index components	2016-2017		2017-2018	
	Rank/138	Score (1-7)	Rank/137	Score (1-7)
Global Competitiveness Index	76	4.1	69	4.3
Basic requirements	61	4.6	55	4.8
Institutions	90	3.6	85	3.7
Infrastructure	59	4.2	57	4.4
Macroeconomic environment	72	4.6	44	5.2
Health and primary education	49	6.1	50	6.0
Efficiency enhancers	89	3.9	83	4.0
Higher education and training	60	4.6	51	4.7
Goods market efficiency	111	4.0	100	4.0
Labor market efficiency	134	3.2	130	3.3
Financial market development	131	2.9	128	3.0
Technological readiness	97	3.3	91	3.6
Market size	19	5.2	19	5.2
Innovation and sophistication factors	101	3.3	81	3.5
Business sophistication	109	3.5	97	3.7
Innovation	89	3.2	66	3.3

Source: Schwab (2016 and 2017)

The improvements in the third pillar (Macroeconomic environment) are visible, but the other index components show stability or a very small decline (See Table 2).

In the basic requirements, as shown in Table 2, the performance of Iran in primary education and health issues is satisfactory (6.1 and 6.0 out of 7 in 2016 and 2017, respectively) compared to the average of all the Middle East and North Africa countries (Fig. 5). When compared

to other MENA countries (Middle East and Northern Africa), it is visible that the size of Iran’s market is much more favorable than in the neighboring countries.

An important problem for Iran is that the country has not received a good score in the institutions pillar, which refers to governance problems. Table 3 shows the details related to the elements measured in the institutions pillar.

Table 3
Details related to performance of economy of Iran in institutions

Index components of 1 st Pillar	2016-2017		2017-2018	
	Rank/138	Value	Rank/137	Value
<i>1st pillar: Institutions (average)</i>	90	3.6	85	3.7
Property rights	104	3.9	100	3.8
Intellectual property protection	126	3.2	107	3.5
Diversion of public funds	83	3.3	68	3.5
Public trust in politicians	52	3.4	49	3.4
Irregular payments and bribes	92	3.5	83	3.6
Judicial independence	91	3.5	81	3.6
Favoritism in decisions of government officials	49	3.4	46	3.6
Efficiency of government spending	81	2.9	45	3.7
Burden of government regulation	97	3.1	83	3.3
Efficiency of legal framework in settling disputes	76	3.5	76	3.5
Efficiency of legal framework in challenging regs	96	3.0	81	3.1
Transparency of government policymaking	116	3.5	105	3.5
Business costs of terrorism	105	4.5	96	4.7
Business costs of crime and violence	79	4.4	74	4.4
Organized crime	90	4.3	91	4.3
Reliability of police services	73	4.3	71	4.4
Ethical behavior of firms	85	3.6	78	3.7
Strength of auditing and reporting standards	116	3.8	118	3.7
Efficacy of corporate boards	128	4.0	125	4.0
Protection of minority shareholders' interests	117	3.5	110	3.6
Strength of investor protection 0-10 (best)	117	4.0	126	3.5

Source: Schwab (2016 and 2017)

As shown in Table 3, the performance of Iran in almost all components of the institutions pillar were poor in 2016-2017, especially in “Efficiency of government spending” (2.9 out of 7), “Burden of government regulation” (3.1), “Efficiency of legal framework in challenging of regulations” (3.0), “Intellectual property protection” (3.2), and “Diversion of public funds” (3.3) – highlighted by grey boxes in the table. However, in the next year’s report an increasing trend may be detected, especially in the former poorest score “Efficiency of government spending” (Schwab 2016 and 2017). The component “Efficiency of government spending” was called in the 2016 Report as “Wastefulness of government spending” with the same calculation method, i.e. “In your country, how efficient is the government in spending public revenue? [1 = extremely inefficient; 7 = extremely efficient]” (Schwab 2016, p. 371 and 2017, p. 342).

The score of Iran in “Efficiency enhancers” is 3.9 (2016) and 4.0 (2017). This criterion reveals that although Iran has a relatively good performance in the pillar of higher education and training (4.6 in 2016 and 4.7 in 2017), the efficiency of the financial market (2.9 in 2016 and 3.0 in 2017), labor market (3.2 in 2016 and 3.3 in 2017) and goods market (4.0 in both years) is very poor. On the other hand, Fig. 5 shows how poor the technological readiness in Iran is when compared to other MENA countries (3.3 in 2016 and 3.6 in 2017).

Finally, the weakest part of the economy in Iran is in the innovation and sophistication pillar, where the score

was 3.3 in 2016 and 3.5 in 2017. This criterion is measured by two pillars of business sophistication and innovation. As shown in Table 2, the scores of Iran in the business sophistication pillar were 3.5 (2016) and 3.7 (2017) and in the innovation pillar 3.2 (2016) and 3.3 (2017), while innovation is one of the most important factors of any economy.

IRAN IN THE GLOBAL VALUE CHAIN

As mentioned above, the most value-adding stages of global value chain are in R&D and after-sale services stages, while the least value-adding stage is in production. With a simple analysis of the activities in the economy of Iran, it may be seen that Iran is in the production stage of the global value chain curve, and there are many foreign companies in Iran producing their products in Iran. Iran spends USD 0.7 billion on R&D, which is only 0.12% of the GDP, and it is ranked as 50th in world based on the amount of expenditures on R&D. (In comparison, the USA spends USD 473.4 billion on R&D and it equals 2.742% of GDP.)

The Global Innovation Index (GII) published by INSEAD (World Intellectual Property Organization) is an index showing how innovative an economy is (Dutta et al. 2017). According to latest reports in 2017, the GII of Iran reached the score of 32.9 out of 100 and its rank was the 75th among 127 economies. Both the expenditure of Iran

on R&D and the country's GII confirm the present rank of Iran in the Innovation and Sophistication pillar of the global competitiveness (Dutta et al. 2017).

Iran is a country that buys licenses for products, produces them in the country, and in many cases exports them. It is worth mentioning that the production is not done fully in Iran and the companies in Iran only assemble the products. This means that in addition to importing the ideas of the developed countries, Iranian companies buy and import mostly all the parts of the products and just assemble them and export them. This process includes importing the knowledge and ideas and the primary materials and also exporting the final products. Samsung, LG, KIA, Benz and Tata Motors are examples of companies which produce their products in Iran.

Even in the oil and gas industry, in which Iran has a great position in the world, the primary knowledge of this industry has been imported from the other countries. Therefore, it can be claimed that Iran is placed in the lowest part of the global value chain.

DISCUSSION AND CONCLUSION

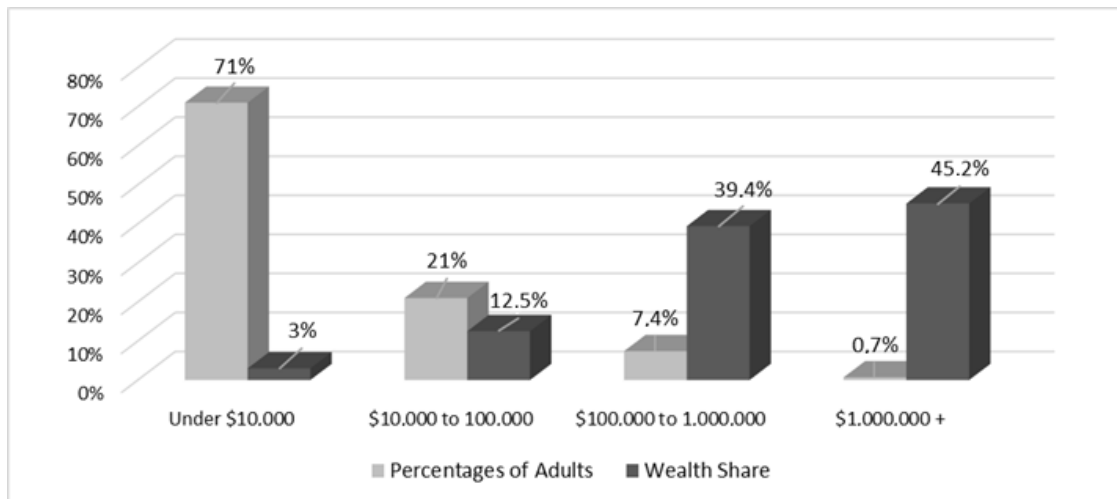
According to the Global Wealth Report, and as it is shown in Figure 6, 45.2% of the world's wealth belongs to only 7% of the world's population and 71% of the world's population has only 3% of the world's wealth (Credit Suisse Research Institute, 2015). In our opinion, in order to obtain wealth, the improvement of an economy but primarily a willingness to change is needed. Although there are countries or international organizations which are

able to help undeveloped countries to develop, the change should be done from inside the economy.

There are different approaches in the literature for economic upgrading. According to Rabelotti (2014), economic upgrading is moving up the value chain. He explains there are two ways to upgrade along the global value chain curve: 1) the efforts of companies and 2) conducive (national/regional/local) innovation and business systems. Gereffi (2005) introduced four strategies for economic upgrading to capture more value in the GVC, which are the following:

- 1) Process upgrading, which can be reached by introducing superior technology,
- 2) Product upgrading, which can be achieved when economies have the superior technological sophistication and quality to produce higher value-added products,
- 3) Functional upgrading, which can be achieved when the economy can provide products or services in new segments or activities of a GVC which are associated with higher skill content and value added. For the economies previously specialized in production, this means becoming competitive in upstream or downstream activities, such as R&D or marketing, and
- 4) Chain or inter-sectoral upgrading, which can be achieved when an economy participates in new but often related industries that produce higher value-added products or services, often leveraging the knowledge and skill acquired in the current chain.

Low (2013) perceived servitization (i.e. moving towards a service economy) as a solution for moving up the global value chain.



Source: Credit Suisse Research Institute, Global Wealth Report 2015

Figure 6. Global Adult Population and Share of Total Wealth by Wealth Group
*The umbers are in USD

Although Iran has good potential and capabilities, such as a young workforce and plentiful natural resources, Iran's economy has been unable to reach a good position in the international economy. Some of the reasons for this are the lack of proper institutions, lack of fitting management and not applying optimal monetary and fiscal policies as a reason for such situation (Alavi et al. 2016). Of course, the non-advantageous political situation also plays an important role in this process.

Instead of focusing only on production and exporting products, the economic activities and political decisions should be focused on developing human capital and creating and exporting ideas instead of products, which represent the lowest value-adding steps. As was presented in Table 1, Iran has a very good potential of highly educated people, but, as presented by Ijim-Agbor (2009), according to the International Monetary Fund in 2009, Iran was ranked as the topmost of the countries losing their academic elite, with an annual loss of 150,000 to 180,000 specialists. These numbers show that brain-drain is a huge problem in Iran, and its roots should be explored in order to solve this problem. Based on the GCI, the score of Iran in "innovation" is 3.2 out of 7, while based on GII the score of Iran in "innovation" is 30.5 out of 100. Hence, it is recommended that Iran spend more on higher education and training to empower reliable human capital who are empowered by cutting-edge knowledge and are able to generate ideas and solve problems independently.

After that, attempts should be directed to providing an environment in which the educated people prefer to stay in Iran to help the economy so that it is able to use its investment in human capital. The score of Iran on higher education and training was 4.6 and its rank was 60th among 138 countries in 2016, while in 2017, the score was 4.7 and the rank was 50th. This indicates that Iran needs to spend more on its human capital, but the main problem in Iran is that the country spends on higher education, but it is not able to use the educated people. There are two main reasons behind this. The first reason is the poor performance of Iran in creating an appropriate economic environment in which the educated people would like to work. The unfavorable political and economic conflicts that Iran faces is the second reason; namely, developed

countries can provide an appropriate environment and good opportunities for the educated people, which leads towards the high level of brain-drain. After empowering the human capital, and improving the business environment, Iran should spend more on R&D to make new ideas and improve the situation of Iran in the global value chain.

On the other hand, Iran has achieved a very poor score in goods market efficiency, the labor market and the financial market. It is recommended that to improve the score of Iran in market efficiency Iran, first of all, should facilitate running business processes in an easier way, as it is very time and money consuming at the present. This might encourage foreign investors to share their value and benefits with Iran. It would be a long process, because at the present Iran does not have a good performance in becoming globalized (the score of the economy of Iran in "prevalence of foreign ownership" was 2.4 out of 7 (2016) and 3.0 in 2017).

It is promising – from comparing the results of the Global Competitiveness Reports of 2016 and 2017 – that in the past year a slight improvement could be detected in almost all indicators. A direct effect of upgrading is that it enhances employment: local subsidiaries hire additional employees who carry out the support activities and the new business functions they become entrusted with. New employees usually have higher educational attainment than production workers, hence upgrading improves quality employment. Furthermore, functional upgrading may facilitate product upgrading and can lead to further blue-collar employment (Alavi et al. 2016).

As a brief summary of the present research, it can be stated that Iran has the potential for becoming a more important player of the international market, as there is a well-based layer of the society with educated people, but at the present, many of them try to find their life goals abroad. The conditions of the macroenvironment are rather unfavorable. The isolation of Iran, stereotypes about Iran and the fragile political circumstances are the main constraints of the way towards development, being present in the international market and being as competitive as would be possible based on the natural resources, and social features of the county.

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Special Ethical and Compliance Issues Regarding Property Valuation Reports: Applicability of Valuations in Responsible Property Investment

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SUMMARY

This paper presents some ethical and compliance aspects of valuations and demonstrates the importance of real estate appraisals in responsible property investment. The basis is fieldwork (interviews with senior Hungarian experts supported by questionnaires) focusing dominantly on the Hungarian practice and experience, combined with a review of the literature. This paper focuses on the operative side of investments: defining a detailed investment process, highlighting the unique features of ethical, responsible investments and then selecting the steps where an independent valuation is necessary and highlighting which aspects of ethical property investment should be supported by appraisals. The aims of this paper are 1) presenting the necessity of valuations, 2) giving examples when the independence of valuations is questionable.

The conclusion is straightforward: independent appraisals are essential in all major milestones, but the independence aspect is critical. There are two practical ways to support this: 1) full implementation of professional standards (in developed property markets) and 2) centralized and common frameworks, rules and some “nudges” established by financial administration (in semi-developed markets like in Hungary).

Keywords: Ethics, Real Estate, Commercial Property Valuation, Sustainability

Journal of Economic Literature (JEL) codes: A13; R33; Q56

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INTRODUCTION

There is a broadening literature on the ethical aspects of investments. Ethical and responsibility-related issues are moving into the mainstream of not only economics as a science, but of daily business as well (De George 2005): there is an increasing trend of funds being invested in ethical instruments and assets (Michelson et al. 2004). From the perspective of sustainability, investing in real estate has greater importance when its social and environmental consequences are considered (Pivo 2007).

From the end of 2007 a unique and deep financial crisis swept over the world. The origin of the scandal was the total collapse of transparent and risk-sensitive real estate investment and financing activity. It was not only a fundamental crisis, where the former asset values depreciated rapidly. There was also a broad ethical aspect

of the entire story: several investment schemes originated and were managed in bad faith, with the purpose of directly misleading the ultimate cash investors, supervisory authorities and customers. How is it possible? Why did investment managers undertake so much risk, even turn to crime, in order to beat the benchmarks and realize a few more percentage points of return? Many questions arose that should be answered from theoretical and practical points of view.

This paper highlights the evidence for the necessity of independent property value appraisals. These reports play a crucial role in the investment process. During the years of the past financial crisis several cases were reported in commercial and investment bank portfolios in which the independence of appraisers or valuations had been questionable. This paper attempts to turn the spotlight on the most common independence issues.

The first section defines some topic-related business categories. In the second section there is a detailed presentation of property investment process. The third part summarizes the main steps of the real estate valuation process and briefly presents the most important contents of valuation reports considering the needs of a responsible investor. In the next section – based on the defined processes – there is a detailed overview of the proper application and importance of valuation reports in responsible real estate investing. In the fifth section there is a short presentation about the findings of the interviews with local market experts. The sixth section overviews the ethical issues arising in connection with appraisals, then offers some proposals for the future, while the final section restates the main conclusions.

SOME BASIC DEFINITIONS OF PROPERTY BUSINESS

Property investment and the related business environment have their own professional wording and definition system. As the profession is somewhere between technical and economic sciences, there is a mixture of phrases and theories originating from engineering and finance. As investment and evaluation activities are strongly based on the classic corporate finance toolset, definitions which are essential for understanding our topic are mainly linked to economics and finance (the basic phrases are presented by corporate finance textbooks, for example Brealey et al., 2011).

RICS Global Standards define *real estate* as “land and all things that are a natural part of the land (e.g. trees, minerals) and things that have been attached to the land (e.g. buildings and site improvements) and all permanent building attachments (e.g. mechanical and electrical plant providing services to a building), that are both below and above the ground” (RICS 2017). As it is a “physical-like” description on buildings and lands, we should differentiate the business phrase *real property*, which is “all rights, interests and benefits related to the ownership of real estate” (IVS 2017). From the business point of view (real) property is a financial asset which represents a long-term cash flow to its holder(s). This cash flow is not only a series of incomes, but also contains costs, expenditures, taxes, duties, etc. relating to operation and holding, moreover the capital expenditures of acquisition, renovation, facelifting, and finally debt servicing relates to the credit lines connected to the given asset. From an analytical point of view we should definitely differentiate commercial properties, which are exclusively used for business purposes, from residential units and serviced apartments (mid- or long-term rented flats). This paper focuses on commercial properties.

In real business transactions the value of a given property is a straight and exact dimension. This is the *transactional price*. Although it seems like a “crystal clear” category and international professional standards –

like International Valuation Standards (IVS) or the professional standards of the Royal Institution of Chartered Surveyors (widely known as the “Red Book”) – define the general principles and technical framework, in valuations the value is rather relative, depending on several aspects, such as time horizon, pressure on stakeholders, methods and chosen approaches of valuation, appraisers’ personal judgments, etc. Although a given transaction price may vary from the value determined by an appraiser (or even that is the default case), it does not definitely mean that the valuation is incorrect. Moreover, there is no exact, “one-over-all-others” value. The standards distinguish several value categories, such as equitable value (formerly fair value), market value, investment value, liquidation value and synergistic value (RICS 2017). For a given property there is a strong correlation and dependence between the value categories; differences mainly depend on the stakeholders’ positions (demands) and the property itself.

There are several groups of stakeholders typically involved in property transactions. The *developer* is an entrepreneur who transforms the real estate from an original physical and business set-up to a completely new status. The transformation is typically an intensive value-adding via a combination of planning, structuring, financing, constructing, letting and operating.

Property *investors* invest funds into pre-developed or finished properties. Some of them are *responsible or ethical investors*, who are not exclusively focused on financial returns, but also consider the consistency of the investment case with their personal values (Webley et al. 2001; Michelson et al. 2004). Pivo argued that ethical investments are being driven by business considerations: “concern for risk and return is the biggest driver, and fear of insufficient financial performance is the biggest impediment to doing more” (Pivo 2007, p 248).

Financers (typically commercial banks) are the institutions that are co-financing the equity owners (developers and investors) with senior mortgage loans. *End-users* are the companies who are the tenants or lessees of the commercial properties and facilities. Real estate valuers (appraisers) may be engaged with delivering property valuations in order to support the decisions of stakeholders, especially in risk undertakings. The valuer who has no material links with the client assigned him with the valuation, an agent acting on behalf of the client or the subject of the assignment (RICS 2013).

THE COMMERCIAL REAL ESTATE INVESTMENT PROCEDURE

A typical property investment life-cycle can be divided into three phases.

1) Pipeline building and acquisition

1.1 Indicative negotiations between the seller and the buyer: based on general, non-sensitive information

parties are trying to reach a non-binding agreement on the terms of the transaction.

- 1.2 Due diligence initiated by the buyer: to understand the business potential and the risk profile of the given real estate the buyer concludes a detailed tax, financial, legal, sustainability and technical analysis (“due diligence”). As part of this understanding the buyer engages an independent specialist to deliver an in-depth analysis on the property value.
 - 1.3 Binding negotiations: based on the findings of due diligence, parties finalize the deal.
 - 1.4 Fund raising: parallel to these activities, the investor is raising funds (equity, loan) to finance the purchase. Financers are doing their own analysis: for example, banks may hire another valuer to consider the liquidation aspects of the given asset - standards do not totally accept this value dimension, but there are principles regarding the forced sales of assets (IVS 2017).
 - 1.5 Internal decision: based on the negotiations, the findings of the due diligence and the ultimate terms of funding, the investor has to conclude its own internal (investment committee) decision.
 - 1.6 Closing: concluding the arrangement, signing the contract.
 - 1.7 Post-closing and takeover: after the closing the buyer takes over the real estate (ownership rights, operation and correspondence with the end users). Inputs for this step are directly derived from the due diligence and the transactional documents.
- 2) Portfolio management
 - 2.1 Regular reviews and reporting: investors review the performance of their assets on a regular basis and report the most important facts and forecasts to the financers. The basis of the reviews is internal controlling and regularly provided value appraisals.
 - 2.2 Screening: this is the practice of including or excluding assets from the investment portfolio on sustainability criteria (Michelson et al. 2004).
 - 2.3 Ratings and revaluations: Based on reviews and the extraordinary affairs decision-making bodies of investors regularly rate the portfolio items and in

justified cases they decide on raising provisions or write-off. There is always at least one supporting independent valuation behind the decisions for reasons of transparency and independent governance.

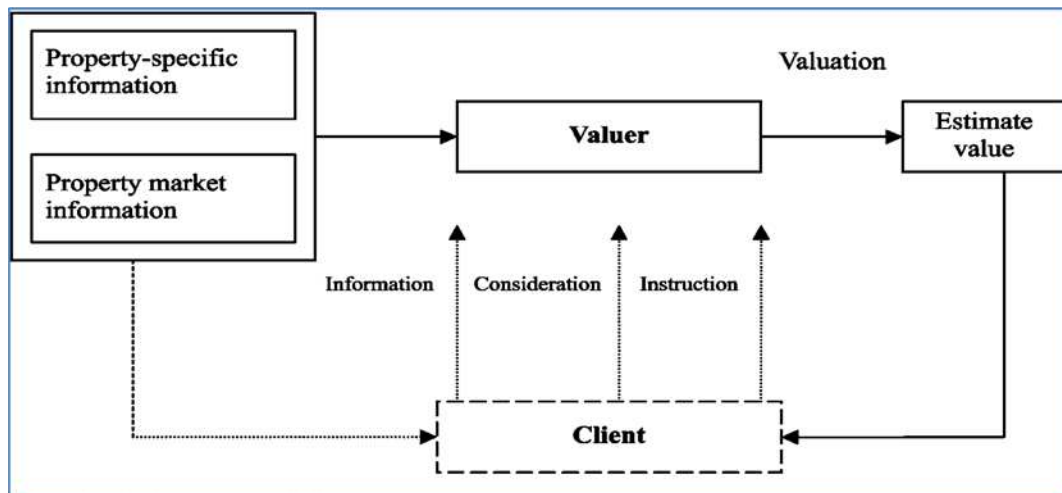
- 2.4 Decisions on exit or recapitalization: The main decision-making bodies of investors decide on exit or refinancing (releasing some part of invested funds). A supportive appraisal is a script to set up and manage the expectations regarding the terms of exit and cash release.
- 3) Exit transactions

Similar steps should be taken as in acquisitions (instead of fundraising there is a need for repayment or reallocation of funds).

SIMPLIFIED OVERVIEW OF THE REAL ESTATE VALUATION PROCESS

As we can see from the list above, one of the most critical foundations of any part of the investment process is the independent property valuation. Appraisal is not only a detailed presentation of the given asset, but a transparent support for all material business decisions. Because of this, it is more important for ethical than traditional property investors, as responsible investors prefer to follow a transparent way of doing business. Responsible investment is the integration of personal values, social considerations, ethical values and business factors into the investment decisions, in which transparency and long-term feasibility are very important, and – as Michelson team argued – “there is considerable benefit in an approach which treats ethical investment as a process and examines all the connections and disjunctions that take place within this process” (Michelson et al. 2004), p 8.

Chen and Yu (2009) published an expressive figure on the valuation environment (Figure 1). Although property and market information is obvious and clear, the valuer is receiving information from not only external sources, but from the client (investor and/or financer), which may be a source of misunderstanding, misstatement or even influence.



Source: Chen & Yu 2009

Figure 1. Valuation environment

The practical but rather strict framework of the International Valuation Standards provides a detailed manual on the valuation process and contents of the valuation report (IVS 2017).

- 1) Scope of work: The scope of the valuation engagement must be confirmed before all other steps.
- 2) Material topics to be covered: (1) Identification and status of the valuer, (2) Identification of the client and any other intended users, (3) Purpose of the valuation, (4) Identification of the asset or liability to be valued, (5) Basis of value, (6) Valuation date, (7) Extent of investigation, (8) Nature and source of the information to be relied upon, (9) Assumptions, (10) Restrictions on use, distribution or publication.
- 3) Implementation: This part of the process covers the preparation and analytical work.
 - a. Investigations: inspection, inquiry, computation and analysis.
 - b. Considerations about the appropriate valuation approaches (market, income or cost approach).
 - c. A valuation record shall be kept during the investigations.
- 4) Reporting: The final step in the valuation process is communicating the results of the assignment to the commissioning party and any other stakeholder. The purpose of the valuation, the complexity of the property being valued and the users' requirements will determine the level of detail appropriate to the valuation report.

Material contents of a report: (1)-(10) same as at Scope of work, (11) Valuation approach and reasoning, (12) Value amount, (13) Date of the valuation report.

Austin gave a similar process map splitting the total procedure into eight steps (Austin 2012):

- 1) Identification of the problem,
- 2) Scope of work determination,
- 3) Data collection and property description,
- 4) Data analysis,

- 5) Site value opinion,
- 6) Application of the approaches to value,
- 7) Reconciliation of value indications and final opinion of value,
- 8) Report of defined value.

This segmentation is very similar to the above presented IVS framework: the first two steps are in line with "Scope of work", steps 3 to 6 match "Implementation", and finally step 8 is exactly the "Reporting". The remaining step 7 is a bridge between investigation and value reporting as "the purpose of the final reconciliation process is to resolve the differences among various value indications, to reveal conflicts or unresolved questions, to provide a quality control assessment of the valuation process, and to identify key factors that should be cited and explained, or elaborated upon, within the appraisal report" (Austin 2012, p 104).

APPLICATION AND IMPORTANCE OF REAL ESTATE VALUATIONS IN RESPONSIBLE PROPERTY INVESTMENT

Long-term focused (responsible) investors and financiers are strongly dependent on the findings of the appraisal – business factors, technical and operational remarks, sustainability statements, etc. As responsible property investors make efforts that "go beyond compliance with minimum legal requirements to better manage environmental, social and governance issues" (Pivo 2007, p 235), this means that all issues raised by the report may have a huge impact on not only the risk and earnings profile of the books of investors and financiers, but also on the sustainability criteria fulfillment of the given real estate.

As Vanags and Butane (2013) noted, as the demand for sustainable real estate is increasing, fairly stated due diligence has to consider the impact of sustainability. They highlighted that the biggest challenge is “the integration of sustainability considerations into the determination of model input assumptions” (Vanags – Butane 2013, p 1227). When assessing the influence of sustainability on value, analysts and appraisers have to evaluate the qualitative nature of their work and improve efficiency by carrying out a sustainable property financial analysis. Its main steps are the following:

- 1) selection of a financial model,
- 2) evaluation of property sustainability,
- 3) assessment of the costs/benefits of sustainability,
- 4) evaluation of the financial simplifications of costs/benefits,
- 5) determination of the financial model inputs,
- 6) concluding a risk analysis and
- 7) presentation (Vanags & Butane 2013).

Michelson and his team found that transparency and the disclosure of all relevant information are important considerations for responsible investors (although these lead to higher transactional costs and fees) (Michelson et al. 2004). Pivo (2007) argued more generally that stakeholders could implement responsible property investments through better reporting, disclosure, location and leasing decisions. He gives concrete proposals regarding responsible property investment (RPI):

“Lenders can incorporate RPI criteria into their underwriting processes. Asset owners can assess their portfolios for social and environmental performance, and ask fund managers to incorporate RPI principles into their investment mandate. Fund managers can increase allocations to property types that are associated with greater social or environmental benefits (...). Asset and property managers can implement RPI by improving the eco-efficiency of properties, using fair employment practices, hiring from locally underemployed groups and engaging in other community programs. Developers can create projects that adopt socially and environmentally considerate construction practices, create greener properties, target underserved areas and communities, and incorporate stakeholder consultation through the development process.” (Pivo 2007, p 237)

Based on these statements and the investment life-cycle detailed above, we can conclude that appraisals have a crucial effect on roughly all steps of the investment procedure. In transactions (acquisition, exit, refinancing) one of the most important outputs of due diligence is the property valuation. From either the investor’s or financier’s point of view, stakeholders consider their position compared to the value determined by the appraisal. In portfolio management activities regular valuations are necessary for reviews (either on the investor’s or financier’s side), while all one-time decisions must also be supported by appraisals. Moreover, for responsible investors the valuation is even more essential, because

- a) the report helps in understanding the current sustainability status and future environmental and social aspects of development possibilities of the examined property,
- b) the content of the valuation is also useful for the reduction of the real estate’s ecological footprint,
- c) the report helps them in the screening process,
- d) responsibility requires transparency (towards all stakeholders) and the proper presentation of investment decisions – the *independent* appraisal is definitely a proper tool for demonstrating transparency, in line with Michelson’s argument.

As noted earlier, there is a tendency for some of the investors to behave, think and work responsibly. In parallel there is another trend: not only are investors becoming more responsible, but the asset values are becoming more dependent on responsibility issues. As markets become more sensitized to sustainability matters, these factors begin to complement traditional value drivers, both in terms of real estate end-user and investor behavior. Sustainability covers a broad range of economic, environmental, social and physical factors that may impact property value and of which appraisers should be aware (RICS 2013). Although the literature and institutional valuation frameworks emphasize the importance of sustainability, the interviewed experts felt that sustainability and environmental issues are not relevant in transactional practice in Hungary.

INTERVIEWS WITH LOCAL MARKET EXPERTS

A non-representative expert sample was selected based on the author’s professional experience in the property business: 15 professionals with significant track records and market knowledge, all of them with at least 10 years of experience in the Hungarian property market. Eight interviews were performed, all supported by short questionnaires. Among the interviewees were regulators, consultants, investors, financiers, and valuers. The following topics were discussed:

- 1) ethical issues in property valuation engagements,
- 2) ethical issues in property transactions,
- 3) legal background, self-regulation of market players on domestic and international levels, responsibility and accountability within property valuation and property investment business lines.

The questionnaires consisted of 23 statements in 4 groups. Interviewees were asked to rate the statements on 5-point Likert scales. Based on the evaluation of questionnaires some relevant opinions formulated:

- 1) Soft client influence is a serious problem in valuation engagements, partly due to the inefficient regulation background.

- 2) Conflict-of-interest situations either on the client's or the valuer's side is a rather ordinary issue, while legal background and internal rules are insufficient.
- 3) Both transactional parties (seller and buyer) are open to cooperating "against" financiers or other stakeholders, even to the point of misleading them by fake conditions, representations or disclosures.
- 4) Ordinary and extra-ordinary information disclosure to stakeholders is not a usual part of the daily business routine in Hungary.
- 5) Risk measurement and structuring of sustainability issues in property transactions do not meet the international standards.

LESSONS LEARNED – ETHICAL ISSUES REGARDING VALUATIONS AND PROPOSALS FOR RESOLUTION

All investors and professional experts know that even after the most accurate and sophisticated valuation process the output (not only the value, but the related assumptions and calculations) can spread around the practical facts (transactional price). This is a part of the "ordinary business". Sometimes spreading tends to be rather a valuation error, but institutional controls such as counter opinions, regularly repeated valuation reviews and the international valuation frameworks presented here are able to minimize the risk of valuation errors (IVS 2017).

Therefore, the most important issue is not the value spreading, but the damage to objective and fair characteristics of the valuation. If independence, competency or ethical behavior of valuer is questionable, than the responsible status could be damaged.

Jonathan A. Knee's bestseller book gives a sadly smart phrase on the irresponsibility and unethical professional advisory activity. The author worked as an investment banker responsible for arrangement of initial public offerings ("IPO" or stock market launches) advisory mandates. The investment bankers always have deep (internal) understanding about of the offered securities. Because of income maximizing they did not disclose all relevant information precisely and honestly in some risky cases. If they hesitated doing these, someone always noted that "IBG YBG". "I'll be gone, you'll be gone" meant that there was nothing to worry about: in a few years everyone would leave for sure (Knee 2008, p 18).

Unfortunately, a similar approach can be found in thousands of property investment transactions. Fund managers, debtors, creditors, valuers: lots of institutional players are interested in blowing up the bubble. This section gives a short overview on the ethical issues regarding value appraisals, then tries to propose some development in order to avoid ethical problems and enlarge the possibility of a responsible attitude.

The most important topic in this field (as reported by the Hungarian experts) is the management of the valuers'

competence and conflict of interest situation. RICS framework precisely regulates the topic in a major professional standard. Independence and objectivity are demonstrated to be the most important criteria. They prescribe detailed rules on competence: practical experience and adequate technical knowledge are needed before the individual (member) valuer may accept an assignment (RICS 2017).

The framework takes into account that it is impossible to provide a definitive list of situations where a threat to a valuer's independence or objectivity may arise (but it provides some examples on conflict of interest situations). Valuers should reflect on the general conflict of interest principles and their spirit. There is a defined basis rule: valuers "shall at all times act with integrity and avoid any actions or situations that are inconsistent with their professional obligation. Where a conflict, or potential conflict, is identified, consideration has to be given as to whether the instruction should be accepted or declined. To provide an audit trail, a note of all conflict of interest checks and their resolution must be retained with the working papers." (RICS 2014, p 20) Besides detailed documentation there are some concrete proposals on appropriate handling such as

- rotation policy: arise where the valuer provided a series of reports over a period of time – familiarity with either the portfolio or the client could lead to the perception that valuer's independence and objectivity has been compromised,
- disclosure policies on (1) previous involvement, (2) proportion of fees payable by a given customer relative to the total fee income of the valuer's firm, (3) status, knowledge and skills of valuer, (4) extent of investigation, (5) the valuation approach(es) chosen by the appraiser, etc. (RICS 2017).

If a conflict of interest situation is not managed successfully for any reason, than there is much more room for *client influence*. Chen and Yu (2009) researched this topic in Singapore and Taiwan, but in their paper they review the related literature which examined also the markets in New Zealand and the United States. Although valuers definitely should be honest, unbiased and independent when undertaking valuation engagements, as "valuation is not only a science, but also an art", this allows appraisers the opportunity to be influenced by clients. Chen and Yu gave several examples of client influence in the study, such as opinion shopping, comparatives supporting (property of a similar function, in a similar location, etc., whose value may indicate a benchmark value), method suggestion, value indication (all by the client) or submitting a draft value (by the valuer – permitting the client to review the draft report prior to formalization; submitting some outcome of valuation before its completion is qualified a high risk to the valuer's objectivity (RICS 2013)). The authors found that professional clients preferred to influence the valuation by changing circumstances, data or calculations, while clients

who are not familiar with valuation industry simple use “further business or no business” threats (Chen - Yu 2009). The aim of influence could be to support a transaction near to closing, to overfinance an investment from a credit line or to optimize the equity and provision behind existing portfolios.

The local experts interviewed in this study added some more interesting forms on client influence: on occasion a client simply does not pay the valuer’s invoice after receiving a value not in line with his expectations, or a (more sophisticated) client asks the valuer to use special assumptions in the calculation which influence the approach or directly the value.

Insufficiently covered or documented due diligence and poorly recorded valuations also affect the position of investors, especially responsible ones. If internal or external (audit) monitoring raised this issue, then it would mean negative impact on holding the given asset in the portfolio.

Although there are detailed guidelines for assessing buildings’ sustainability characteristics (RICS 2013), *insufficient disclosure of sustainability issues* may also impact responsibility status of investment – as the interviewed experts reported.

After the above review the most common ethical issues, I would like to put forth some practice-based proposals and highlight some new implementations to show alternatives for broadening the basis of responsible, ethical property investing activity.

1) *Long-term incentivized senior staff in financial institutions*: Although there are some dividend-linked benefits in commercial banks, the majority of the senior officers do not depend on the long-term performance of their employer. Typically, commercial banks have no long-term incentives which are also connected to the sustainable financial performance of the asset portfolio. There are some well-known case studies about the motivation systems and corporate culture of the international financial institutions; some examples are presented by Knee and by Ho (Knee 2008, Ho 2012).

The requirement of proper allowance system explicitly means that the basis of bonus benefits would not rely only on the change in share price or return-on-equity (ROE) ratio (or another similar financial key performance indicator), but also a measured ratio would be calculated on assets’ externalities. Leading human consulting professionals are keen on supporting companies in implementing long-term remuneration and bonus programs, but rarely active in launching systems linked to the long-term interest to all or the majority of the stakeholders of the given entity.

Similar to the reconsideration of top-management remuneration policies at state-owned recapitalized commercial banks, this long-term based, socially

intensified system could be launched by a centrally motivated or even regulated campaign.

- 2) *Strict regulation of conflict of interest situations for valuers*: As presented above, in case of valuations one of the hottest and most frequently arising issues is the compliance status of the appraiser experts. Responsible investment activity requires objective, transparent and independent work from the engaged consultants. Based on the interviews and my personal experience, only the multinational real estate companies (whose experts are members of international associations like RICS, meaning these strict standards are obligatory for them) manage conflict of interest issues professionally. In order to incentivize the competition between valuer firms and take into account the long-term interest of the public, there should be strict conflict of interest regulation for the whole valuation industry (generally speaking for the whole advisory business). Hungarian experts noted in the questionnaires that while the international professional standards for compliance issues work properly, the local Hungarian regime and the practice of market players are rather poor.
- 3) *Importance of back-testing, control, quality assurance and official feedbacks*: Although international professional organizations give prominence to backtesting, which is the basis of quality assurance, the local practice is rather underdeveloped. Even privately owned institutional players were damaged because of a series of poor valuations. A centrally oriented and supervised quality assurance system is still missing, although in the recent times central banks have launched regular stress test focusing on the equity situation of the financial industry. There were some campaigns initiated by European Union based regulators (ECB 2016), but based on my interviews and personal professional experience there is still much room for improvement in the field of supportive feedback in order to develop valuation framework.
- 4) *Centralized database on property prices with easy access*: There is no properly working integrated database of Hungarian property values. There were some common efforts by international advisors to build up a database focusing on frequently traded commercial real estate sub-segments, but as big market players and authorities are building separate databases so far there is no overall, transparent and easily accessible database (details are reviewed and recommendations by Burczi et al. 2017). The lack of transparency means higher uncertainty in valuations and due diligence, leading to lower commitments and risk undertakings and/or higher required rate of return from responsible investors. This situation could be improved if the tax office and network of land registries could cooperate and gradually built up an integrated database (preconditions are reviewed by Burczi et al. 2017). Beside the improvement of the investment environment it would encourage the monitoring functions and the tax collection practice.

Properties are very similar to ordinary financial products. Due to consequences of the financial crisis several central banks and regulatory authorities have been launching transparent and easy-to-use database or benchmarking systems for loan, deposit or insurance products. Similar projects have been initiated by financial regulators but thanks to the different products and not perfectly comparable items, the implementations and even the outcomes are being realized more slowly. In Hungary the National Bank is implementing a centralized property database in order to be able to monitor property-linked positions of local commercial banks. A new database focusing on residential properties has already been launched (Vágó & Winkler 2016).

CONCLUSION

This paper outlined some issues of responsible property investment and the related real estate valuation process. First short overviews on the investment activity and the basic concepts of property valuation were presented and the two topics were connected with the application of valuations in investing practice, especially focusing on the special requirements of ethical investors. In the last part of the study special topic was highlighted regarding valuations: the issue of compliance, conflict of interest and client influence. The reason behind this choice is that without institutional and practical solutions for these

ethical issues, transparency is unable to reach the critical level that is essential for broadening the basis of responsible investing activity and generally the ecosystem of responsible investments.

The findings of this qualitative research support the outcomes of studies in other countries. Failure of independence (even partial) and conflicts of interest are important risk factors. While in the most developed markets the strict fundamental and ethical standards of professional institutions are adequate tools for guidance and monitor, Hungarian practice shows a different example because of inefficient regulations.

Finally presenting some further research possibilities of the topic:

- 1) research and testing of the proposals – e.g. comparative analysis of different benefit systems of financial institutions,
- 2) qualitative research with case studies about compliance, fraud, and associated regulations,
- 3) a practice-based proposal supported by international examples for the Hungarian property price database (e.g. Burczi et al. 2017),
- 4) a comparative analysis of regulation regimes in different markets and professional property valuation standards,
- 5) a market study about the demand for investment funds restricted only to ethical investments (yield comparison, governing rules, etc.).

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Impact Studies of Regional Effects of Research Infrastructures: Economically Concentrated or Multidimensional – Approach of a Holistic Evaluation Model

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SUMMARY

This article shows the current focus of impact studies of regional effects of research infrastructures in German. A literature review clarifies whether these studies concentrate on economic effects or assume a multi-dimensional perspective. Furthermore, it will determine where there is still a need for research in the evaluation of infrastructures and which effects are still of interest to the regional impact of a research institute. Based on this analysis, a first approach to the multidimensional evaluation of research infrastructures is presented. The evaluation investigates not only economic effects of research infrastructures, but also new knowledge effects (e.g. project innovation type), political effects (regionality of projects), and cultural effects (e.g. anchoring in the cultural memory). The general objective is to highlight the positive impact of a research infrastructure on the region (the associated federal state) and to expand the examined aspects of previous studies.

Keywords: research infrastructure, regional effects, economic effects, knowledge effects, social effects

Journal of Economic Literature (JEL) codes: I23, I28, O31, R12

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INTRODUCTION

Research occupies an important position in a future-oriented society. The rising research expenditures express the importance. The German government's goal of investing three percent of Gross Domestic Product (GDP) in research and development (R&D) was achieved for the first time in 2015 (BMBF 2017, p. 8). With an increase of 9.5% (to 62.4 billion euros), in 2015 German companies invested more than ever in their own research and development (BMBF 2016).

Within Germany, regional research expenditure and the share of GDP expenditure are very different, suggesting a significant difference in the economic and industrial structure of the regions (BMBF 2017, pp. 13–14).

The economic structure in Germany is divided into the manufacturing sector (including the construction industry) and the service sector (Statistische Ämter der Länder 2017a, p. 3). These two account for almost 100% of the

economic structure in the federal states. The areas of agriculture, forestry and fisheries can explain a possible difference (in total a maximum of 1%). On a nationwide average, the distribution is 30% for the manufacturing sector and 69% for the service sector (Statistische Ämter der Länder 2017a, p. 3).

Further indicators describing a difference in the economic and industrial structure among the federal states are e.g. the investment ratio as well as the economic performance and growth (Statistische Ämter der Länder 2017b, pp. 24–25). Economic performance and economic growth are directly related. The economic growth also increases if the economic performance in Germany is better. However, the economy in the federal states is growing to varying extents. In 2016, Germany's total economic output amounted to EUR 3,133 billion, an increase of 1.9% over the previous year (Statistische Ämter der Länder 2017a, p. 7).

Small and medium-sized enterprises (SMEs), in addition to large companies and corporations, are particularly responsible for performance and growth. Out

of more than 2.4 million businesses [sections B to N (except K) and S95 of the WZ 2008 (classification of industry)] in Germany, 99.3% are in the SME category, 60.7% of the total workforce is employed (or more than 15.5 million) by SMEs, account for 33.3% of the overall turnover of Germany (Destatis 2018; Söllner 2014). The share of SMEs in the federal states is similar to the national average. The same applies to the shares of micro, small and medium-sized enterprises in all SMEs in the respective countries. However, the absolute number of large companies in the federal states differs considerably (GENESIS-Online Datenbank).

The evaluation of investments in a small economic structure with low R&D expenditures is particularly important. Research infrastructures occupy an important position in the innovation system. The Wissenschaftsrat defines research infrastructures as follows: "*Research infrastructures are understood to be those which are in part public or private, specifically built for scientific purposes, medium to long-term, and for their proper construction, operation, and use, specific scientific or interdisciplinary (Method) competencies are required. Its function is to facilitate or facilitate research, teaching and the promotion of young researchers. They are locally fixed, distributed over several locations or are only provided virtually without a defined physical contact point. They are not used exclusively by individuals or groups, but are in principle open to an international professional community or several professional associations. A research infrastructure always includes specially qualified personnel that facilitate or facilitate the use of researchers, teachers and, in some cases, students. Likewise, there are always general infrastructures such as buildings, power supply networks, operating software and the like.*" (Wissenschaftsrat 2011, p. 17, translated by author)

The following literature review shows which objects and which effects are of interest in the previous studies.

IMPACT STUDIES OF REGIONAL EFFECTS OF RESEARCH INFRASTRUCTURES

This evaluation of studies on regional impacts of research infrastructures is limited to the German-speaking area and includes literature from the year 2000 onwards. The limitation of literature to the German-speaking world is mainly because the German research landscape is unique with its R&D activities in industry, public research (universities, research organizations, academies, etc.) and intermediate research (German Research Foundation and other foundations). In addition, due to the public funding of many research infrastructures, there is great interest in assessing the impact of these facilities.

Regional effects are effects attributable to a specific spatial category (city, municipality, economic region of

the federal state). These effects can be direct, immediate, indirect or induced. Direct effects occur in a company. Immediate effects arise through supplier relations of a company. Indirect effects arise from suppliers' supplier relationships. Induced effects are multiplier effects (definition according to Schasse et al. (2016, p. 20)).

Following the example of Emrich et al. (2013) and Stoetzer and Krähmer (2007) and own supplements, it was possible to provide an overview of the literature on the evaluation of regional effects. Due to the lack of space, discussion here is limited to four important sources.

The Economic Importance of the University of Kassel for the Region of Northern Hessen

This empirical analysis of Beckenbach et al. (2011) is based on the impact studies of Blume and Fromm (2000a), Blume et al. (2001) and surveys of Daskalakis and Kauffeld-Monz (2007), and Daskalakis et al. (2008). The investigation of the effects takes place here in the categories of input and output analysis. Direct regional effects of the input are determined with regard to personnel, material and construction expenditure as well as consumption expenditure. With an input-output analysis and a developed coefficient matrix, the indirect effects of the expenditure are determined. The output effects of a university are well-trained graduates, the generation of knowledge as well as the transfer of knowledge and the spin-offs from the university. Finally, Beckenbach et al. analyze the relevance of the research facility to regional companies. Under relevance here assessed the perception of the university by companies in the region, compared the innovation-specific specifics of the companies and the appreciation of the university, and examined the innovation-relevant characteristics of the spin-offs.

The study shows that a university makes a significant contribution to shaping the region. The economic effect on the output side (with regard to the spin-offs) is the largest.

Regional Economic Impact of Public Research Institutions in the Region of Basel and Northwestern Switzerland

The work of Haisch (2008) analyses the income, employment and tax effects as well as the effects of the transfer of knowledge of a university and a technical college in Switzerland. The systematization of Engelbrech et al. (1978) is applied and the two research institutions are examined with regard to the provision of services and the output.

The performance is determined using a (Keynesian) multiplier analysis to assess the impact of a single organization on an entity (a region). In addition, expenses of a research institution are direct effects and the effects of demand on suppliers are indirect effects. Making knowledge available to a wide public and innovations that optimize products and processes are the output of a

research institution. Theoretical considerations and the interviews of research groups of both institutions make the transfer contribution of a university clear.

The results show large economic importance and strong influence on the innovative ability of regional enterprises by the university. The indicators of regional anchoring offer good starting points for further work.

Universities as a Regional Economic Factor

This study of Schubert and Kroll (2013) examines the activities of higher education institutions in terms of their economic impact. The main impacts are "GDP per capita, unemployment rate, available per capita income and regional per capita patent revenue" (Schubert and Kroll 2013, p. 4). Effects that, above all, have an economic background and do not take into account comparative perspectives such as non-investment or alternative investments.

The methodology relies in particular on regression procedures to convey regional outputs through the local activities of higher education institutions and so-called fixed-effects panel data models. The calculations are made on the basis of absolute numbers and not on data with a specific reference to a particular university. By summarizing all higher education institutions in the federal state, the determined effect in a region is given as a derivative and aggregated value. The definition of region types makes structural differences of the regions / federal states clear.

This survey finds either a positive effect or a non-negative contribution to all the above aspects, e.g. an increase in GDP, a reduction in unemployment and an increase in patents, as along with non-significant change in the disposable income in all federal states. With the help of this analysis, the basis of legitimacy of universities is extended and substantial implications (for East Germany and university investment decisions) can be made.

The Contribution of the Fraunhofer Gesellschaft to the German Innovation System

This study by Frietsch et al. (2016) introduces the Fraunhofer Gesellschaft (in the further course Fraunhofer) with another approach to measuring the contribution of a research institution. The systemic perspective assesses the impact on the German innovation system.

This analysis examines the levels of innovation, microeconomics and macroeconomics, highlighting the often difficult-to-see effects of Fraunhofer. The participation of Fraunhofer in the development of technology (lines) takes place in the innovation-economic

perspective with the help of expert interviews. Above all, the microeconomic perspective deals with the effect of cooperation and sets the matched-pair approach, which uses a "statistical twin" and certain control variables to compare success between cooperating companies and non-cooperating companies (Frietsch et al. 2016, p. 49). In the course of the macroeconomic observation level, the economic contribution of Fraunhofer is measured and identified on the basis of merged data from internal sources as well as from the Federal Statistical Office (DESTATIS) and subsequent application of panel data econometrics.

The result of this study shows the significant support of Fraunhofer within the German Innovation System. In addition to application-oriented research, Fraunhofer Institutes make direct and indirect contributions to strengthening the system. Essential here are the economic factors identified here, which detect a positive difference between monetary effects and investments in Fraunhofer. In addition, Fraunhofer helps to implement political goals and the internationally oriented training of young scientists.

Summary of the Studies

There are a large number of scientific papers in German-language literature dealing with the significance, charisma and contribution of public research institutions, especially universities and colleges. At first glance, the existing methods focus on assessing the regional economic contribution. That other aspects such as the infrastructural, cultural or social impact of institutions are more likely to be left out (Haisch 2008, p. 18; Beckenbach et al. 2011, p. 6).

Few sources of literature deal with a single research institute and its regional impact. "The empirical research on the demand effects of scientific institutions has so far been characterized by a large number of case studies on individual German universities [...] Publicly funded research institutes have rarely been included in such studies." (Franz et al. 2002, p. 15) The studies are primarily concerned with the economic impact of research infrastructure and thus confirm the first impression.

In most cases, economic effects include not only the effects of service provision (input), but also the effects of output and thus knowledge transfer as an economic parameter (Blume and Fromm 2000a, Pavel 2008, Schubert et al. 2012). Knowledge as an essential competence of research infrastructure is often an economic factor. This approach does not only understand knowledge as an economic aspect and has therefore added this category to Table 1, which gives the impact categories and effects of research infrastructures.

Table 1
Effects of research infrastructures

Category	Effects
Economics	Influence on regional income, labor market, economic structure, labor mobility, location decisions
Knowledge	Effects on knowledge networks, knowledge transfer, dissemination of knowledge, integration into networks
Politics	Changes in the political structure, increased public participation, better organization of political processes
Demography	Effects on population size, structure and mobility
Infrastructure	Effects on the housing market, traffic, medical care, volume and density of shopping
Culture	Greater supply and demand for cultural assets, impact on cultural climate
Education	Impact on educational participation and quality of (higher) education
Social	Effects on the quality of life, influence of students, influence on regional identity, image
Ecology	Influence on the consumption of land and of other natural resources, use of the environment, influencing the handling of nature

Source: Haisch 2008, p. 18 and own additions

This table shows that there are other effects of research infrastructures in addition to the frequently examined economic effects. Typically, they do not appear directly, not in the first round of action, and certain effects only set in after a longer period. In the further course of own research activities, we therefore try to develop a procedure model and concepts for the evaluation of most effects. The status will be shown in the next section based on the literature review and my preliminary evaluations.

REGIONAL EFFECTS OF RESEARCH INFRASTRUCTURES

A region is a "cohesive geographical area of mostly medium order between aggregated economy and disaggregated spatial points (localities) as marking a particular scale of spatial analysis" (Haas and Neumair 2017).

Contiguous areas may evolve depending on cultural (e.g., language), economic (e.g., currency), or agricultural attachment. At the political level, federal states divide regions. They are places of living, work, leisure and can change quickly in terms of time and space (Sposito and Faggian 2013). The systemic link between a region and a

research institution is diverse. In addition to their primary role, the research organization assumes responsibility on many levels and influences it in different ways (Haisch 2008, p. 17).

Economic Effects

Regional demand effects of personnel expenditure

The personnel expenses of a research institution change over time and depend on the number of employees. As a result, the direct demand impact of staff spending over the years evolves. The regionally effective demand results from the previously calculated consumption expenditure and the regional consumption quota. The place of residence of the employees mainly determines the regional consumption rate. There is a direct correlation between regional demand and place of residence, as the greatest demand for goods and services arises at home. So, the higher the proportion of employees residing in the region, the higher the regional consumption and demand.

Another place of consumption is the workplace. The regional consumption rate increases if the workplace is in the same settlement. The outputs outside a region, e.g. while on vacation, are comparatively low, but must not be

neglected (see for example Haisch 2008, Beckenbach et al. 2011, Schubert and Kroll 2013).

Regional demand effects of property and construction expenditure

In contrast to the demand effect of the personnel expenditure, the material and construction expenditures become directly inquiry-demand and can be found out over the addresses of the suppliers/service provider (see for example Haisch 2008, Beckenbach et al. 2011, Schubert and Kroll 2013).

Influence on regional economic performance

By combining internal company data with regional economic data, the research organization's influence on regional economic performance can be determined. Thus, among other things, it is possible to calculate the tax multipliers of the financial volume or the public financing of a research infrastructure (see for example Frietsch et al. 2016).

Knowledge Effects

Knowledge transfer

The three central functions of research infrastructures according to Assenmacher et al. (2004) are:

(1) the generation of new knowledge,

(2) the processing of global knowledge on regional use, and

(3) the selection or pre-selection of relevant information.

The generation of knowledge and transfer to (regional) companies represents the primary task of a research institution. With the second function, often referred to as antenna function, a research institute comes to the task of knowledge transfer. It tries to optimize the benefit for companies from the information, because the companies have little effort to obtain this information. The national and international networks of the research institute also play a crucial role in this, as they provide access to the latest trends and challenges in the region. On the one hand, the third function seeks to avoid a lack of information, but on the other hand also to avoid an over-abundance of information. This is mainly about the differentiation of relevant and irrelevant information for (regional) companies. The implementation of knowledge and technology transfer between research institutions and companies varies widely (see Table 2). A distinction can be made between hard and soft transfer forms (Assenmacher et al. 2004).

In summary, knowledge effects regarding research infrastructures can have the following regional effects: promotion of innovation and growth, regional development with the formation of regional networks, increase in competitiveness of companies and regions, initialization of regional research topics (in companies and politics) (Assenmacher et al. 2004, pp. 133–147)

Table 2
Transfer forms of knowledge

Transfer form	Type of transfer	Example
Soft transfer form	information transfer	Identification of problems with a literature analysis
	Consultant and reviewer activity	Evaluation of information and alternatives
Hard transfer form	Research cooperation	Student theses on behalf of companies
	Staff exchanges	Staff exchanges between companies and research institutes
	Scientific training	Participation in meetings, workshops and conferences

Source: according to Assenmacher et al. 2004, pp. 146–148

Project innovation type

In short, "a project that is essentially characterized by the uniqueness of the conditions as a whole" (DIN 69901-1 2009). A general classification of projects is possible in investment, research and development as well as in organizational projects. It is possible to supplement this distinction by the project size (small, medium, large) and project complexity.

Projects usually have a (narrow) time frame (fixed beginning in time, defined end in time); are subject to financial and personnel requirements; have one or more predefined project goals at which the project's success can be measured at the end and appropriate measures for achieving the goals can be derived. Characteristic of projects is the implementation in teams and high uncertainty or the high risk.

A classification of the projects of a research institute is relatively clear. The research and development project type is authoritative, but not sufficient for further evaluation. Therefore, other categories are useful for these projects. Categories such as e.g. the innovation of projects. According to Stummer et al. innovations can be subdivided into product, process, market and social/organizational innovation (Stummer et al. 2010, pp. 10–16).

A product innovation is a renewal or improvement of a company's manufactured products and services. Renewed or improved products can substitute existing products for a higher, additional benefit or a better price / performance ratio (substitutive innovation). The renewal will also open up expanded business potential and markets (value added innovation) and satisfy previously low-level needs (application innovation) (Stummer et al. 2010, p. 14). A project example for product innovation is the development of a technology for a specific application.

Process innovation focuses on the more efficient production of products and services. Optimization of key production factors such as time, resources used, output, and therefore costs due to innovation in the manufacturing process is achieved (Stummer et al. 2010, p. 15). Among other things, the use of automation technology represents a project example for a process innovation.

Market innovation represents an "absolute innovation". Associated with this is the first time offering of this product or service on the market. An innovation of this kind often opens up a new market or shifts competitive positions in the existing market. To minimize the risk, the target group and their consumption behaviour are analyzed in advance (Stummer et al. 2010, p. 16). Such projects are rare. Therefore, only a few projects in this category represent such an innovation. A market innovation, for example, are products such as smartphones or smartwatches.

The fourth and final innovation of this categorization is social/organizational innovation. It refers above all to the employees in the company and the corporate structure. Other aspects are the legal area and occupational safety.

Often there is a direct link between this innovation type and others. Projects to mention here are those that promote the use of assistance systems in production and thus optimize the processes in the company. At the same time, they change the process organization and increase the output quality. This probably leads also to an increase in employee satisfaction, which is difficult to measure (Stummer et al. 2010, p. 16).

The categorization of innovations according to Stummer et al. (2010) is almost congruent with the classification according to Bullinger and Schlick (2002). Here, the division into product and process innovations (technically oriented innovations) as well as structural and social innovations (human oriented innovations) takes place.

Another way of categorizing innovation is the approach of Hutzschenreuter 2009 (see Figure 1). The dimensions of customer benefit and solution principles are the distinguishing features here. Feature values are "consisting" and "new". This in turn results in four types of innovation. These are incremental innovation, application innovation, technology innovation, and strategic innovation.

		Customer benefits (e.g. application)	
		consisting	new
Solution principle (e.g. technology)	consisting	incremental innovation	application innovation
	new	technology innovation	strategic innovation

SOURCE: 2009, p. 373

Figure 1. Types of innovation according to Hutzschenreuter

One of the incremental innovations is the optimization of products and services. An existing customer benefit is therefore satisfied with an optimized existing technology (Hutzschenreuter 2009, p. 395). With regard to projects in a research institute, this includes, for example, optimization in the logistics chain.

Compared to incremental innovation, application innovation creates new customer value using an existing solution principle (Hutzschenreuter 2009, p. 396). The transfer of a method or methodology to a new area of application is a project that represents such an innovation.

A technology innovation fulfils an existing customer benefit with a novel technology. The way in which data gained plays an important role in projects with research institutions (Hutzschenreuter 2009, p. 396). Compared to

the past, where process data was taken by observing, recording the time or describing the process, process data are now collected automatically or through simulations.

The fourth and final innovation of this categorization is strategic innovation. It represents the greatest innovation. By using new solution principles, a new customer benefit is achieved at the same time (Hutzschenreuter 2009, p. 396). New business models characterize this type of innovation. This strategic change has a big impact on how technologies are used. Customer-specific data plays a decisive role now.

The review of innovation intensities is thus possible from several perspectives, on the one hand by the self-assessment of the companies and on the other hand by the classification of projects in one of these innovation categories. The innovation potential is measured by interviewing companies and "by the number of mentions of the various innovation-related activities" (Blume and Fromm 2000b, p. 111). The implementation of a potential assessment has not taken place to date.

Political Effects

Regionality of projects

For the regionality of the projects, it is necessary to analyze all projects of the research institute according to the clients, their country of residence and their postal code. This evaluation makes it easy to identify the share of regional projects in the total number of projects. Categorizations such as "projects within your own region", "projects with adjacent neighbors" or "projects within a radius X" can be very helpful for further evaluation.

Cultural Effects

Anchoring in the cultural memory

In theory, there are different forms of memory. The duration of remembering divides memory into social (short-term memory) and collective memory (long-term memory). When addressing the memory, the medium plays a major role. Conversations are the medium of social memory, while mental images are the medium of collective memory. Another form of memory is cultural memory. The cultural memory is characterized by "that we appropriate them [the signs: language, gestures, facial expressions, images, experiences, and so on], not to 'master' them or to use them for certain, but to deal with them and make them an element of our identity" (Assmann 2006, p. 4).

The anchoring of the research institution in the cultural memory is to be determined by means of a survey. In the process, images of the region, including the research infrastructure, are shown and, after that, the recognition of the individual locations is compared. The relation between the recognition and the total number of respondents gives the factor of anchoring in the cultural memory.

CONCLUSION AND FURTHER INVESTIGATIONS

The evaluation of German-language literature shows a concentration on the determination of economic effects. Economic effects also integrate knowledge effects due to the frequent classification in service production and output. Typically, investigated research infrastructures were universities and the study period was often limited to one year. This means that a development of regional effects over a period of several years has rarely been analyzed.

The in-depth studies consider the following:

- (1) firstly, to evaluate the effects of knowledge on another level,
- (2) secondly, to extend the analysis to the effects of other categories,
- (3) and third, to increase the period of observation in order to compare individual annual results.

The first point aims to see knowledge not only as an economic factor. The focus is on the handling of knowledge, the preparation and transfer of knowledge as well as the frequency of a particular project innovation type. The second point clarifies the intention of a holistic valuation model. The last point is to avoid the vulnerability of a one-time evaluation. For example, it brings to light the resilience and strength of a research infrastructure. Research infrastructures can therefore be important stability factors for a region in a crisis.

This work presents a first approach to a holistic assessment of regional impacts of research infrastructures. Social, cultural and ecological effects are the focus of further actions. Extending the literature to the English-language sources is a goal despite the uniqueness of the German innovation system.

It has become clear that a research infrastructure has a positive effect on its region. An extension of the existing assessments is possible through further meaningful indicators that are not limited to economic effects. During the preparation of this text, therefore, ideas for other indicators emerged.

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