THE IMPACT OF INDUSTRY 4.0 ON THE COMPETITIVENESS OF SMES

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Abstract: The small and medium sized enterprises (SMEs) are the foundation of the growth of most European economies. Although increasing of their competitiveness is high on the agendas of the policy makers, the business support organisations, and the entrepreneurs and managers themselves, there is still lack of relevant discussion regarding the SMEs’ development through implementation of Industry 4.0 principles. The conducted analysis has also noted a difference in the relevant literature for the definition of the I4.0 and its scope. Based on this we find it necessary to propose definition which clearly explains the objectives of I4.0 and defines its scope. Furthermore, this paper presents potential opportunities for and implemented impact of I4.0 on SMEs with insight in the developments in Bulgaria. The analysis presents the benefits from and the obstacles for implementation of Industry 4.0. Such transformation raises critical discussion for the influence over the workers’ education and skills, and the product lifecycles. This paper also examines the role of the governments as enabler of SMEs in the implementation process.

Keywords: DEFINING I4.0, I4.0 AND SMES, INDUSTRY 4.0, SMES COMPETITIVENESS, SME GROWTH.

1. Introduction

Industry 4.0 is the new Industrial Revolution focusing on digitalization and integration of the value chain. This, fourth, industrial revolution changes the production processes and the logistical activities along the supply chain. The main goal of the implementation of Industry 4.0 in a company is to reach higher productivity and flexibility. This cannot be achieved only through improvements in the production process through incremental and disruptive process innovation, but rather through thorough technological and organizational transformation, as well as updating the business model of the company.

Enabling different types of innovations, the implementation of Industry 4.0 fosters an evolution to systems in which the interaction, and even integration, of different previously rather independent business elements is achieved. Many large corporations, which have the resources and strategies for development, recognized the importance of adoption of these new practices. In the beginning of this decade, the early adopters seized the opportunity to develop an additional competitive advantage, chaining “the game” and setting it as a requirement for catching up and keeping market share. This second wave is increasingly engaging small and medium-sized enterprises (SMEs), many of whom are still in the phase of screening and cost-benefit analysis. In order to support them in this process, this paper offers analysis of the main benefits and obstacles for SMEs in the implementation of Industry 4.0. Nonetheless, it is expected that like in the previous revolutions, when the changes are influencing many segments of the companies’ operation and the ecosystem itself, those that will fail to adapt, will fail to survive.

Competitiveness

Porter (1990) emphasizes the importance of the competitiveness on micro level (the firm) to the competitiveness on macro level (the nation). He also stresses the importance of a well lead innovation and technology (66.7%), are carried out and applied on three objects: human (61.1%), product (55.6%), and infrastructure (44.4%).

Competitiveness and Industry 4.0 in EU

The concern with the challenge of shrinking portion of manufacturing in European Union’s GDP, contributed the Industry 4.0 to be addressed very seriously. One of the main documents is a communication from the European Commission to the Parliament for “European Industrial Renaissance” in 2014 (COM, 2014 /14). It highlights cloud computing, big data and data value chain developments, new industrial applications of internet, smart factories, robotics, 3-D printing and design as the new technological opportunities for industrial modernization. The conclusions of this document are aiming at increasing the industrial competitiveness through inter-areas policies, increased local-, national-government and EU investments, setting the specific objective of raising the contribution of industry to GDP to 20% by 2020.

In order to achieve this objective, the European Commission has earmarked € 80 billion in the period 2014 – 2020 for research and innovation including support for development of key enabling technologies, the Horizon 2020 program. Unfortunately, we will have to wait for few more years for ex-post evaluation of the program and for the measurement of the real impacts on industry transformation. What is clear now is that the focus of the European Commission and the Horizon 2020 program has encouraged local, regional and national governments across Europe to develop different financial and non-financial support for reindustrialization and increasing of the competitiveness of the European Union. The focus in most of these enablers is fostering innovation though further development of the ecosystem and supporting SMEs for restructuring, modernization and knowledge acquisition.

Overall, the European landscape on one hand is pressuring SMEs to set implementation of Industry 4.0 higher at their agenda, and on the other is offering significant support in the process, which makes it the right time to start. This paper offers insight in the benefits from implementation of Industry 4.0, but also presents the current obstacles in the process. As it was stated earlier the literature offers different sometimes even contradicting definitions and understandings of the key terms of the new industrial revolution, which may be confusing or even misleading for newcomers in the topic. To ease their inclusion, but also to set precise frame on what and how is discussed in the paper, it is initiated with definition of digitization and digitalization and the Industry 4.0 itself.
2. Defining Industry 4.0

About 80% of all European exports are industrial goods. The European industry accounts for 16% of EU GDP and employs about 32 million people in more than 2 million businesses. These figures show that the industry is an engine for prosperity and growth in Europe (Plattform Industrie 4.0, 2019). For many decades an ongoing process of industrial automation and digitalization has been one of the sources for European companies to succeed in global competition. In almost every European country, industry is now forced to increased and systematic digitalization in order to become more efficient (cost reduction), more flexible (individualized products without increasing costs apiece) and – above all – to innovate new, digitalized business models. Thus, digitalization has become an indispensable success factor for European companies (Tschan/dl/Kogleck, 2018).

Fig. 1: Overview of European Initiatives on Digitizing Industry (European Commission - state Nov 2018)

Additionally, the emergence and finally the omnipresence of IoT solutions in our daily lives force industries to adapt their organization to a high level of connectivity. The upheaval of our practices brought by internet and digital technologies now reached manufacturing process in industries. This need of connection starts a deep change and give a new paradigm – Industry 4.0. It refers to a phenomenon related to new consumer uses and new objects that directly impact the current business models and organizations. It is increasingly associated with the definition of digitalization and this term is increasingly used in the context of the digital transformation of companies (Mario, Hiligoyen, 2019). Facing digital disruption, digital transformation has become a major and strategic issue for all organizations of all sizes: business, marketing, human resources, production process, information system, data, etc. (Vivier, Ducrey, 2019).

Digitization and Digitalization

Fraysee (2013) based his definition of digitalization on three different approaches: First, from the business point of view, digitalization is like partially or totally changing a product, a service, a brand or a business activity in the digital world, considering information technology and communication, and connected uses of consumption. Second, from an organizational point of view, it corresponds to the conduct of the change inherent in the integration of ICT (Information and Communications Technology) in the processes and organization of work. Third, it can be defined as the explosion of life that is daily associated with multiple screens. Brennen and Kreiss, however, base their definition on the third view of Fraysee, the social life and how people interact with each other in the 10s of the 21st century (Brennen, Kreiss, 2014; Bloomberg, 2018).

In the narrow sense of digitalization in the industrial context it can be defined as the transformation of business models using digital technologies and their internet based Internet of Things (IoT) networking to create value (Wallmüller, 2017; BMWI, 2015). This implies the increasing transformation of (all) analogical information into data that can be processed with information technology (digitization). Digitalization can take place on three levels: (1) products and services, (2) processes and decisions, and (3) business models (Matzler et al., 2016).

In general digitalization implies the integration of digital technologies into everyday life by the digitization of everything that can be digitized. Consequently, digitization can be defined, as the conversion of analogue information in any form (text, photographs, voice, etc.) to digital form (Schallmo and Williams, 2018) with suitable electronic devices (such as a scanner or specialized computer chips) so that the information can be processed, stored, and transmitted through digital circuits, equipment, and networks. In this context three terms are used partly overlapping in literature: digitalization, Internet of Things (IoT) and Industry 4.0 (I4.0).

Bischof, Tschan/dl and Brunner (2017) define the partial overlapping of the terms differentiate it analytically (Fig. 2). Digitalization covers the entire consumer IoT field (consumer IoT, e.g., smartphones, TV sets) and a large part of Industry 4.0, with the latter being a part overlaps with IoT (Industrial IoT), but also has components that can function without internet technology (e.g., automation, Manufacturing Execution Systems [MES]). A smaller, but all the more important part of Industry 4.0 does not include digital technologies, which are lean production - management and people (e.g., acceptance issues). Finally, there are also digital technologies outside the terms of IoT and Industry 4.0 (e.g., digital radio transmission).

Fig. 2: Definition of terms in digitalization

Industry 4.0

The fourth industrial revolution marks a new stage in the transformation of companies’ organization. All along the implementation of Industry 4.0 phenomenon, many definitions were given depending the context of applications. However, the term Industry 4.0 as well as digitization is not yet universally defined. Essential components of Industry 4.0 are the technical integration of cyber-physical systems into production and logistics, their interconnection via the Internet of Things and Services (IoTS), as well as the implications for value creation, business models, work organization and downstream services.

More specific and widespread is the definition of “Platform 4.0” (Obermaier, 2016), for which the term is synonymous with the fourth industrial revolution, a new level of organization and control of the entire value chain across the lifecycle of products. The basis is the availability of all relevant information in real time through networking of all entities involved in the creation of value. The combination of people, objects and systems creates dynamic, real-time optimized and self-organizing, cross-company value creation networks that can be optimized according to different criteria such as cost, availability and resource consumption.
Kagermann et al. (2013) describe Industry 4.0 as a collection of seven concepts. Smart factories, cyber-physical systems, self-organization, new systems in distribution and procurement, new systems in the development of products and services, adaptation to human needs and corporate social responsibility.

Hermann et al. (2014) suggest definition of Industry 4.0 around its ability to design and provide new products to the variety and complexity intensification with low cost and low environmental impact. That means that Industry 4.0 presents a set of technologies and concepts linked to value chain reorganization (Hermann et al., 2015).

Zeulika et al. (2016) states that Industry 4.0 is used for three, mutually interconnected factors; digitization and integration of any simple and complex technical, digitization of products and services offer, new markets models. All the human activities are interconnected thanks to Internet solutions (IoT-Internet of things, IoS-Internet of Services, see Lasi et al., 2014; Ning and Liu, 2015; and IoP-Internet of People). These technologies help companies to spread information during all life cycle systems.

In his research activities based on risks identification, opportunities and critical factors of success for the Industry 4.0 in SMEs, (Moeuf et al., 2018) give a definition of Industry 4.0 that focus particularly on specific steering of SME. “the Industry 4.0 is an approach of industrial steering aim at real-time flow synchronization and unitary and customized Build to Order (BTO) from customers”.

The evolution due to new technologies and new market models highlight the necessity to identify new challenges in terms of management, skills, jobs and organization. It’s mentioned in the White Paper published by European Commission (COM(2017)2025), “Making the most of the new opportunities whilst mitigations any negative impact will require a massive investment in skills and a major rethink of education and lifelong learning systems.”

3. Industry 4.0 in SMEs

The interest of implementing Industry 4.0 concepts within the business operations of SMEs is significantly increasing in the last years. It is equally important on macro level as it is on firm level leading to endless discussions on the benefits from and the obstacles for implementation.

Benefits from implementation of Industry 4.0

The influence of Industry 4.0 on companies and industry is expected to enable the emergence of new business models affecting and reshaping the entire lifecycle of products from their preparation to the marketing leading to improvement of business processes and ultimately, increasing the companies’ competitiveness (Pereira and Romero, 2017). According to Müller et al. (2018) the process of implementing new technologies is being conducted in all industries so as to lead to reducing costs, increasing productivity and providing customers with solutions tailored to their specifics. Since the term “Industry 4.0” originates from a high-tech strategy introduced by the German government, the impact on SMEs will be analysed considering several studies and reports based on data gathered by German companies.

Following a study conducted by Boston Consulting Group (Lorenz et al., 2016) with more than 600 German and US companies, about 19% of German companies have fully applied Industry 4.0 meaning that they implemented smart factory measures or first measures toward a concept (such as the introduction of autonomous robots), compared with 16% of US companies. Other data provided shows that German manufacturers can be regarded as very ambitious since 60% of them are planning to apply or have applied advanced technologies (within the next one or two years) such as digital factory logistics or predictive maintenance, compared with approximately 40% of US manufacturers. German companies seem to also be further ahead in terms of preparing for Industry 4.0 compared to their US colleagues as almost half (47%) of the German companies have developed their first full Industry 4.0 concepts, and only 18% of German respondents said that their company is not yet prepared to introduce Industry 4.0 technologies. In comparison, only 29% of US companies have developed their first concepts, and 41% stated that their company is not yet prepared. The slight differences in the advancement stage of Industry 4.0 in German and US companies are not reflected in the opinions of respondents about the important benefits of its adoption. For example, three-quarters of German respondents and two-thirds of US respondents associate Industry 4.0 with increased productivity and cost reduction. Almost equal amount of respondents in both countries (48% in Germany and 43% in the US) also connect it with revenue growth. But it is worth mentioning that the benefits from Industry 4.0 depend on how successfully, companies develop and manage newly skilled personnel.

Schröder (2016) has observed a strong connection between company size and implementation of Industry 4.0, as large companies are substantially more advanced in the integration of their production plants in higher-level IT systems. He also argues that there is no universal model for applying Industry 4.0 in SMEs and the perception of the challenges and opportunities posed by Industry 4.0 depends on the different characteristics of companies.

The overall impact and potential arising from the adoption of Industry 4.0 in companies can be outlined in several aspects:

- **The economic potential of Industry 4.0** – The evaluation of economic effects is rather difficult. One thing that could be considered as a major opportunity is the cost reduction as mentioned above leading to economy of financial resources. Since nowadays, many of the business tools and software are available through cloud computing, SMEs do not need to pay high costs for digitisation of their businesses (King, 2018). Even if a SME partially applies Industry 4.0 inexpensive technologies, it would still benefit economically through automation of some tasks, for example through a simple smart application. This rather non-complicated automation software will also have a positive impact on the productivity rates in the enterprise. Other researchers argue that since Industry 4.0 combines different and many technologies, only when applied together their full potential in SMEs will be realized. Since these technologies are in different states of advancement when being implemented in SMEs, it would be unclear when and to what extent positive effects will be utilized.

- **The smarter the production process, the better the product quality** – Smart technologies are now used in every industry, especially in the manufacturing processes in SMEs which lead to the creation of smart products. By incorporating smart technologies in the production process, SMEs are able to monitor, follow and control it and do so autonomously (Maresova et al., 2018). The smart products also carry important information about their production process, as well as regarding their purpose and application. Such smart products are equipped with sensors, components and processors that are aimed to collect information and guidance to customers and to send this data to the manufacturing system (Abramovici and Stark, 2013). In this way, the quality of the products is significantly improved as well as the efficiency of the production process in terms of time and costs. These benefits can transform SMEs model of work into a smart model and help them grow. A forecast of the potential savings for different areas of production is shown in Table 1.

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Total value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory costs</td>
<td>- 30 % to - 40 %</td>
</tr>
<tr>
<td>Manufacturing costs</td>
<td>- 10 % to - 20 %</td>
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Table:

<table>
<thead>
<tr>
<th>Type of cost</th>
<th>Total value</th>
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<tbody>
<tr>
<td>Logistical costs</td>
<td>-10% to -20%</td>
</tr>
<tr>
<td>Complexity costs</td>
<td>-60% to -70%</td>
</tr>
<tr>
<td>Quality costs</td>
<td>-10% to -20%</td>
</tr>
<tr>
<td>Maintenance costs</td>
<td>-20% to -30%</td>
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- **New way of communication** - New business models and value creation networks are one of the direct outcomes of the transformation in manufacturing companies as a result of Industry 4.0 implementation. The impact of these changes will allow for a new way of communication along supply chains. It is envisaged that the communication channels will be in real-time. Through that type of networking, all actors will manage to reach maximum profit using limited sharing resources. The new way of communication has a significant effect on SMEs' business models as more customer-driven rather than product-oriented innovations are predicted to be developed. The supply as well as the technical support chains, the process of conducting operations, manufacturing, distribution of products and services can also be digitalized in light of the new ways of communication.

An important opportunity introduced by Industry 4.0 and with great impact on SMEs is the “digital twin” concept. It is defined as a virtual illustration and model of a given asset (tangible and intangible). The digital twin is described through the structure and behaviour of connected elements or “things” generating data in real time. The data is analysed, combined with other data connected with the working environment and presented to the SMEs or the user in the form of “digital twin” with the idea to understand its history, needs, background and interact with it in order to complete certain tasks. The digital twin presents companies and users with possibilities to explore and find the best solutions to given problems in a fast and pragmatic way. A good example of using such solution in practice is The Laboratory for cooperation within Industry 4.0 of the Institute for Information Management in Engineering and the Karlsruhe Institute of Technology. There a digital twin of a machine for grinding is used for optimization of the process and for working in a virtual reality network. Along with these activities, the resource flow is also taken into consideration in order to showcase the practical advantages of the suggested solution allowing for increase of the productivity with over 20%. According to the German association of information technologies, telecommunications and new media (BITKOM), digital twins in manufacturing industries will have combined economic potential of over than 78 billion EUR by 2025 (based on Popova, M. et al., 2018).

**Obstacles for SMEs for Industry 4.0 implementation**

SMEs are more challenged when it comes to adopting Industry 4.0 compared to large companies since most of them do not have a fully automated production, so the proportion of manual and hybrid activities is higher. They are thus advised to turn to networked production in order not to lose their competitive edge on the international market. One of the biggest challenges that SMEs face or will face is the elaboration of a relevant strategy, a cost-benefit analysis of Industry 4.0 technologies that will be useful to them and the lack of data security and uniform standards. Lorenz et al., 2016 cited above observes also that lack of data security is one of the main challenges of companies. The same source points out the lack of qualified employees as the top challenge followed by investment requirements. According to Türkes, M. et al. (2019), lack of expertise also represents a boundary to Industry 4.0 development meaning that there is a lack of culture in the company, no internal training is conducted on acquiring digital skills and no specialists to drive the implementation of new technologies. A significant conclusion is drawn that small companies as well as large ones in US and Germany need careful planning in order to address their major concern to cover the necessary investment costs (Lorenz et al., 2016).

More in-depth analysis of the obstacles for the technological implementation of Industry 4.0 is provided below:

- **Lack of digital strategy** – A digital strategy that is adapted to the digital and business realities and challenges is described as one of the opportunities for development that Industry 4.0 presents but the lack of it is considered a limit to the growth of SMEs. The senior management of manufacturing SMEs is presented as more cautious regarding Industry 4.0 and more concretely, the networking of production compared to the production managers (Pierre Audoin Consultans, 2015). This caution could be problematic as the application and integration of Industry 4.0 in SMEs have to be carefully planned and a development of comprehensive digital strategy should be initiated at a very early stage of implementation. Within the strategy, restructuring of all company processes, employees’ roles and qualifications should be taken into consideration, especially regarding the development of new business models and opening of new markets.

- **Lack of uniform standards & legislation** – The absence of uniform standards and norms in terms of the integration of IT systems and other data and machinery within the company is another obstacle. An international standard has not yet been implemented and no up-to-date information has been found as such. This allows for the occurrence of mistakes and mismatches in the integration process along with rising unrest about unauthorised access to certain data. In addition to standards, proper working measures and legislation regarding Industry 4.0, such as the development of cyber security, artificial intelligence, etc., are not in place in developing countries. This allows for significant lagging in the progress of Industry 4.0 in some countries and creating a multi-speed Europe and world as a whole.

- **Lack of data security** – This obstacle is intertwined with the lack of uniform standards and legislation. If a SME wishes to create a functioning digital network, it is required that all actors have mutual trust over the data they share. The data in question ranges from information on the production merits of SMEs to new ideas about innovative products’ creation. Leakage of important documents can affect the reputation of companies negatively and lead to loss of profits and clients. SMEs perceive that using Industry 4.0 technology, such as cloud services, is not protecting confidential data of the company and it is allowing for a third party to access it. The security issues are heightened by the fact that SMEs are not sure about the geographical location of the data stored and what jurisdiction it is applied.

Smith et al. (2016) identified the main difficulties and therefore, obstacles encountered by SMEs with regard to participating in the Industry 4.0 supply chain are:

- **Lack of awareness** about high-tech solutions and the potential advantages of implementing them in production processes;

- **Lack of financial resources** to buy the necessary technology and/or invest in R&D activities to create the needed technology when it is not readily available. Each of this requires easy access to funding which is an obstacle for many SMEs.

- **Insufficient or lack of capacity to test Industry 4.0-based solutions** including limited access to facilities to test the solutions and advanced technologies;

- **Insufficient amount of highly qualified experts in the field of ICT** to implement and use advanced Industry 4.0 solutions.
SMEs often face competition from big companies and fail to attract such experts;

- **High entry barriers for acquiring and using advanced technologies.** Due to the eased access to funding that large companies have, they are considered to be the ones that test and patent advanced technological solutions which makes it harder and more expensive for SMEs to make use of them. In addition, the development of Industry 4.0 regulating legislation, if developed following US and Asian examples, itself may favour “industrial champions” bringing benefit to large corporations raising the entry barriers for SMEs and newcomers. That is why, extending the entry barriers could overcome this obstacle.

All these obstacles pose a challenge before SMEs, especially in EU countries which are considered as “modest innovators” such as Bulgaria. The country has been at one of the last places in terms of introduction of digital technologies in economy and society according to DESI index, 2018. In order to promote the growth in Bulgarian SMEs, a national strategy “The transformation of Bulgarian Industry – Industry 4.0” is introduced. Although the good ICT structure with high speed access; the grounded tradition in the ICT sector; the access to EU-funded programmes and the wide usage of Internet are considered as an advantage of the country and a sufficient basis for the implementation of I.4.0, Bulgaria still has a long way to go. One of the biggest obstacles before the country are the non-working ecosystem of innovations (science – education – innovations) and the lack of impact of R&D on the competitiveness of SMEs. A great opportunity is recognized in the ICT sector as it is defined to be the most powerful driver for growth in the industry as well as creating ICT clusters for industrial application in the country could accelerate the adoption of Industry 4.0 elements in SMEs. Another opportunity lies in the expansion of the networks for access of next generation (NGA) and the adoption of future internet applications based on e-services of high quality.

The effects of Industry 4.0 on Bulgaria and all other countries are considered to be a higher degree of internationalisation of production which will be easier to achieve for the large companies which have implemented Industry 4.0-based solutions and it would be harder for SMEs who, in turn, may become more dependent on big corporations as their main customers.

Following Smith et al. (2016), these challenges need to be addressed by adopting multi-pronged approach including the following measures:

- Locating a place in existing supply chains next to Industry 4.0 leaders and benefiting from their knowledge and experience.
- Targeting developing niches in a more dispersed production system and marketing them in more localities internationally.
- Implementing advanced solutions which facilitate production on more decentralised basis such as 3D printing.
- Improving data processing with regard to resource planning and customer relationship management.

It is possible for the transition to Industry 4.0 to be enabled by the public sector on EU and national level through lowering entry barriers for SMEs to the Industry 4.0 market and supply chains and also through increasing public investments in R&D which may balance the market of high-tech solutions.

An interesting solution to address one of the biggest challenges for SMEs, namely the lack of qualified employees along with the lack of financial resources is implemented by The Institute for Information Management in Engineering and the Karlsruhe Institute of Technology where a laboratory for cooperation within Industry 4.0 is created and more particularly, a digital “sandbox” in order to gather SMEs and encourage them to brainstorm, exchange ideas and come up with solutions through gamification. The “sandbox” enables participants to use common tools and instruments in order to try new things and achieve their goals working together. In this way, the acquired digital knowledge transforms into skills used in their everyday job tasks. In the “sandbox”, the financial risks that SMEs take are limited because a real investment is conducted only when there are clear, measurable advantages. That concept has been implemented in ELABO in Crailsheim as part of the introduction of their “Shopoor Execution System”. The digital “sandbox” can be used as a good practice example that can have a positive impact on other SMEs as they can adopt and test it when faced with various problems.

The new technologies and approaches introduced by Industry 4.0 are rapidly changing the business landscape for SMEs. Willing or not, they would need to address the upcoming trends in order to maintain their competitive edge and thrive. Thus, becoming aware and educated on the complexity and prerequisites for the implementation of Industry 4.0 is of utmost importance for both the management and the employees of SMEs. Requalification, life-long learning, and constant adaptation to the needs of the market and the industry, driven by the increasing digitalisation of the economy and work processes, could be the key assets for the success of Industry 4.0. The adequate talent organisation and provision is one of the main advantages of SMEs even though automation will take up some of the tasks of employees. The impact of Industry 4.0 on machinery, systems, and processes in companies would consist of them becoming integrated and connected wirelessly, but highly skilled employees would have to interact with them to procure an effective work process. Closing the skills gap of employees in SMEs as soon as possible would mean that SMEs have a high chance of catching up with the Industry 4.0 development and not staying far behind large companies.

### 4. Conclusion

The aim of this paper is to support the penetration of Industry 4.0 in SMEs through supporting the basic two pillars: Clarification of the scope of Industry 4.0 and the impact of Industry 4.0 to SMEs.

#### Scope of Industry 4.0

The concept of Industry 4.0 through most of its scope is leaning on the possibilities deriving from digitalization and internet of things, but also it has a small section that is based only on non-digital elements, such as people organization and processes. This is the best illustration of its scope. This fourth industrial revolution is only driven by the contemporary technical and technological opportunities, representing a new era of new, flexible business models pivoting around the key competences of the organization. This is creating completely new ecosystem in which the prerogative for success will be given solely to those companies which will have the ability to utilize optimal resources and to respond both proactively and reactively to the fast changing environment.

#### SMEs and Industry 4.0

The impact that Industry 4.0 has over the competitiveness of industry through the productivity, flexibility and efficiency is changing its position of revolutionary reform into essential concept. The SMEs that are already analyzing their opportunities for restructuring according to the new trends, have already overcome the main entry barrier(s) connected to lack of awareness and strategy. The inclination of the European Commission, the national and local authorities towards Industry 4.0 suggest that at least on the middle run, SMEs across Europe will have alternative options for affordable financing (loans or co-financed grants) as a support in the restructuring. This process of implementing public funded projects is usually much longer, but SMEs need this lag to start with the non-digital reforms. This revolution in the organization’s business model, culture, and mindset, needs to be in line with human capital development, technological and market strategy of the organization. Clearly, for many SMEs the fulfilling of the prerequisites for successful Industry 4.0 implementation will be benefit itself.
5. Acknowledgement

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