

# THE APPEARANCE OF DIGITALIZATION IN THE STRATEGIES OF SMES IN CENTRAL-EASTERN EUROPE

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**Abstract** - Digital technologies have made entire industries transform and create new ways of operating and organizing larger firms. There are also strong motives for SMEs to implement these rapidly evolving technologies, but in the Central-Eastern European region they often have limited resources. International research suggests that companies need to strategically transform their business model and their strategies, in order to take advantage of digitalization. So far, SMEs have focused on the adoption of digital technologies rather than on the strategic-organizational changes needed. The purpose of this study is to explore the need and the way of digital transformation strategies in SMEs. What are the key drivers, the opportunities and challenges, how do strategic leaders view this phenomena? To answer it, we will also show the results of a recent empirical study of Hungarian SMEs.

**Index Terms** - Small Medium Enterprise (Sme), Strategy, Digitalization, Business Model, Supply Chain, Hungary

## I. INTRODUCTION

In the age of Digitalization (which refers more or less to the 4<sup>th</sup> Industrial Revolution in manufacturing), the wave of technology accelerates the use of intelligent systems nowadays; that means the integration of computer systems become much more reality in the business world. By the developments of Information and Communication Systems (ICT), the transformation of traditional companies into smart factories occurs by intending of creating flexible and agile structures (Weyer et al, 2015). This new technological reality has also enormous effects on business philosophies (such as “lean” concepts)

especially by decreasing the complexity on planning the operations and service.

Digitalization means also a new type of collaboration between human and intelligent systems (Erol et al, 2016). The smart concepts and digitally enabled production coordinate with each other and create the framework of self organized reconfigurations as the backbones of creating the smart factory (Wang et al, 2016).

On the other hand, customer needs are also affected: The age of mass customization will be replaced by “personalized production”, allowing customers to get their highly custom tailored products. (see Figure 1.)

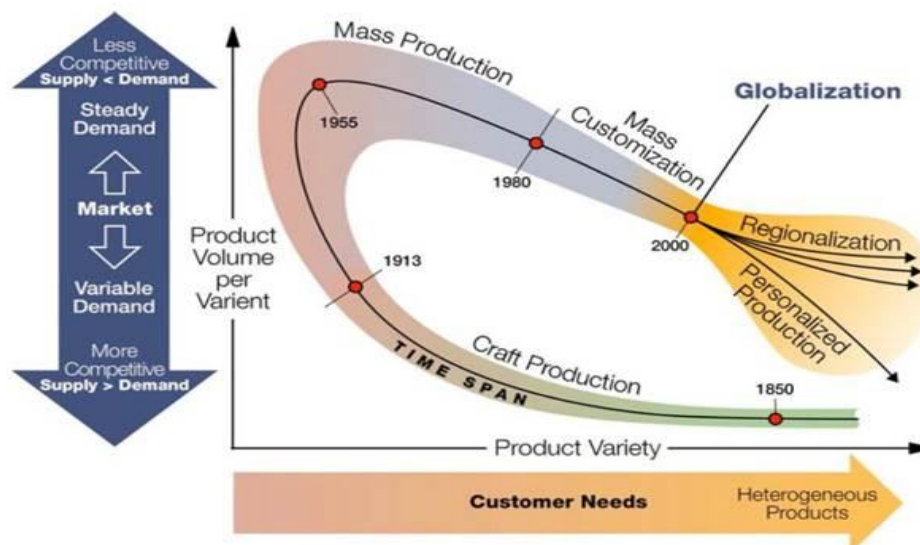


Figure 1. Customer needs in the light of Industrial Revolutions  
Source: Koren, Y. (2010)

When looking on Fig. 1, we can also realize the personalized production needs (including also the high speed of throughput) over the complex supply chain. The age of time based competition has really arrived. The manufacturing and production systems have been gradually complemented with information technology support tools in recent decades, as increasingly complex technological solutions, production in often multiple locations and the coordination of supporting logistics processes started to pose a more and more complex challenge. Accordingly, 90% of all production processes are now supported by IT tools. The increasingly dominant and pivotal role of IT in companies have changed lifestyles and working environments, the significance of which is unquestionable. Miniaturization and the development of communication technologies enables the blending of the physical and virtual world and gives way to the so-called CPS – Cyber-Physical System. Industrial production becomes integratable into an intelligent environment that is referred to in reference literature as smart factory. Based on this technological evolution, Germany announced the arrival of Industrie 4.0, also called the fourth industrial revolution and established their “Plattform Industrie 4”.

The Hungarian platform - acting today as the Industry 4.0 National Technology Platform Association - was established May 2016 under the leadership of the Institute for Computer Science and Control (SZTAKI), Hungarian Academy of Sciences, with the participation of research institutions, companies, universities and professional organizations having premises in Hungary, and with the full support and commitment of the Government of Hungary

SMEs – although small and flexible – are not always prepared to the new challenges of digitalization. They often apply these new technologies, nevertheless they do not change their strategy (and business models and processes) accordingly.

In a recent survey (between April 2017 - June 2018) many strategic decision makers of Hungarian enterprises have been asked regarding the individual capabilities and the level of readiness to digitalization of their companies. Among the 232 respondents there were industrial, commercial and service companies as well. About two third of them were micro-, small and medium enterprises. One third belonged to large corporations (Fig. 2.).

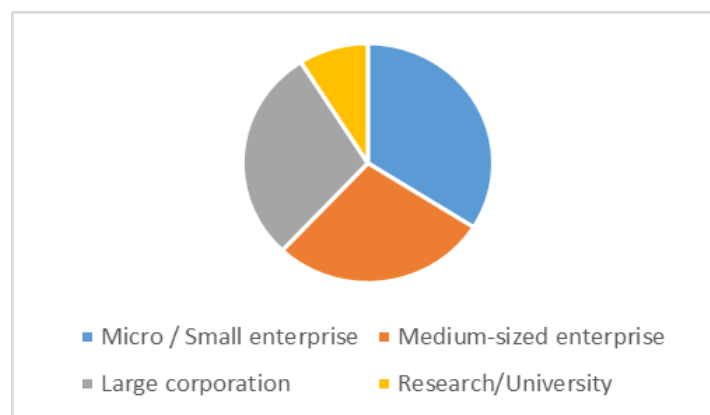


Figure 2. Distribution of Respondents by Company Size (%)  
Source: own editing

In the followings we will focus on the results regarding the questions towards the need of strategic changes, resulting from digitalization. We will focus on the answers of SMEs, and – wherever possible – we will compare these with the responds of large corporations.

The questionnaire was created according to a similar German survey of VDMA (Allianz of German Machinery and Equipment Producers), with over 3200 partner companies. (More information about them on <http://www.vdma.org>).

Based on this, we were also able to show a benchmark betw. Hungarian and German answers.

## II. LITERATURE REVIEW

There's no doubt about the important role SMEs play in creating jobs, stimulating innovation and promoting

entrepreneurial skills (Ipinnaiye, 2016), as well as their significant contribution to economic growth of a country (especially, in an emerging stage such as Hungary). Recent trends of doing business have led to what is called today: the digital era, which is mainly about digitalization, automation and even Internet usage. Digitalization has for the last years been described as a driving force affecting both business and private life and is often compared to other technological revolutions like the steam engine and electricity, like other pervasive trends such as globalization or urbanization, it is a phenomenon that is not easily defined and its effects have been studied from several perspectives, often with different outcomes (Karltoorp, 2017).

Digital technologies have become a source of disruption in many industries as they are changing business models and processes, and even affecting the

rules of business (Karlton, 2017). A lot has been said about benefits and gains that is brought about to businesses by these digital technologies, however, previous researchers have found that SMEs often encounter some obstacles such as their lack of finance, knowledge and skills, etc. and these challenges have brought about their resistance to technology adoption, which resulted in inferior perception of their performance compared to the large corporations (Stankovska, 2016).

There are enough literature and research studies conducted on benefits and effects of digitalization in general, drivers of SME's performance, generic strategies of SME's, the role of SMEs in the country's economic growth, but very little has been done on the effect of digitalization (or digital transformation) strategies of SME's.

Prior research suggests that the above technologies have become user-friendly, cheap, standardized, ubiquitous, interactive and easily accessible, and such features have changed the way of communication, balance of power, interaction with the marketplaces and marketing mix in particular. These changes diminish the SMEs' barriers for adopting new technologies, such as lack of financial resources, knowledge and skills, and enhance their strategic position on the global marketplace (Stankovska, 2016).

Ipinnaiye et al. argued that SME performance is not only determined by the firm's inherent characteristics and firm strategy, but as well as the macroeconomic environment in which it operates (Ipinnaiye et al, 2016). A firm's internal strategy may include things like marketing strategy, pricing strategy, effectiveness and efficiency on production and most importantly constant improvements on customer satisfaction/responsiveness, while on the other hand, digitalization can be viewed as one of the external factors, which could be used as a performance indicator in modern business context. According to contemporary business standards, companies that have not invested enough on digital technologies have a gloomy future because they might not be able to survive competition.

Literature further suggests that research studies which were conducted few years ago show, that most small and medium enterprises at the time, were not keen and were lagging behind on adoption of digital technologies, and this was because of various reasons which included fear of undergoing digital transformation, lack of understanding and knowledge, or a lack of sufficient resources to implement all the necessary changes that comes with digital transformation. Also the shortage of highly skilled and experienced employees in SMEs was not and it's still not helping them in this regard compared to larger companies who usually have a pool of skillful and knowledgeable employees on this field. All these factors instilled fear on many SMEs and discouraged them to put digitalization or digital transformation on

their strategic agenda.

Lastly, international research has also suggested that digitalization create opportunities for innovative business models and is a strong force of change that is transforming business processes, firm capabilities as well as products, services and supply chain relationships. To take advantage of digitalization, SMEs must work hard to integrate digital technology into their businesses (Papp et al, 2016). It is also very important for companies to train their employees and prepare them for this global phenomenon.

This paper will investigate how digitalization has affected the strategies of SMEs, whether they are ready to facilitate and execute their strategies accordingly, or whether there is a gap of strategy adoption between large corporations and them.

### III. SURVEY OF DIGITALIZATION STRATEGIES OF HUNGARIAN COMPANIES (SMES VS. LARGE CORPORATIONS)

#### A. Importance of Digitalization / Industry 4.0

As a whole, 82.3% of the responding companies consider Industry 4.0 as important or indispensable from the aspect of competitiveness. (details are shown in Figure 3). This result is favorable, even if the above ratio is somewhat less (79.2%) in the case of domestic companies, while it exceeds (91.4%) in (internationally owned) large ones. The above figures indicate a breakthrough in this category in terms of the awareness of digitalization and the recognition of its importance in the course of the past couple of years. It is also apparent that new solutions are continued to be imported, primarily by multinational corporations, and these are gaining ground gradually in the domestic SME sector as well. The above phenomenon is also underpinned by a further analysis of this issue, showing that 77 % of large corporations and 62 % of SMEs deem it important or indispensable to adapt Industry 4.0. Interestingly, the role of Industry 4.0 in competitiveness and the proportion of 'no' answers vary by company size. Perhaps this latter suggests that we face some sort of ignorance here. (Fig. 3.)

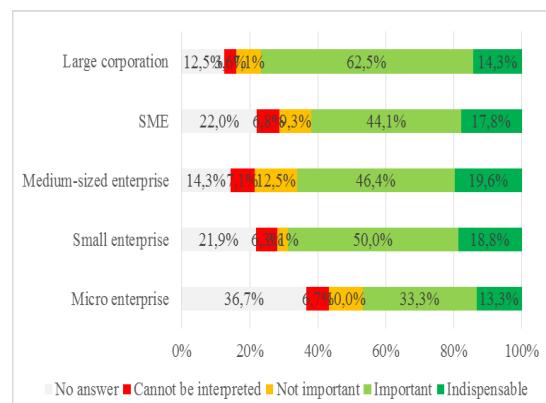
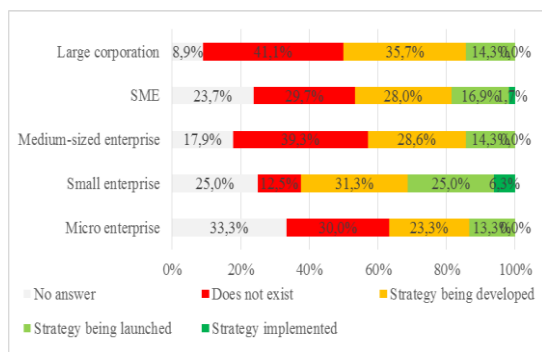


Figure 3. The Importance of Digitalization (Industry 4.0) from the Aspect of Competitiveness  
 Source: own editing

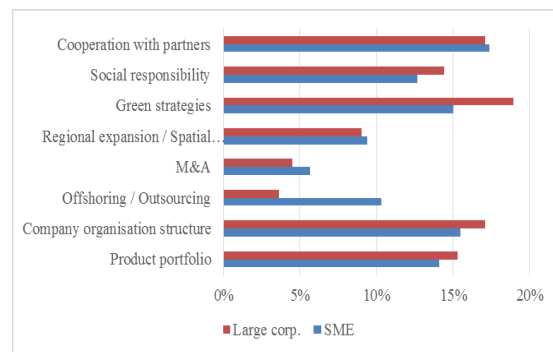
This picture of positive awareness – disregarding micro enterprises – immediately becomes unfavorable when taking a look at the answers to another question to Figure 4: although the proportion of responses ‘important’ and ‘indispensable’ was 82.3% in a previous question, all in all only 18.6% of respondents have an ongoing or already implemented relevant strategy. In the absence of a strategy, it is no wonder that they have no related index number system, either. Only two small enterprises reported that they had already implemented their strategies. No large corporation made such a statement. In respect of launching, SMEs are better off. The question is, to what extent the above judgement based on self-assessment is actually reliable. (Fig. 4.)



**Figure 4. Existence and implementation status of Industry 4.0 strategy**  
 Source: own editing

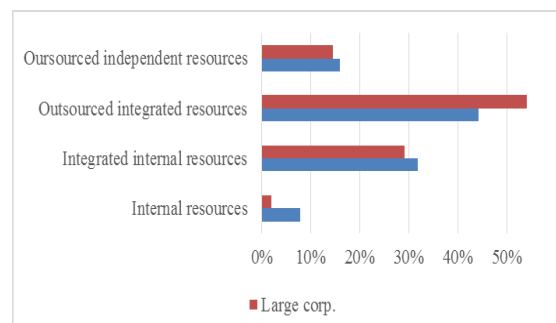
In the case of domestic – SME companies, it is saddening that only 8.5% of them have an ongoing or already implemented strategy. 91.5% have no such thing. It is interesting that the ratio of having a strategy (25.7%) versus no strategy (74.3%) is better in the case of companies in majority or exclusive foreign ownership, however, the result is not as favorable as expected. This would suggest that technological transfer to Hungary has not yet a high priority for foreign parent companies, although we presumed just the opposite in respect of taking responsibility. In the knowledge of the above, it can be stated that this is clear inconsistency on part of corporations. Our conclusion is that – in spite of the finding referring to the previous question – there are still many things to do in terms of providing information, and introducing the mentality related to Industry 4.0. Particular care should be taken to the differentiated handling of target groups within the internal structure of the SME sector, meaning medium-sized, small and micro enterprises as individual target groups. Figure 3. and Figure 4. Existence and implementation status of Industry demonstrate the support of this recognition, calling attention to the inhomogeneous nature of the SME sector. The existence of a strategy is a necessary criterion but not sufficient in itself. In another question we have also examined the scope and territorial extension of the strategy, meaning to which areas it extends to. It is interesting to observe that the second

largest difference can be shown in environment-conscious thinking between large corporations (19%) and SMEs (15.0%), (see Figure 5. Scopes of 5), meaning that large corporations think more responsibly about their environment and – as the graph demonstrates – about their social environment as well. The offshoring / outsourcing difference (large corp. 3.6%; SMEs 10.3%) conveys the message that this topic is more interesting for SMEs, representing an opportunity or threat for them depending on their market position. Nevertheless, the duality of corporate structure is not really shown. This is presumably due to the fact that this topic is new, so no matter who gets involved in it, the strategy will be similar to the chapters of a university textbook, and it will not be implemented in a customized manner.



**Figure 5. Scopes of Digital strategies**  
 Source: own editing

The orientation of corporate strategy, as well as the related “philosophy” of company organization and operations will be characterized by two factors. The first object of scrutiny – in a separate question – was to measure, what kind of human resources enterprises use for carrying out their duties and what connections there exist between each functional organizational unit (Figure 6.6).



**Figure 6. Company organization, operational philosophy**  
 Source: own editing

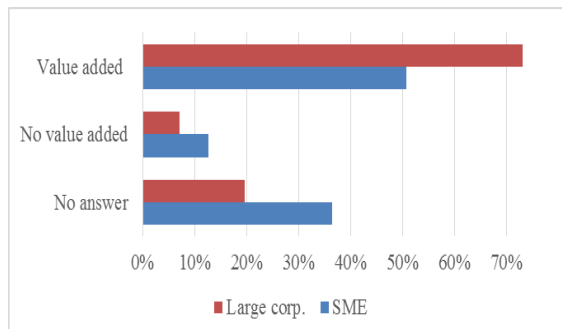
From the national economy’s point of view, it is satisfying that the Industry 4.0 approach can be considered effective in this area. Business administration with outsourced resources appears in increasing numbers, which indicates service-based operations; furthermore, integrated implementation is getting more dominant in terms of



both external and internal resources as opposed to fragmented solutions.

**B. Self Assessment SMEs vs. Large Corporations**

The often mentioned need for change is closely related hereto, namely that Hungary needs to move towards added value generation, sort of abandoning the past of manufacturing activities and assembly. As regards the criteria for the place occupied in the value chain – knowledge as added value – 73.2% of large corporations have (proudly declared) that some of product development, production design, marketing, and after-sale services appear among their activities as individual functions, so additional (high tech digital) value is added.



16. Self-assessment of Corporate (Digital) Value creation  
Source: own editing

As regards of 12.7% of SMEs, it is worthy of respect that they are committed to assembly and manufacturing as their main profile, so no additional added value is created by them. As regards to the entire question, there are 15% to 20% differences between large corporations and SMEs.

Efficient Industry 4.0 based manufacturing and logistics require major investments. Such a decision is obviously strategic and determines the company’s future focuses. This is why two separate questions referred to this high-priority area, inquiring for the areas in which support developments (investments) of Industry 4.0 were implemented by enterprises in the course of the past two years.

Furthermore, we were eager to learn, what types of investments are planned in the period between 2018 and 2020. In Hungary today, corporate investments and developments are dominated by production, manufacturing, IT, and quality assurance, to be followed in order by employee training and development, logistics and research and development.

The answers show us that the above areas will preserve their dominant role in the future as well. Nevertheless – as managers indicate - their weight will decrease to areas (perhaps disproportionately neglected today but to be focused on in the future) on the basis of the answers, such as

- procurement,
- value chain management and
- accounting/finance.

Such developments support horizontal integration and contribute to the implementation of the business aspect of the ecosystem.

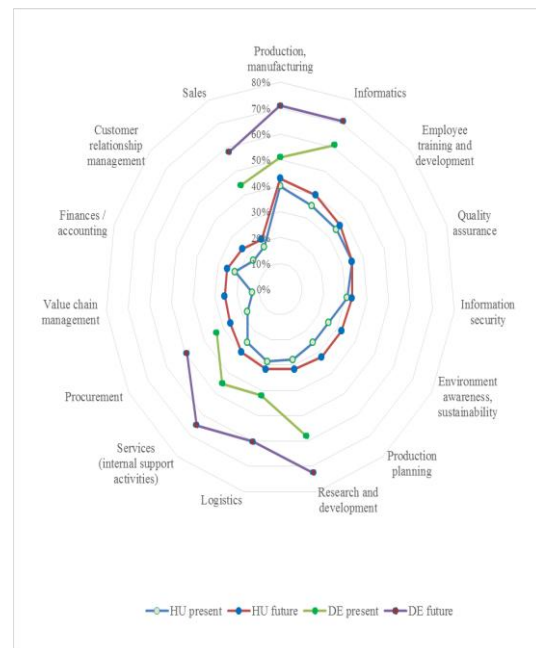
**C. Comparison to another European Benchmark**

As the VDMA questionnaire – which was also taken by us as a basis - failed to specify each target area as possible answers, a full-scale comparison cannot be made, but it is highly conspicuous that a considerably higher proportion of German enterprises realize investments in order to implement Industry 4.0 and the rate thereof is intended to be increased even more in the “future”.

Figure 7 shows the differences of the Hungarian and the German answers. It is startling that while in Hungary the number of enterprises carrying out IT investments, amounts to 35.3% of the examined multitude, which figure is expected to increase to 39.8% in the future, this figure is 61.0% in Germany as a matter of course, which will rise above 71.0% in the future. As regards to research and development, the distance is even greater between the two countries. While in Hungary 27.8% of interviewees intend to invest in R&D and 31.6% thereof in the future, 58.1% of German companies invest in this area today, and this figure will increase to 72.5% in the future.

Based on the above, we presume that the distance between the levels of development of these two countries will be difficult to be reduced in this area.

At the same time, a further conclusion can also be drawn, namely that a healthier proportion, a distribution pointing towards a balance may be established between the areas as investment targets at Hungarian companies in the future. (Figure 7).



27. Present and future target areas of Industry 4.0 developments Hungary vs. Germany  
Source: own editing

As stated in another question, money is a necessary but insufficient condition for both country’s managers’

point of view. Research and development investments for boosting innovation will reach their objectives if they are regulated by conscious corporate processes. It is a basic issue whether a company has a technology and innovation management process for digitalization, and if so, to what areas it extends to.

25.1% of Hungarian respondents acknowledge that they have no such process in place, perhaps due to a lack of recognizing such a need. Only 10.9% have regulations completely covering the company's needs. In general, it can be stated that the IT area can be considered as the youngest and most innovative organizational unit within a company. Perhaps, it is due to this fact that the level of regulation of these processes is more dominant compared to traditional manufacturing technologies. At the same time, it is regrettable that the level of regulation of the service area (highly prioritized in Digitalization issues) is only slightly more than 12%.

## CONCLUSIONS

In this paper we have reported on a part of a survey, to learn whether Hungarian SMEs have been aware of digitalization and whether they put this area into their business strategies.

Our findings show that they are far behind large corporations by creating appropriate business models, establishing digitalization chapters in their strategies, or even thinking in Supply Chain terms.

As a conclusion we can state that there is room for further development on this field, even if compared to companies of the industrial steam engine Germany. A similar survey in another country of the world would be advantageous. The authors are looking to find research partners of the above.

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