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Barriers to the Competitiveness of Beer Industry Suppliers in the Application of Industry 4.0 Solutions - Presentation of the Partial Results of an Empirical Research

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Abstract: The paper examines the attitudes of the supplier base Industry 4.0 solutions from the point of view of competitiveness in one of the markets of Hungarian agricultural products, the Hungarian food industry, including the supply chain of beer production. I use the "Visegrád Four" countries as the basis for the regional comparison, and then I use the Hungarian answers, which came to the questionnaire of my own primary research, in context through in-depth interviews using the foreign results.

Keywords: competitiveness, Industry 4.0, empirical research, beer industry, raw material

1 Introduction

On the one hand, the aim of my study is to examine the issue as a scientific novelty, different from the focus of cross-industry research, which examines only countries, pointing to the specifics of a given industry, in this case the beer industry.

Another aim of the study is to identify the factors that are currently obstacles in order to increase the competitiveness of Hungarian SMEs, so that they can be addressed by recognizing them.

2 Literature review

From an international perspective, that is, across continents, we may encounter different consumer preferences, raw materials, and technology, and I refrain from discussing this due to the size limitations of this publication. Even in Europe, we



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can only rely on the description of general trends, because beer consumption has undergone and is undergoing a significant transformation in recent years thanks to the revolution in craft beers. Small beer companies influence the market for materials of multinational companies on the raw material and packaging side (i.e. the demand for more hops is directly related to the increase in the supply price, assuming full capacity utilization), but more importantly, on the demand side, they contribute to the change of preferences by educating consumers: while during previous economic crises a significant part of consumption is consumed by economy beers, resp. own-brand beers, with the advent of new recipes (or, in fact, the breweries that produce them), consumers are increasingly confronted with names hitherto unknown to them (such as IPA, such as Indian Pale Ale or APA, American Pale Ale, etc.), by trying them, on the one hand, newer beer-consuming layers become involved, and on the other hand, the preference of already consumers changes and consumption shifts towards more charismatic, more aromatic beers.

Compared to the products already on the market, the more aromatic beers mentioned above belong to a higher, often premium price category, so the proportion of products consumed changes in the slightly growing market. Understanding the general European trend described above, my basic concept was to examine the Central and Eastern Europe (CEE) as a constrained area, but I see that due to historically different developments (i.e. belonging to the former Soviet bloc), due to the different development of the economies (see the date of EU accession), I narrowed it down to countries with similar economic performance and European Union development goals, therefore I chose the cooperation of the Visegrad Four (Szegedi, Papp and Malouin, 2018).

In the case of the Czech Republic, there is a generally positive attitude and openness on the part of senior management rather than at lower levels of the corporate hierarchy. Companies don't even have an industry 4.0 strategy and no designated staff member to oversee the topic. Now, companies don't know exactly what to expect from these new tools and unfortunately, they have no idea of the relevant costs. In the absence of this, Basl's research sheds light on the fact that technology-induced improvements cannot be translated into practical life by management, among the factors that motivate employees, because most employees do not have knowledge of the subject. However, the joint research of Basl and Kopp also reveals that there are already companies in the Czech Republic that use these new solutions, but at the same time they can be financed by a small number of companies on the one hand and by highly capital-intensive companies on the other. The solution is used by several researchers to increase state subsidies, respectively. seen in the application of publicly funded programs. As for the beer industry, aggressive proliferation of commercial brands has emerged since the '90s, with new multinationals entering the market investing to expand available capacities and meet group-level production expectations.



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In Poland, research by Werner-Lewandowska and colleagues has shown that Polish workers are ready for such a change in the industrial environment in terms of competencies and are optimistic about the future, it is not in the way of change. The emergence of the following three factors is seen as lacking in current Polish companies: corporate capabilities, engineering knowledge and infrastructure. The first two are a factor that can be developed in the short term, but infrastructure issues go deeper into corporate operations: a negligible proportion of companies still use robots. This trend is not new, anno, the global beer giants appearing in the country after the change of regime saw the key to this, not in mechanization and automation, but in the transformation of existing business processes, based on the professional knowledge and experience of management members. The reason for the acquisition of the complete companies was that the groups of companies did not have knowledge of the local markets, it would not have been commercially justified to set up new factory units because not all the data required for the business plan were available.

Regarding Slovakia, according to the research of Grenciková et al. (2019), most Slovak companies do not plan to develop at all, however, those open to development plan to develop themselves in the field of industry 4.0 without horizontal or vertical partnership. At the same time, more and more of these companies are seeking external expertise.

This openness began with the transformation of regional economic processes, the disintegration of Czechoslovakia, when Heineken, SAB and AbIn appeared on the market and began their operations by transforming local supply chains, listening to local suggestions. As with other transformations, bulk purchases have become the norm rather than the purchase of fragmented quantities. The lack of information on the products to be procured locally among the products needed for production called into question the structure of the own operation, the acquisition of existing breweries with a well-established supplier base using proven processes was a logical step in the free markets after the change of regime.

According to the summary of Marionova et al. (2006), it is typical for the region that after the change of regime, Western multinational companies began to expand, but this was accompanied by varying activity and investment from country to country. Nowadays, as mentioned earlier, due to the large manufacturers, the markets of the countries are highly concentrated, the sources of innovation and R&D activities are these multinational companies.

Beside of the international outlook, we shall not forget the other Hungarian businesses neither:

Pányi had highlighted the stakeholder involvement as key success factor in the Industry 4.0 change management, using the automotive sector as example (Pányi, 2018);



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Király, Kis Jakab and Reicher had examined the representative of the transportation sector and they had found that reducing working hours (which can be an essential benefit of the Industry 4.0 tool application) can contribute for the development of the firm. (Király, Kis Jakab, Reicher, 2018);

Comparing the retail sector's developments to the above mentioned, Lekovic and Katai had published that the electronic retailing -which is strongly correlates with the IT background of the operations- had contributed the most to the overall revenue of given companies (Lekovic, Katai, 2016);

From software usage point of view, we have to mention a study from 2016: Horváth had shown in his paper that his research selected company had introduced a new software for the operational management, which is clearly help to the management to balance the resources (Horváth, 2016).

3 Methodology and results

After reviewing the literature, I conducted in-depth interviews with well-known company executives in the field to gain a better understanding of the terminology and to have up-to-date information from the industry. I examined the textual imprint of the in-depth interviews with content analysis, with the researcher's curiosity as to what are the most commonly used terms, call words, and what message does verbal communication associate with the topic. In addition to the direct e-mail inquiries reaching 350 professionals after the interviews, the research was also published on the LinkedIn professional community portal in the Corvinus Alumni Club (3739 members), the Hungarian Business Association (6478 members) and the Procurement People Network (6725 members). questionnaire.

Of the approximately 17,000 potential respondents, I recorded 111 responses, representing a rate of 0.65%. When sharing the questionnaire, I targeted and asked for the completion of those who are the Hungarian suppliers of multinational beer companies operating in Hungary.

The significance level of the Cramer indicator is 0.013, i.e. the relationship is statistically significant, so I reject the null hypothesis that there is no correlation between the variables. A value of 0.276 indicates a weak-medium relationship. Each of the respondents completed both questions, so two samples of 111 respondents form the basis of their cross-tabulation analysis. The primary task of the respondents was to indicate what their main activity is, i.e. in which direction the supply chain is in relation to the brewery.

To analyze the two in-depth interviews conducted, I used a description of their text, they were the units of analysis. I carried out the research from two points of view:



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on the one hand, in a quantitative way, I counted the most common words and phrases related to the topic, and on the other hand, in a qualitative way, focusing on the content. At the same time, I analyzed this content on two levels: on the one hand, at the level of manifest, i.e. visible, easily manifested, surface content, and on the other hand, at the level of latent, i.e. hidden, but decipherable, decipherable content. The following five words were most frequently mentioned: “New” 6 times, “Real” 5 times, “Product” 4 times, “Moment” 4 times, “Technology” 4 times. From the frequency of the words, I concluded that the two most common words confirm the forward-looking, innovative nature of the topic, and refer to the immediate, real-time application of the solutions. differentiates these solutions in the process. The product could be included in the keywords because, on the one hand, the products of Industry 4.0 are present as products to be sold on the market, and on the other hand, the buyers can improve the quality of the output of their own production. The words duration and technical solutions refer to the implementation of multiple data measurements instead of statistical averages, and to the independence of the measurement from human intervention. Regarding the questionnaire, the respondents were competitive and. Of the industry 4.0 solutions that contribute to this, digital illiteracy was mentioned 84 times, lack of financial support 82 times, and lack of support for research, development and innovation 76 times as the most common barriers. The second most mentioned group belongs to the barriers with 70 and 40 mention frequencies. Missing or outdated information and communication technologies (68 mentions), “Outdated production technologies, processes” (61 mentions) and “Lack of skilled labor” include 46. The medium frequency of mention suggests that companies have indicated barriers to competitiveness in relation to their own current manufacturing / service activities, i.e., in my interpretation, not only barriers to competitiveness in relation to industry 4.0, but also in their day-to-day operations. As the respondents had multiple response options, it is also worth noting that the fewest mentions were given to the narrowing market opportunities (mentioned 4 times) and the lack of expansion opportunities (mentioned 5 times) as an obstacle. That is, they see these two components as the least disruptive, as they do not see their own market shrinking, and they know exactly what expansion opportunities are available to them.

54% of the respondents work for companies with less than 50 employees, 17% work for a company with between 50 and 100 employees, and companies with more than 100 and 400 employees have the same number of respondents, two did not answer the question.

The headcount data show a match between the number of SMEs registered in Hungary and with data on employment of micro-enterprises and in logistics (more precisely with the low number of family businesses typical of transport), cf. the distribution of answers to the question about the company's field of activity.

More than 80% of the respondents are FMCG manufacturing service partners, which of course includes HR services, IT services, real estate management services



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and logistics services, among others, so the population surveyed with the questionnaire is relevant and valid for the dissertation. The proportion of responses from FMCG companies is close to 10%, which also gives an analysis of the market under investigation.

The distribution related to the registered office highlights the predominance of the Central Hungary region, however, in addition to the two missing answers, it contains answers from all three large regions. The division of the territory of Hungary was made due to the headquarters of the 3 large brewing companies already discussed in the dissertation (Sopron, Budapest and Bőcs), with the intentional omission of the county or other territorial investigation units of EUROSTAT.

Almost half of the respondents (48.65%) have a quality assurance certificate, 42% have a value between 2 and 5 and 7% have more than 5 certificates, 2 people did not answer here either.

Findings

As a summary of the manifest content of the interviews, it can be said that the importance of the data and analyzes was emphasized by the subjects of the interviews as the foremost, primary step in the processes of Industry 4.0. It is important, so to speak, essential for companies to have a detailed understanding of the technology and to be open to what they do not yet know.

I analyzed the latent content from the tendency of certain concepts and the co-occurrence of the elements and their legally recurring features: I see the lack of manpower and the affinity for the integration of processes in the management of supply chain actors as key, unspoken factors. The current and future shortage of manpower means that the working time spent on the production of one unit of product must be reduced, and thus the further use of mechanized, automated solutions is recommended. The openness and attitude of the management towards integration is a strategic element of the company's operation, which in the long run determines the applied technologies, costs and the closeness and depth of cooperation.

The experience and theoretical knowledge of the practicing company professionals and managers on the topic highlighted the need to examine the supply chain, i.e. not only the internal, logistical and production processes of brewers, but also the processes and inputs that preceded it. It was particularly interesting to me, as the conclusions of the discussions, that companies were open to independent, professional guidance if they did not have to bear the costs themselves or were presented with "good practices" from other companies, i.e. exactly the solutions that could be applied to them. Feedback also indicated that so far businesses can only deal with the topic on the basis of separate knowledge bases, a common cross-section is missing: a guide applied to Hungary, negotiating the beer industry and



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assisting SMEs (or even only industry technology report or industry analysis with Industry 4.0 focus). could apply his thoughts and suggestions is not yet available. I believe that answering these questions in my dissertation is a scientific added value and novelty.

Due to the answers to the questionnaire, the most frequently mentioned factors shed light on an interesting trend, which could also be a concluding sentence of my study: the current Hungarian brewing suppliers, which supply to multinational brewers, resp. on the one hand, they admittedly do not understand digital trends (i.e. digitally illiterate in this respect), as their production processes or administrative tasks have been backed up to date with online, real-time or possibly automated solutions it goes in that direction. At the same time, the most important conclusion due to the lack of financial and R & D & I subsidies is that the examined companies do not feel development as an internal compulsion, but as a result of an external impact, a task to be supported and implemented from external sources. The lack of support for the above subsidies is echoed in the other responses, namely that, for example, missing or outdated information and communication technologies should not have been in the second most common mention if self-development had been a priority for companies. As companies do not finance technological developments themselves, they cannot enter the market more efficiently at a given cost level or more cost-effectively at a given production volume, which may put them at a competitive disadvantage in the short term, for example in neighboring countries. trends have been identified and are being implemented for implementation. In the case of non-stationary activities, companies in neighboring countries may take advantage of the reduction of barriers to the free movement of services and gain a competitive advantage over Hungarian companies across borders.

Only one direct material supplier responded, evidently from the brewery's input side. On the other side, 3 responses were received (due to the low number of pieces compared to the sample size, the focus of the research on which the dissertation was based was the upstream side), but this customer side - due to the complexity of the Hungarian economy - can be represented by other actors in the supply chain (for example, if a malt producer has a pub and can take advantage of a previously established business relationship). Representatives of 10 production companies filled in the questionnaire, which refers to the producers of other possible substitutes with similar characteristics in addition to the three large breweries (for example, soft drink producers for non-alcoholic beers and champagne for stronger, buck beers). 8 Indirect material suppliers shared their opinion, their portfolio includes consumables, logistics equipment (e.g. EUR pallets, CHEP trays, etc.). Representing the largest set of 89, manufacturers' service partners from all segments of the business process, such as HR, IT, etc., appear.



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Summary

The current Hungarian brewing suppliers, which provide direct and indirect products and services to multinational brewers, do not understand the digital trends, as their production processes or administrative tasks have been supported by online, real-time or possibly automated solutions to this day, despite to see that the market is heading in that direction. Due to the lack of financial and R & D & I subsidies, my research pointed out that the examined companies do not feel development as an internal compulsion, but as a result of an external impact, a task to be supported and implemented from a source outside them. By removing known barriers to competitiveness, using software and hardware available in the markets (even so-called "boxed"), domestic companies could improve their productivity, economy and be able to expand into new markets.

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