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SELECTED ASPECTS OF DEVELOPMENT OF THE FOOD INDUSTRY IN POLAND IN THE UPCOMING DECADE

Key words: development options, restrictions, food industry, agribusiness

ABSTRACT. The aim of the article is to present selected aspects of food industry development, in Poland, in the upcoming decade. The food industry, as one of the most important sectors of Polish agribusiness, year by year is becoming a point of interest for many institutions that would like to indicate its achievements as well as suggest the most appropriate development options. The article deals with discussion issues concerning finding an optimal development path for possibilities of using intellectual capital, techniques and technology as well as the benefits resulting from these for the food industry in Poland at the beginning of the 2020s. Selected development paths with their advantages and drawbacks are presented, and broadly defined restrictive conditions. Quantitative methods, such as ARIMA type models and the Ward method were used in carrying out the studies. Two methods, the MV/BV method and the q-Tobin method, were used to calculate intellectual capital. A search for existing domestic and international literature and reports was also conducted.

INTRODUCTION

Issues concerning the functioning and development of the food industry in Poland may be considered an original type of experimental field for researchers, economists and representatives of economic practice. As one of the most important sectors of the economy, the food industry in Poland is of interest to all sorts of institutions and companies dealing with the ongoing monitoring of its functioning and, at the same time, extrapolation of hypothetical development in the modern economy with the use of the latest techniques and technology. The most important institutions dealing with such activities in Poland include the Institute of Agricultural and Food Economics, the Institute of Agriculture and Rural Development and the Agricultural Advisory Centre in Brwinow, with all its branches, among others. The food industry, due to its functions towards society, is permanently supported by the government and, at the same time, within the financial envelope, benefits from European Union support. One of the most important functions of the food industry, not only in Poland but also in the world economy, is to provide food safety, which predestines it to special treatment and special institutional and research care. Together with the end of the third decade of the food industry functioning in the market economy in Poland, we should ensure its development, use possessed intellectual capital, modernize,

introduce modern techniques and technology, and identify the challenges that inevitably determine its position in the future.

THE MODERN FOOD INDUSTRY IN POLAND

The current position of the food industry in Poland results not only from EU accession but also from an almost thirty-year effort of agricultural producers and entrepreneurs wishing to participate in modern food manufacturing. In the second part of this period, prosperity has been observed and organizational units of the food industry in Poland have proved their value, not only in their own country but also on an international arena. The food industry has become a branch of the agribusiness sector in the economy worthy following and its enterprises were an example for others to follow in the way it has quickly transformed and adapted to European Union requirements regarding quality, sanitary and veterinary rules. Polish products were becoming more and more competitive both on the domestic and international market and Polish enterprises became crucial players in the food production supplied on an EU and global market [Firlej 2017, p. 346]. According to analysts from the IGD Retail Analysis company, food products trade in Europe will have increased by over 16% by 2022 and will equal ~ EUR 2,300 billion, with new European Union member countries contributing considerably to this. At present (the end of 2019), it ranks eighth place in terms of food products trade in Europe and, in accordance with an evaluation by experts from the IGD Retail Analysis company, it is worth EUR 63 billion. It is estimated that the sale of food products in Poland will grow about 3.1% year after year, which will exceed their sale by about 1% in countries like France, Germany and Italy. Its value will increase to over EUR 73 billion. Experts emphasize that the food industry in Poland is subject to stable development, which is supported by the stable economic situation. Its growth will be facilitated by, among others, investments in new technologies and the permanent modernization of production processes. The ever increasing range of food products in leading food chains also proves that there is a constant development of the food industry in the agribusiness sector in Poland. It should also be taken into consideration that the food industry in Poland is facing challenges addressed at entrepreneurs as well as consumers in order to counter food waste which has become a plague nowadays, both on domestic and international markets. As reported by *Rzeczpospolita* governmental organisations estimate that, by introducing new laws, 100 tonnes of food may additionally be saved every year. According to European Union estimates, 89 tonnes of food is wasted every year – 179 kg per person, in Poland 9 million tonnes, 235 kg per person [Pogroszewska 2019][1].

[1] On 18 September, the law on the prevention of food waste entered into force introducing new responsibilities for the trade sector. Large retailers and warehouses will have to conclude an agreement with a non-governmental organisation and provide it with food free of charge. It refers to entities with a retail space above 250 m^2 (for the first two years above 400 m^2) with an income coming from at least 50% of the sale of food. On 1 March 2020 regulations of the law on fees will enter into force. Retailers will pay 0.1 PLN for 1 kg of wasted products. They will calculate the amount at the end of the year by themselves and pay into the bank account of the organization by 30 April. In case of not fulfilling this requirement they will be fined from PLN 500 to PLN 10,000.

CHALLENGES FOR ORGANISATIONAL UNITS IN THE FOOD INDUSTRY

Taking into account the necessity of the constantly needed and absolutely required production of food products, the food industry faces a lot of challenges resulting from market mechanism influences and the reaction to competitive activities in different fields. The 4.0 Industry, called the fourth industrial revolution, is ever more often mentioned. It aims at creating intelligent factories as well as a surge in productivity. Rapid economic changes due to technological development, the growing level of robotization of production and a skillful exchange of ideas, experiences and information facilitate the implementation of the 4.0 Industry idea aiming at supporting entrepreneurs in developing and implementing new technologies and business models based on the conception of modern production. The potential of the 4.0 Industry in the era of modern production seems unlimited and a fully automated plant with modern robotized working places in Poland is just a matter of time. Plenty of them are at a preliminary stage and entrepreneurs emphasize that more such plants are still needed. While visiting functioning entrepreneurs in particular sectors of the food industry (i.e. brewing, non-alcoholic beverages, food concentrates etc.) it is evident that many of them have a modern production, properly planned and realized on the basis of a professional strategy and with the use of new solutions on a sector level. Entrepreneurs have better orientation in market needs regarding logistics solutions trying to optimize production processes, equip their plants with modern highly automated warehouses, autonomous transportation and support devices (i.e. drones) available on the market. The currently functioning market needs to ensure the production of food products on a massive scale in line with quality needs, which means manufactured from proper raw materials, according to good practice and having required certificates. The modern food industry should be prepared and ready for new challenges that will ensure the achievement of success in the future. It is increasingly difficult to outdo contemporary food industry leaders whose production volume and influence on the world market often have a gigantic dimension. For this reason, a number of studies should be conducted regarding the search for distinguishing elements of Polish food products and, at the same time, supporting the achievements developed with so much effort over the last three decades by food industry companies in Poland. The fragmented food market also requires studies as it is facing consolidation tasks involving mergers and acquisitions or company succession – their scenarios and variants. There is still a need to codify the most attractive sectors of the food industry in Poland.

MANAGEMENT STAFF

A special and, at the same time, very difficult challenge in planning the development of the food industry in Poland will be the modification of managerial roles, which will take place in the era of modern production demanding competences, qualifications and large scale employee reconversion unknown so far. The perfectly formed human capital is to cope with automated production processes, modern technologies, automation and robotization of workplaces, which require a new approach to the strategic management of food enterprises. It also should be taken into consideration that, in the near future, a

generational change will be more frequent, which means the takeover of companies resulting in the possibility of introducing more modern solutions, know-how and a modern approach to modernization. There will definitely be modern management strategies of food companies already supported by the success of Polish food, not only on the domestic but also international market. Staff managing food enterprises in a modern way will have to take care of creating and ensuring the effective realisation of the company's development plan using the experience of their leaders and constantly implementing new technologies. Many companies will be forced to comply with merger and takeover processes, some of them – consolidation processes, but a number of them will go bankrupt not withstanding market competition. The best companies will have to focus on new technologies as well as well-educated and qualified management staff supported by influencers, celebrities or trendsetters. Social media with its well-trained and expert staff can also be significant in food company development and should inspire producers and consumers to activity and promote Polish healthy food on an international market and prevent the limitation of its advantages and sale. Nowadays, bloggers and media most frequently used by consumers, such as Facebook, Instagram, Snapchat, Pinterest play a significant role as they are the places of first contact for consumers and, in a short time, can be more closer to them. The media create new promotion ideas and build new consumer habits which, especially in the case of younger age groups, is very important. On the other hand, we should not only care about the needs of millennials but also take into account the demands of the 'silver generation' by developing marketing strategies to support brands for the "50+ generation".

MATERIAL AND METHODS OF STUDY

The aim of the study was to present possibilities resulting from the measurement of intellectual capital of selected WIG-Food index companies and identify the development of average intellectual capital in them in the years 2004-2018 with a forecast on the basis of a model. The quarterly data from the years 2004-2018 referring to selected financial results were used in the study. Data was downloaded from the portal Investing [Investing.com 2019] and Notoria [Notoria.com 2019]. Descriptive and comparative methods were used in the study as well as selected quantitative methods such as ARIMA type models and the Ward's method. To calculate the value of intellectual capital two methods were used: the MV/BV method and the q-Tobin method.

The MV/BV method was proposed by Thomas Stewart in 1997 [Stewart, Ruckdeschel 1998] and uses the difference between the book value and market value of a company to calculate the value of intellectual capital. The results do not indicate a direct value of intellectual capital in the company but the fact that it exists. The q-Tobin method was proposed by Nobel Prize winner Tobin in 1969 and is the ratio between the market value and the cost of exchange of tangible fixed assets. The Q-Tobin method, like the MV/BV method, is used to analyze the evolution of intellectual capital in time and compare results between companies operating in the same economic area.

The notation of ARIMA models (Auto-Regressive Integratef Moving Avarage) is defined with the use of signs (p d q)(P D Q) and the basic form of the ARIMA model is presented as:

$\phi(L)\, y_t = \theta(L)\varepsilon_t$

where $\phi(L)$ and $\theta(L)$ are polynomials of delay operator L which is defined as: $L^n y_t = y_{t-n}$.

These models enable to forecast the results of time series on the basis of held historical results. ARIMA type models require that the analyzed time series was stationary, which means that such parameters as the average and variance are stable. In order to fulfill these conditions the study uses the differentiation method with a delay by one period of the analysed time series.

THE MEASUREMENT AND FORECAST OF INTELLECTUAL CAPITAL DEVELOPMENT

Intellectual capital called "wealth of the organization" [Stewart, Ruckdeschel 1998, Sveiby 1997] or "asset of the organization" [Dzinkowski 1999] is key to success in building an organisation in the 21st century. It is defined in many ways and one of them is a statemant that intellectual capital is a sum of intellectual property and the values of complex connections of processes and cultures connected with inter-personal relationships and human capital in an enterprise [Fitz-Enz 2001]. According to the Management Encyclopaedia: "Intellectual capital may be defined as a company's intangible assets which do not have physical or financial meaning. These assets remain under organiza-

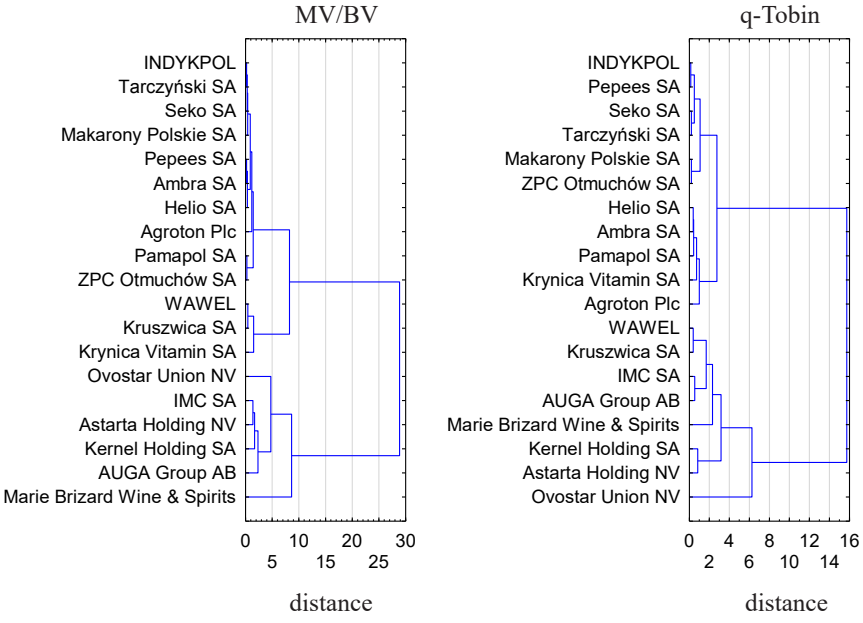

Figure 1. Dendrogram of a group of companies diversified due to size of intellectual capital measurement with selected methods

Source: [Garncarz, Mierzejewski 2019]

tion supervision and influence a generation of other profits. They also have a significant impact on company quality" [mfiles.pl 2019]. A. Pobrotyn defines intellectual capital as non-financial capital reflecting a hidden gap between market and book value [Pobrotyn 2012, p. 122]. Analysing the company's intellectual capital in relation to transformations taking place in organisations seems particulary important [Garncarz, Mierzejewski 2019]. A number of measurement methods of intellectual capital were proposed in the literature, including the MV/BV method and the q-Tobin method [Sveiby 1997].

Intellectual capital is an important distinguishing factor of a company in the present economy. Knowledge and elements connected with it as well as general use influence the results achieved by the company [Firlej et al. 2016]. Due to the values of results of intellectual capital indexes two groups of enterprises may be distinguished from among WIG-Food index companies (Figure 1) [Garncarz, Mierzejewski 2019]:

– Group I – INDYKPOL, Seko SA, Pepees SA, Helio SA, Ambra SA, Makarony Polskie SA, Pamapol SA, ZPC Otmuchów SA, Tarczyński SA, Krynica Vitamin SA, Agroton Plc;

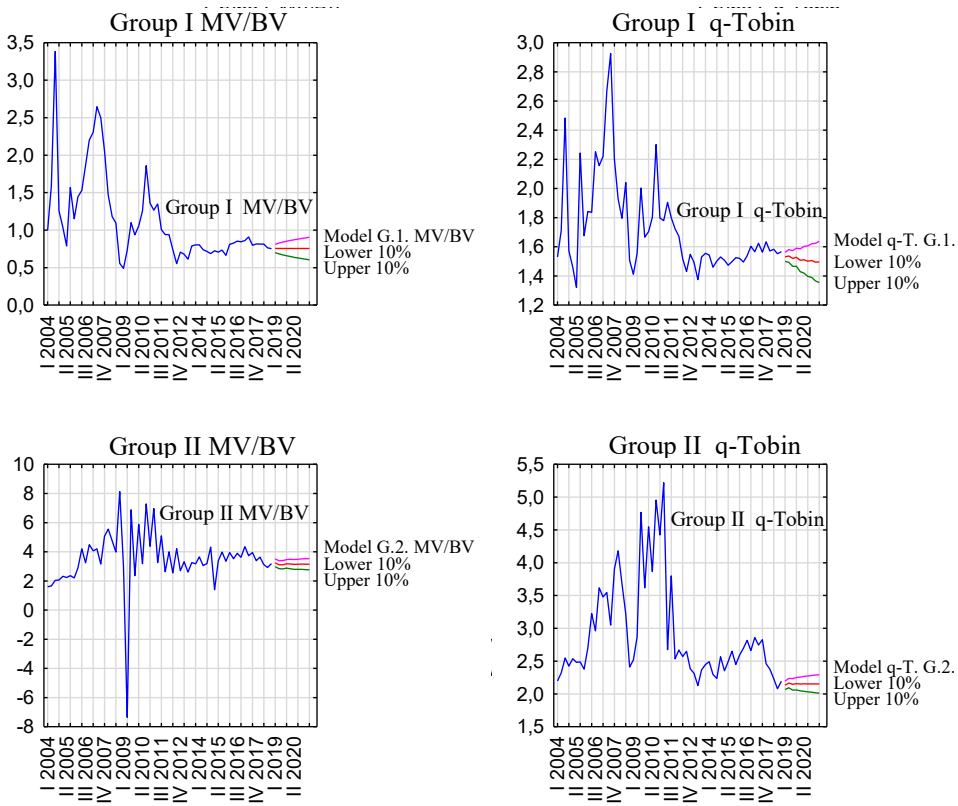

Figure 2. The average value of intellectual capital in the years 2004-2018 with the forecast based on a model

Source: own studies based on data [Investing.com and the Notoria.pl]

– Group II – WAWEL, Kruszwica SA, IMC SA, AUGA Group AB, Marie Brizard Wine & Spirits, Kernel Holding SA, Astarta Holding NV, Ovostar Union NV.

The average values of intellectual capital parameters were calculated for the presented groups of enterprises and these values were modelled on the basis of ARIMA model assumptions. The results of calculations are presented in Figure 2. The MV/BA method as well as the q-Tobin method indicate a dynamic decrease of intellectual capital value in companies by 2012 and then a relative stabilisation of the level of these factors. In addition, the rapid improvement of intellectual capital value in WIG-Food index companies have been observed since 2004 when Poland joined the European Union. According to the forecast, it may be noticed that there has recently been a visible stabilisation of the intellectual capital level (bigger stabilisation is observed in the second group of enterprises), which indicates the necessity of redefining the sector business model or more intensive implementation and production based on intellectual capital.

CONCLUSIONS

In summarizing considerations on food industry development in the upcoming decade, it may be stated that the food industry is facing one of the best periods in terms of its increase and development. The current economic upturn in Poland undoubtedly facilitates this situation but it is also supported by the fact that the food industry ensures our food safety, so is of everyone's interest. On the basis of the conducted studies, the following conclusions and reflections can be drawn:

1. The food industry plays a very important role in a person's everyday life, so it is a research field in finding an optimal development path. At the beginning of the third decade of the 21st century, the definition of the possibility of using intellectual capital and the implementation of its functioning structure, especially dedicated techniques and technologies will be required. In order to enhance company competitiveness, a wide range of instruments should be used, including information systems, for managing companies as well as the modernisation of their organisational culture and Corporate Governance.
2. The conducted studies proved that in the analysed companies there was a dynamic decrease of intellectual capital value until 2012 and after that the level of indexes relatively stabilised. The situation shows stabilisation in a sector which should be discounted in the following years.
3. It is also emphasized that since 2004, after Poland's accession to European Union structures, there has been an unpredictable and significant improvement of intellectual capital value in WIG-Food index companies. Its further development would be particularly useful to follow current world trends.
4. The conducted forecasts suggest that thinking about the necessity of redefining the sector business model, supporting the need of a more intensive implementation of management and production methods based on intellectual capital are becoming appropriate, which results from the fact that the visible stabilization of the intellectual capital level has recently been observed.

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WYBRANE ASPEKTY ROZWOJU PRZEMYSŁU SPOŻYWCZEGO W POLSCE W NASTĘPNEJ DEKADZIE

Key words: warianty rozwoju, ograniczenia, przemysł spożywczy, agrobiznes

ABSTRAKT

Celem artykułu jest przedstawienie wybranych aspektów rozwoju przemysłu spożywczego w Polsce w następnej dekadzie XXI wieku. Przemysł spożywczy, jako jeden z najbardziej znaczących działów polskiego agrobiznesu, staje się z roku na rok punktem zainteresowania wielu instytucji, pragnących wskazać jego osiągnięcia, a zarazem podpowiedzieć najbardziej odpowiednie warianty jego rozwoju. W artykule podjęto tematykę dotyczącą dyskusji w obszarze znalezienia optymalnej ścieżki rozwoju w zakresie możliwości wykorzystania kapitału intelektualnego, technik i technologii oraz wynikających z tego tytułu korzyści dla przemysłu spożywczego w Polsce u progu lat 20. XXI wieku. Przedstawiono wybrane ścieżki rozwoju przemysłu spożywczego wraz z nakreśleniem ich wad i zalet, a zarazem odniesiono się do szeroko pojętych warunków ograniczających ten rozwój. Przy realizacji badań wykorzystano metody ilościowe, takie jak: modele typu ARIMA oraz metoda Warda. Do obliczeń wartości kapitału intelektualnego wykorzystano dwie metody: metodę MV/BV oraz metodę q-Tobina. Przeprowadzono także kwerendę istniejącej literatury, raportów o zasięgu międzynarodowym i krajowym.

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