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Innovations in the Chocolate Manufacture as Part of Polish Confectionery Industry

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Abstract. From the perspective of every enterprise operating in the agri-food industry it is very important to be competitive on the market and meet the requirements of consumers. Among all the branches in this sector, the Authors' attention was attracted by the confectionery industry due to the high growth dynamics of chocolate manufacture in Poland. The purpose of this article was to characterize the innovations introduced in Polish confectionery industry in the enterprises manufacturing this category of confectionery. The article uses information originating from the subject literature and the data collected from major enterprises involved in chocolate manufacture. Ten enterprises with the total of 90% share in the sale of the discussed products on Polish market represented the research objects. The study was carried out in the first half of 2018. The first part of the article defines the essence of innovations and identifies their types. Next the article presents the part of Polish confectionery industry focused on chocolate manufacture and provides examples of the applied innovations. The article is finalised with presenting development opportunities for the described part of confectionery industry along with identifying further research directions in the studied area.

Keywords: Innovation, Chocolate Manufacture, Confectionery Industry, Food Industry

1 Introduction

Currently innovations, and thus innovativeness, represent an important component in the focus of both entrepreneurs and science. They constitute one of the fundamental determinants influencing the development of individual companies as well as entire enterprises. They define the pace, directions of economic development and forms of international cooperation [18].

Innovative activities are undertaken by both large and smaller enterprises. The conducted research indicates, however, that small and medium enterprises are not as innovative as the large ones. An important reason for this situation is the narrower activity scope of smaller entities as compared to large enterprises having a more extensive offer and more modern manufacturing technologies [28].

In the course of recent twenty years Polish agri-food sector was subject to significant transformations. It is one of the industries which revived swiftly after the

crisis resulting from the political transformation. Thus, it also turned out a very important stimulating agent of economic growth. In addition, owing to the continuous development of technical, technological and organizational nature, Poland has reached the forefront of modern and innovative European food producers [5]. The agri-food sector covers many branches among which the following can be distinguished: fruit and vegetable industry, bakery industry, meat and fish industry or confectionery industry. The latter is particularly important due to its dynamic development. The sector covers approx. 350 producers, among which 100-120 companies employ over 50 people. The following major enterprises with foreign capital, manufacturing chocolate products on the Polish confectionery market can be listed: Nestle Polska, Mondelez International, Lotte Wedel, Ferrero and Mars Polska. Polish confectionery manufacturers have 20-25% share in Polish confectionery production. The most important confectionery producers with Polish capital include the following companies: Wawel, Mieszko, Colian and ZPC Otmuchów [29]. Among all confectionery industry categories, the chocolate industry appears to be interesting because of the growing chocolate manufacture in Poland, its diversity and the increase in chocolate consumption. The market range of products is continuously growing and includes bitter, milk and white chocolates, without additives, with additives and filled ones. It should, however, be noted that the level of chocolate consumption in Poland, despite its growth, remains relatively low comparing to such European countries as Switzerland or Germany. Moreover, the forecasts for this category are quite promising. Therefore, it stimulates further investments in this sector. Currently, the manufacturers are highly competitive for each other as they keep introducing new or improved products into their offer [6].

The purpose of the article is to characterize innovations implemented in the Polish confectionery industry focused on chocolate manufacture. In order to carry out the set objective the article was divided into the following parts, which:

- define the terms of “innovation” and “innovativeness” and also discuss the types of innovations,
- describe the Polish confectionery market and provide examples of innovations in enterprises manufacturing chocolate products,
- identify the directions for further research and trends in chocolate manufacture.

The article is based on the subject literature review and on the data collected from major enterprises manufacturing chocolate products on the analysed market. The empirical research method was based on case studies using direct observation and structured interviews with the representatives of selected enterprises. Ten enterprises with the total of 90% share in the sale of the discussed products on Polish market represented the research objects. The study was carried out in the first half of 2018.

2 Innovations and Innovativeness in the Subject Literature Perspective

Each organization can be approached as part of the socio-economic system, distinguished for the realization of a defined goal, characterized by the specific tangible and intangible resources, which facilitate its achievement. Therefore, the following goals can be identified [22]:

- generating maximum profit,
- developing organizations in which profit is recognized as the measure needed for the implementation of developmental goals,
- creating value and passing it on to clients,
- co-creating value with clients in the experience-based environment.

In the rapidly changing environment, within which organizations operate, management should be focused on creating value for the client. Such defined goals result in creating modern strategies by organization managers approaching market as the best place for developing partnership interactions between organizations and clients [4]. It should also be observed that enterprises are continuously in need of the increasingly innovative solutions in order to retain their competitiveness on the market. Therefore, it seems obvious that the introduction of innovative products and services by organizations remains the most important condition for maintaining their market competitiveness [22].

J. Schumpeter is generally regarded the author of the concept of innovation. He identified innovations as the introduction of new products to the market, but also as the introduction of new production methods, entering new markets, acquiring new sources of raw materials or introducing new organization of industry. He also separated the meaning of such terms as “innovation” and “invention”, arguing that a large number of inventions will never turn into innovations, as they will not be introduced into production. On the basis of this concept various definitions of innovation were creates approaching it as an absolute novelty or as an implementation of solutions developed by another entity. The latter approach is currently most often presented in the subject literature [19].

In accordance with the definition by A. J. Harman innovations consist in the introduction of new or significantly improved products or processes on the market. In turn, G. Silverberg stated that innovations are the result of internal factors, such as expenditure allocated by domestic business entities to e.g. investments in human capital development. In addition, he believed that owing to the well-trained staff, the innovative possibilities of business entities keep expanding and thus result in economic development [13]. In J. Parker’s opinion innovation is a process involving all activities which bring a new product or a production method into practical use. This approach strongly emphasizes the practical application of innovation [35].

According to P. F. Drucker innovation represents a specific tool in the hands of an entrepreneur, which makes the opportunity to provide new services or start a new business based on an introduced change. He perceives innovation as an economic or

social concept rather than a technical one, which is identified with changing the value and satisfying the consumer by means of using specific resources [23].

In the opinion of K. Z. Poznański the innovations related to social and organizational changes are ignored to the advantage of technical innovations, which are very important for the transformations in production and economic development. According to the author, not every new product or technology can be approached as an innovation [20]. Based on this definition the following types of innovation can be distinguished:

- technological, i.e. the ones which introduce new and improved services, e.g. just in time [20],
- process-based innovations characterized by the implementation of new or improved production or distribution technologies. They cover changes in technology, equipment, hardware and software, and also marketing solutions, such as product placement, product or price promotion [17].
- product-based – they refer to the development of new products or the modification of the existing ones. Such innovations can be developed as a result of new knowledge or technology. They can also be based on new possibilities using the already known technology. However, the meaning of the word "product" is understood as a physical good or service [1].
- organizational – they refer to consortiums or clusters. This type of innovation is based on the application of electronic cooperation platforms. In terms of the enterprise management aspect they cover changes in an entity organization or work organization. Such innovations have a positive impact on the organization of work and production, improve health and safety at work and also facilitate employee's performance in the workplace [28].
- marketing – their scope includes the application of new marketing methods in an enterprise and also introducing a new packaging design of the sold products, new product placement on the market, new promotion methods or pricing strategies [32]. They also cover marketing strategy changes and the applied market impact instruments' changes, which are very important for enterprises [9].
- financial, related to obtaining funds, e.g. for the development of transport and logistics infrastructure within structural funds as well as attracting public contractors for the respective activities [27].

The subject literature provides many typologies of innovation. The most popular one was presented in the Oslo Manual. Originally, this division also referred to the definition of innovation, which indicates that such activities consist of many research and technical nature factors or process and product-based innovations only. In turn, since 2005 four types of innovation have been distinguished: product-based, process-based, organizational and marketing ones [22].

The authors A. Pietroń-Pyszczek and K. Piwowar-Sulej compiled different typologies of innovation focusing on the criteria of their division. In this respect the following innovations can be identified [19]:

- based on the field of activity they refer to (functional, objective, technological, organizational and ecological),

- related to technology (technological – process and product-based, non-technological – referring to services and marketing),
- based on their effect/scope of impact (process and product-based),
- based on the originality of changes (creative and limitative),
- based on the range of impact (internal innovations in an enterprise, innovations extending beyond an enterprise),
- based on the place of origin (domestic and foreign),
- based on the size scale and the range of effects (strategic and tactical),
- based on the psychosocial conditions of people implementing innovations (reflective, unreflective, intentional, unintentional),
- based on the stimulation mechanism (supply, demand-based).
- Innovations can also be divided in terms of [34]:
- an object – product-based, organizational, technological, marketing and social,
- the scale of changes – incremental and breakthrough ones,
- originality level – creative, imitating, seeming,
- changes complexity level – related, isolated,
- approach to the natural environment – ecological, indifferent, violating ecological balance, participants of the innovation process – coupled, uncoupled.

The concept of innovation is inseparably connected with the one of innovativeness. Innovativeness is understood as all activities involving the introduction of new products or technologies or the improvement of the existing ones. These solutions are supposed to contribute to the increase of not only economic, but also financial, technical and technological potential in the field of transport and logistics systems. The OECD (Organization for Economic Co-operation and Development) also formulated the definition of innovativeness, which indicates that such activity involves numerous factors of a research, technical, organizational, financial and commercial nature. Its goal is to develop and introduce new improved products and processes [27].

3 Chocolate Manufacture as a Part of Polish Confectionery Industry

The confectionery industry produces goods, which are characterized by the use of a significant amount of sugar and sugar substitutes. They are generally low in micronutrients, but rich in calories and carbohydrates. The confectionery industry consists of three categories: chocolate confectionery, sugar confectionery and gum products.

The confectionery market in Poland is growing faster than any other food industry sectors. Based on the Nielsen report, in the course of twelve months, from September 2016 till September 2017, it recorded an increase of 5.8%, with its value reaching PLN 17.3 billion [24]. In the analysed period, the largest increase was observed in the category of chocolate products – 6.3%. This category covers chocolates, pralines, bars and figurines and also chocolate sets. Although the sale of the latter product type amounts to only 9.4% of the entire category value, it is characterized by the sales

highest growth rate, which presents the level of 13.9%. The increase in sales is confirmed by the research conducted by the analysts from one of the banks operating in Poland, who state that the consumption of chocolate products in Poland has increased by 122% over the past five years and currently amounts to 6.3 kilograms per person [26].

These results are identical with global trends on the chocolate market, which is characterized by one of the most dynamic increases in sales value. According to Euromonitor International, the world's leading independent provider of strategic market research, it recorded an increase of 13% in 2010-2015 and reached the value of 101 billion dollars [3]. As reported by the World Cocoa Foundation, the annual consumption of cocoa beans exceeds three million tons and the global demand for this raw material is continuously growing. The discussed situation is the consequence of growth in demand for chocolate products on the emerging markets. For this reason, the chocolate market remains highly attractive for manufacturers and is characterized by high level of competitiveness. In turn, operating on this market involves high risk. Manufacturers of chocolate products face numerous challenges, of which the major ones include price rise of the main ingredients used in production, i.e. cocoa beans, milk, sugar, fat and oils, nuts or almonds, and the increase in labour costs.

Cocoa beans is the main ingredient in the production of chocolate. Its growing price results from the declining availability of this raw material. The Mars Incorporated warns that by 2020 the cocoa beans deficit could grow up to one million tons per year, i.e. fourteen times more than the respective deficit level recorded in 2013 [12]. In the long-term perspective it can amount to 2 million metric tons. This level can be reached by 2030 [11]. In addition to the increasing consumption it also results from the specific method of cocoa beans production. 70% of the total world production originates from West Africa (Côte d'Ivoire, Ghana, Nigeria and Cameroon). In this region, cocoa is grown by small entrepreneurs who use extensive cultivation methods. A further increase in the production of cocoa has to result from higher productivity of the existing mature trees and the replanting of old unproductive cocoa farms [33].

Growing labour costs represent yet another challenge. In the last twenty-eight years Poland has become one of the most important manufacturers of chocolate products worldwide as a result of extensive foreign investments in this branch of the food industry. In the years 1991-1998 the level of foreign investments amounted to 980.5 million US dollars, of which as much as 40% was spent on greenfield investments, i.e. the construction of production plants from scratch [31]. This situation was caused by the huge potential of the confectionery market in Poland and the desire of global producers to gain a good market position by brand building in the minds of customers and selling their products. In addition, the discussed investments were supported by the situation on the labour market, high unemployment rate and low level of salaries earned by Poles. In 1996 the total annual labour cost per one employee in Poland amounted to USD 5,424.00 and was six times lower than in the European Union countries, where it reached USD 33,572,00. In addition, the unemployment rate in Poland, in the same period was at the level of 14% [8]. Another important stage in the development of the confectionery industry was observed after Poland's accession to the European Union (EU). Lifting customs borders and still relatively low labour costs allowed global

corporations to increase product margins by transferring production from Western Europe to Poland. The level of foreign investments in the food industry in Poland went up from EUR 1,270 million in 2005 to EUR 1,915 million in 2015 [7]. A large percentage of these funds was addressed to enterprises operating on the confectionery market, which in the same period recorded an average annual growth at the level of 4.4% [16]. As a result of these investments, the export of confectionery products manufactured in Poland increased by 79.5%, i.e. from EUR 1.66 billion up to EUR 2.98 billion, and Poland turned into one of the leading confectionery exporters worldwide, with the share of 4.8% [10]. Unfortunately, the situation has changed for confectionery producers in recent years along with the significantly declining unemployment rate, as registered by the Central Statistical Office. In 2005 it was 17.6%, whereas in 2017 went down to 6.6% [8]. This change resulted in the fact that the labour market in Poland was redefined and is currently referred to as an employee market and the companies operating on it must compete with each other to provide the necessary resources for running their own business. Higher demand for employees affected the total labour cost, which in the corresponding period increased from 17,319.00 USD [2] up to 31,930.88 USD [25].

Consumer expectations represent an equally important component, influencing the strategy of chocolate manufacture development. One of them is related to the trend of shifting consumption towards healthier products. Despite the fact that as many as 87% of consumers are predominantly guided by the product taste and the main motivator of chocolate products' consumption is the desire to enjoy it, consumers are still looking for healthier alternatives as a result of healthy lifestyle being intensely promoted in the media. These trends are supported by the government units, which issue stricter provisions and regulations, resulting from the public debate on health problems related to fats and sugar. In connection with the above, manufacturers launch products based on natural ingredients and supplemented with healthy additives, such as e.g. whole grains. Due to the increasing life intensity and free time limitations, the growing role of snacks in a daily diet can be observed on the confectionery market. For this reason, the availability, consumption convenience and the portion size also represent important factors when choosing a product. To sum up the above discussion, it can be stated that the key factors in the development of the chocolate market offer are pleasure, health and convenience. These components also fully reflect the expectations important for the Polish consumer.

4 Examples of Innovations Taking into Account Different Typologies of Innovations

In order to identify trends in the field of innovation development related to chocolate manufacture in Poland, the research was carried out covering major enterprises running the discussed business and operating on the chocolate and confectionery market. Due to the fact that the problem of innovation in relation to food industry enterprises, and specifically to the manufacturers of chocolate and confectionery products is a new issue, the main method of empirical research consisted in carrying out case studies

realized using direct observation and structured interviews with the representatives of selected enterprises. Based on the conducted interviews it was observed that innovation represents one of the main areas of interest for entrepreneurs and constitutes an important pillar in developing a given company strategy and position on the market. As a result of the carried-out research, a wide spectrum of different types of innovations was identified, which were implemented by enterprises manufacturing chocolate products. These innovations can be classified using various division determinants. In order to show their full complexity, the table below presents examples of the implemented innovations along with various typologies assigned to them.

Table 1. Examples of innovations in enterprises manufacturing chocolate products.

Innovation typology	Implemented in chocolate manufacture
Technological Process-based Creative Internal	The application of near infrared (NIR) spectroscopy in chocolate crystallization characteristics by the global chocolate manufacturer with seven plants operating in Poland.
Technological Process-based Limitative	The automation of production processes through using robots in lining the mouldings for packaging boxes of chocolates, for packaging these boxes in multipack cardboard boxes and for palletization – an enterprise from Lower Silesia, employment reduction, savings of approximately 255 thousand dollars. The investment in an innovation in the field of transmission and automatic packaging of the finished product in the central packaging room – an enterprise from Warsaw. The development of a solution for the automatic packaging of chocolate pralines in single flavour chocolate boxes – an enterprise from Lower Silesia, a significant reduction of the packaging line staff from thirty to ten people and savings of 670 thousand dollars. The implementation of the "future line" for the production of various types of chocolate products without the need of refitting, higher efficiency of the production process, the reduction of losses resulting from the processing line downtime – an enterprise from Opolskie region. The application of a cold stamp method for the production of filled chocolate products – an enterprise from Opolskie region.
Technological Product-based Creative	The development of a ruby chocolate recipe characterized by a new ruby colour and berry-like flavour with a slightly sweet and sour note – a producer from Łódzkie region [14].
Technological Product-based Creative Functional Demand-based	The development of a milk chocolate recipe with high content of cocoa, a mixture of milk and bitter chocolate, which turns milk chocolate into a product characterized by higher nutritional value – a global chocolate producer with seven plants operating in Poland. The development of a new category of confectionery combining chocolate and cookies – "chocobakery", a combination of shortcrust pastry with smooth and creamy chocolate texture, in this category of products a cookie plays a functional role, i.e. reduces light hunger and is the source of good ingredients, such as grains rich in nutritional value, which is valuable for the body, whereas

	chocolate is the synonym of pleasure and reward – several chocolate manufacturers.
Technological Product-based Limitative	The implementation of a new packaging system for the chocolate mix products "pic and mix" – a consumer can compose his/her own mix in the store. The implementation of heat sealing packaging for chocolate bars, replacing the traditional packaging made of aluminium foil and paper – several chocolate manufacturers. The reduction of portions by implementing miniature versions of the existing chocolate products, i.e. the so-called "bite size" – e.g. a miniature version of popular wafers produced in Kalisz, packed in bags.
Organizational Creative Strategic	The support for cocoa supply chain through the "Cocoa life programme" aimed at supporting the cocoa growing communities: broadly understood development, promoting entrepreneurship, empowering women and children by providing high quality education – a global chocolate producer with seven plants operating in Poland.
Organizational Creative Strategic Ecological	The implementation of improvements in monitoring pests causing 40% cocoa beans yield losses through carrying out the "Integrated Management of Cocoa Pests and Pathogens in Africa" project aimed at increasing the productivity of cocoa farms and protecting the industry against cocoa beans deficit on the market [30] – the global producer of chocolate with seven plants operating in Poland.
Organizational Creative Tactical	The development and implementation of the original project management method connecting traditional and agile methods combined with high efficiency systems [21].
Organizational Creative Tactical Ecological	The implementation of Lean Manufacturing philosophy known from the automotive industry, aimed at waste reduction and eliminating unnecessary operations and procedures in the production process. It facilitates the reduction of waste generated in the chocolate manufacture process, which results in lower production costs and reduced consumption of raw materials. This philosophy supports manufacturing the highest quality products in response to consumers' expectations [15].
Organizational Limitative	The centralization of processes related to the development of products through the creation of global research and development centres – a global chocolate producer with seven plants operating in Poland.

5 Conclusion

Chocolate manufacture enterprises face numerous challenges and therefore are highly interested in implementing various types of innovation. They remain fully aware that without them they may lose their current position on the market. The conducted research shows that a greater emphasis is placed on technological innovations, which are approached as a response to the current needs of consumers, on product-based innovations or process-based innovations resulting from the current macroeconomic situation. Only a few of the surveyed enterprises are active in the field of organizational

and management type of innovation. Enterprises should focus their efforts on the activities related to the implementation of these innovations which not only allow better adjustment of products to consumers' needs, but above all on the ones which enable price risk management of raw materials and support the re-engineering of products, thus allowing to meet consumers' needs along with reducing costs. The Polish market of chocolate products has taken advantage of its chance and is developing very dynamically, also owing to the already implemented innovations. In the face of changes occurring in the macroeconomic environment, the enterprises manufacturing chocolate products should intensify their activities in the field of organizational innovations, which support increasing their competitiveness and strengthen their market position.

The above studies indicate new trends in the field of innovation in the confectionery industry in the sector of chocolate manufacture enterprises. They can serve as an example and result in defining a new direction of innovation development towards organizational or ecological typology. At the same time, they can be used as the commencement of research on motivational factors for the development of innovations within these typologies. During the conducted structured interviews, the representatives of enterprises easily listed the benefits of implemented technological innovations – new products' sales growth, higher market share, savings in labour costs, the reduction of losses resulting from the processing line downtime or the generated waste reduction. In the case of organizational or ecological innovations this type of argumentation either did not appear or was difficult to measure.

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