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Business innovation

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INTRODUCTION

Innovation is an important factor stimulating the growth of the economy and its international competitiveness. The question then arises how to stimulate innovation, in which sectors and with what instruments / methods? In the field of production, innovation is the development and implementation of new concepts and technologies that improve the quality of products and services or increase production efficiency. For example, information technology has transformed the way goods are produced and sold and services provided, while at the same time creating new markets and business models. One of the most important effects of innovation is its impact on economic growth. In very simplified terms, they can lead to an increase in efficiency, i.e. achieving a higher production with the same expenditure. Many innovations started in Europe and it is still an innovative region, we undoubtedly have the potential to further strengthen our innovation. According to the Global Competitiveness Report prepared by the World Economic Forum, only three countries in the euro area are among the top ten countries in the world.

The R&D spending gap between the euro area and other major developed economies has persisted for some time. In addition, the diffusion of innovation in the euro area seems slow. A recent study by the ECB (European Central Bank) has shown that there is a large difference in productivity between the highest and lowest performing companies. This means that while well-functioning, pioneering companies are very innovative, the so-called laggards reap little benefit from innovation. Structural measures supporting innovation include increasing spending on research and development and investing in education, as well as making it easier for entrepreneurs to set up new businesses and to withdraw those that have filed for bankruptcy more quickly.

Innovation plays a special role among the factors influencing the competitiveness of enterprises and business processes. Regardless of the size of the conducted activity, effective management of innovation processes is the main element of the company's competitiveness. The competitive advantage is determined by the susceptibility to the implementation of any product and technological changes, changes in the management system or in communication with the potential user of the product. Despite many factors limiting the implementation of innovations in small and medium-sized enterprises, their implementation is necessary, because it allows for further development of these companies (often family ones) and more effective adaptation to changes taking place in its environment, winning new markets, and thus gaining a competitive advantage. The need to meet the increasing demands of customers and growing competition motivates small and medium-sized enterprises to introduce changes in various areas of their operation. If a company wants to

develop and be successful on the market, it must improve the products or services it offers, improve technological processes and improve the organization of production, and therefore it should constantly seek and implement innovative solutions.

For the proper development of the enterprise, it is very important to develop a strategy to promote innovation, because their lack becomes the most common cause of a decline in competitiveness. The ability to create and properly use innovations is an important element determining the efficient functioning of an economic unit and the possibility of its further development in a competitive market. The purpose of enterprise development management should be to shape technical, organizational and economic progress, and organizational innovations relating to the sphere of management along with product innovations are among the most important factors shaping the competitiveness of enterprises, including small and medium-sized enterprises[1].

The company's innovation can be defined in several ways. The basic definition of an innovative company is that it is a company that has implemented at least one innovation, while a product or process innovator is defined as a company that has implemented a product or process innovation. All activities related to the development or implementation of innovations, including implementations planned for the future, are classified as innovative activities. Innovative activity carried out in a given period may have three types: activity completed with success, i.e. successfully implementing innovation (although there is no requirement that it should also be a commercial success); ongoing activity, i.e. activities in progress,

The problematic and increasingly difficult sale of agricultural products forces food producers to undertake numerous activities aimed at keeping regular customers with them. Correct identification of the customer's needs will create a demand for a specific good and will allow loyalty to a proven product. The constantly growing awareness of consumers is reflected in the demand for goods distinguished by an original recipe, which is the result of searching for a specific method and unique composition. The modern consumer, when making decisions about the purchase of food, becomes more and more demanding, therefore, it is not enough just to have the right price and standard quality. The basic issue, which is becoming more and more important for a potential customer, is the selection of products with appropriate parameters, among them the most important are: taste and health values, brand, manufacturing traditions, regional origin, or stricter control of the production process. Changes in consumer preferences, increased awareness of nutrition, etc. signal the producer to focus his attention on, among other things, creating an ecological product. The production of an ecological agricultural product is justified and is

[1] Quote from: P. Kokot - Stępień, Innovation management as a source of competitiveness of small and medium-sized enterprises "Organization and Management", 114/2017, p. 222 and p. 227.

an opportunity to improve competitiveness in agriculture. This evolution should be geared towards the production of low-chemical products in line with the promotion of sustainable agriculture. The production of an ecological agricultural product is justified and is an opportunity to improve competitiveness in agriculture. This evolution should be geared towards the production of low-chemical products in line with the promotion of sustainable agriculture. The production of an ecological agricultural product is justified and is an opportunity to improve competitiveness in agriculture. This evolution should be geared towards the production of low-chemical products in line with the promotion of sustainable agriculture.

CHAPTER 1

INNOVATIONS AND THEIR TYPES

Innovation is an attempt to come up with an original solution that meets the needs of the market. And reaching the commercial stage, because many fantastic ideas remained at universities - says Przemysław Pączek, CEO of Nevomo. - In my opinion, innovation is all about simplifying life - adds Wojciech Wieczorek, co-founder of AEROSIZE. - For me, the model of an innovator is undoubtedly Elon Musk, whose Tesla revolutionized electromobility. And it's not without significance that these are simply beautiful cars that look different from anything we've seen so far. I believe that if something attracts the eye, it is much easier to find potential recipients - thinks Zbigniew Gorol, constructor of Nosacz 2 (...)

Source: https://mycompanypolska.pl/artykul/byc-jak-elon-musk-polscy-innowatorów-2021-%5Bzecja%5D/6961

Traditionally, innovations (changes) are the result of a process that begins to generate an idea (idea) for a new solution in the field of a product, manufacturing technology, or new systems in the field of management, but also culture and ecology. In the field of technology and technology, innovation is embodied in the form of an invention that has a specific material or non-material form that can be described by means of a set of features and properties. If the invention also has the feature of utility and applicability with a certain value for the user, it can be called an innovation[2].

Definitions of innovation

Innovationaccording to the "Oslo Manual"[3]is the implementation of a new or significantly improved product (product or service) or process, a new marketing method or a new organizational method in business practice, workplace organization or relations with the environment. This broad definition covers a wide range of possible innovations. Innovation can more narrowly be categorized as the implementation of one or more types of innovation, for example product and process innovations. The narrower definition of product and process innovation can be related to the definition of product and process innovation (TPP) used in the second edition of the Oslo Manual.

It has been assumed that the minimum requirement for an innovation to occur is that the product, process, marketing method or organizational method should be new (or significantly improved) for the company. This includes products, processes and methods that a particular company has developed first and those that have been adopted from other companies or entities.

[2] Commercialization of research results Practical Guide for Scientists, edited by S. Łobejko, A. Sosnowska, Marshal's Office of the Mazowieckie Voivodeship in Warsaw Department of Regional Development and European Funds Department of Innovation, Warsaw 2013, p. 10.
[3]Oslo Handbook. Principles of collecting and interpreting data on innovation. Joint OECD and Eurostat publication, 2005. Third edition in Polish: Ministry of Science and Higher Education, 2008

The Central Statistical Office uses the definition, in which innovation is understood as the ability of enterprises to create and implement innovations and the actual ability to introduce new and modernized products, new or changed technological or organizational and technical processes. Innovation means positive change.

They involve the necessity to meet the needs and expectations of a changing environment, but it must be remembered that the order is often the opposite: it is innovation that changes the environment - an innovator introduces a new quality to people's lives. It must be remembered that many innovations were implemented despite the negative results of market research and against the opinions of experts[4].

Table 1: What is innovation - comparison of different definitions

Innovationis a successful use of a new idea. In the service sector, innovation emerges in all aspects of the organization of a service company. For this reason, it is difficult to distinguish between "real" innovation and mere management, "economy" etc. Entrepreneurs - management practitioners may have a problem with qualifying their daily activities: is the new questionnaire for periodic evaluation of employees in a hotel chain already an "innovation in the hotel business" or only "a minor improvement developing the daily work of the HR department in a hotel"? Several definitions of innovation are given below: **Innovation**it is about extracting economic value from new activities. (Innovation Vital Signs Project 2007) **Innovation**it arises at the intersection of invention and insight, it leads to the creation of social or economic value. (Council of Competitiveness 2005) **Innovation** concerns a wide range of activities aimed at improving the efficiency of companies, including the implementation of new or significantly improved products, services, distribution, production, marketing and organization processes. (European Commission 2004) **Innovation**- a combination of invention, insight and entrepreneurship that creates new industries, creates new value and creates new valuable jobs. (Business Council of New York State 2006)

[4]J. Fazlagić, Is your company innovative? How to look for innovations in the service sector? Hints for the Ministry of Treasury, PARP, Warsaw 2012, p. 19.

Innovation- is the design, invention, development and / and implementation of new or changed products, services, processes, systems, organization methods in order to create new value for customers and return on investment for the company. (Advisory Committee on Measurement of Innovation in the 21st Century, US Department of Commerce)

Innovation is the implementation of a new or significantly improved product (good or service) or process, a new marketing method or a new method of organizing business activity or external relations. Innovation activities are of a scientific, technological, organizational, financial or commercial nature and are intended to or lead to the implementation of innovation. (OECD 2005)

Success of innovationis the degree to which value is created for customers through ventures that transfer new knowledge and technology to new profitable products and services in national and international markets. The high pace of innovation leads to the creation of new markets, economic growth, job creation, wealth and higher living standards. (Innovation Vital Signs Project 2007)

Innovationit is an implemented idea creating a new * value or a new market. (* new for a specific company, country or global). (Report on Polish innovation Go Global !, (VISTULA University, 2011)

Source: Review of the definition of innovation in: AM Aizorbe, CE Moylan, CA Robbins, Toward Better Measurement of Innovation and Intangibles, Survey of Current Business, 1/2009, p. 14; Go Global! Report on Polish innovation Go Global !, VISTULA University, Warsaw 2011 [after:]. Fazlagić, Is your company innovative? How to look for innovations in the service sector? Hints for the Ministry of Treasury, PARP, Warsaw 2012, p. 20.

Table 2: Definitions of innovation

Author	Definition
J. Schumpeter[5]	Commercial or industrial application of something new: product, process, production method; new market or sources of supply; a new form of business activity.
E. Mansfield[6]	The innovation is the first application of the invention.
ME Porter[7]	ME Porter incorporates technological improvements, better methods and ways of doing things into the concept

[5]J. Schumpeter; The theory of economic development, PWE, Warsaw 1990.
[6] E. Mansfield, The Economics of Technological Change, WW Norton and Co, New York 1968.
[7] ME Porter, Competitive Strategy, Free Press, New York, 1980. Polish edition: ME Porter, Competition Strategy, PWE, Warsaw 1992.

	of innovation. This may be revealed in changes to the product, process, new approaches to marketing, and new forms of distribution.
R. Simonetti[8]	Innovation is a creative and interactive process involving the market and non-market institutions. Innovation consists of the creative use of various forms of knowledge that meets market demand and the requirements set by the innovative society
P. Drucker[9]	P. Drucker described innovation as: "a special tool of entrepreneurs through which changes create an opportunity to start a new business or provide new services. Innovation is a specific entrepreneurial tool - an activity that gives resources new opportunities to create wealth.
P. Kotler[10]	P. Kotler referred innovation to goods, services and ideas that are perceived by someone as new. The idea may have existed for a long time, but it is an innovation for the person who sees it as new.
RW Griffin[11]	Innovation is defined as the directed effort of an organization to master new products and services or new applications of existing products and services.
D. Begg, S. Fisher, R. Dornbush[12]	Innovation is' the application of new knowledge to the production process
Council of Competitiveness 2005[13]	Innovation is created at the intersection of invention and insight, it leads to the creation of social or economic value.
OECD 2005[14]	Innovation is the implementation of a new or significantly improved product (good or service) or process, a new marketing method or a new method of organizing business activity or external relations. Innovation activities are of a

[8]R. Simonetti, D. Archibugi, R. Ewangelista, Product and process inovations: how they defined? How are they quantified, "Scientometrics" 1995, No. 32.
[9] P. Drucker, Innovation and Entrepreneurship, PWE, Warsaw 1992.
[10]Ph. Kotler, Marketing. Analysis, planning, implementation and control, Gebethner i Ska, Warsaw 1994.
[11] RW Griffin, Fundamentals of organization management, Polish Scientific Publishers PWN, Warsaw 1996.
[12] D. Begg, S. Fisher, R. Dornbush, Makroekonomia, PWE, Warsaw 1997.
[13]Collective work, Catalyzing Cross-Border Innovation: The Mexican Life Sciences Initiative. Phase I Report, Council of Cmpetetiveness, December 2005.
[14] The Oslo Manual, op.cit.

	scientific, technological, organizational, financial or commercial nature and are intended to or lead to the implementation of innovation.
Business Council of New York State 2006[15]	Innovation is a combination of invention, insight and entrepreneurship that creates new industries, creates new values and creates new valuable jobs.
Innovation Vital Signs Project 2007[16]	Innovation is about extracting economic value from new activities. The success of innovation is the degree to which value is created for customers through ventures that transfer new knowledge and technology to new profitable products and services in national and international markets. The high pace of innovation leads to the creation of new markets, economic growth, job creation, wealth and higher living standards.
Ross A. Webber[17]	Innovation is all research and development processes, the primary goal of which is the application and use of improved solutions for technology, technology and organization.
A. Pomykalski[18]	Innovation is a process covering all activities related to the creation of an idea, the creation of an invention and its implementation in the form of a product or process.

Source: own study.

The basic definition differences presented in Table 2 are mainly due to two different approaches to innovation.

- The former treats innovation as a pioneering application of a product or process,
- The second one recognizes each subsequent use as an innovation.

Another factor that differentiates the definition of "innovation" is the perception of it. It is worth noting that until the mid-1990s, "innovation" was understood to mean the implementation or application of an invention, product, or process. Only R. Simonetti in 1995 emphasized that innovation is a creative and interactive process. He noted that the implementation of innovation requires a variety

[15] Business Council of New York State, http://www.bcnys.org/.
[16] B. Kalweit, E. Milbergs, RS Boege JD Innovation Vital Signs Project, Technology Administration US Department of Commerce, ASTRA, 2007.
[17] RA Webber, Principles of organization management, PWE, Warsaw 1996.
[18] A. Pomykalski, Innovations, Lodz University of Technology, Lodz 2001.

of actions not only from the side of the adapting entity, but also from the market and non-market institutions. This formulation had a significant impact on the further shaping of the concept of "innovation"[19].

Innovations are among the basic sources of gaining a competitive advantage by enterprises, and in a strongly competitive environment they even become a dominant attitude. In such a situation, an enterprise, in order to be able to develop, needs innovation: new products, processes, services, organization, management or marketing methods. On the one hand, they lead to cost reduction, and on the other hand, they provide an opportunity to gain / maintain the market by creating value for the customer.

The process of continuous development of new types of products and services reflects the intensity of structural changes in the modern economy. Innovation is understood as a result and as a process.

[19] M. Baraniak, Financing the innovative activity of individual farms in the Łódź Voivodeship, doctoral dissertation, University of Łódź 2019, pp. 32-34.

CHAPTER 2

PRODUCT INNOVATION

There are basically four types of (main) innovations: product innovation, process innovation, marketing innovation and organizational innovation.

Product innovation (product innovation)[20]is the introduction of a new good or service to the market by a given enterprise, or a significant improvement of the goods and services previously offered in relation to their characteristics or intended use. This includes significant improvements in terms of technical specifications, components and materials, embedded software, ease of use, or other functional characteristics. Product innovations (within products) can use new knowledge or technologies, or be based on new applications or combinations of existing knowledge and technology. The term "product" is used to describe both products and services. Product innovations include both the introduction of new products and services as well as significant improvements to the existing products and services in terms of their functional or utility features. New products are products or services, which differ significantly in their features or purpose from the products previously manufactured by the company. The development of a new application for a product with only minor changes to its technical specifications is an innovation within the product (an example is the introduction of a new detergent using a known chemical composition previously used only as an intermediate for the production of coatings). Significant improvements to existing products can be changes to materials, components and other features that make the products perform better. Product innovations in the service sector may consist in introducing significant improvements in the way services are provided (for example, increasing the efficiency or speed of their provision), on adding new functions or features to existing services or introducing entirely new services. As an example, there are significant improvements in online banking, such as a significant improvement in the speed and ease of use of these services. Another example is the introduction by car rental companies of the possibility of picking up and returning the vehicle at home, which improves customer access to these services. Establishing contact points for management on site rather than in a remote location is an example of quality improvement when outsourcing services. Design and construction works are an integral part of the process of creating and implementing product innovations. However, a product innovation is not a change that does not significantly change the functional features or applications of the product. However, such changes may qualify as marketing innovations, as discussed below. Neither routine updates / upgrades nor regular seasonal changes are product innovations.

[20] The Oslo Manual, op.cit, p. 50

Examples of product innovations

Material goods:

- replacing materials with components with enhanced parameters (e.g. environmentally friendly plastics),
- cameras in mobile phones,
- built-in wireless network in laptops,
- food products with new functional features (yoghurts with live bacteria), programmable heaters and thermostats,
- new drugs with significantly improved performance.

Services:

- new services that significantly improve customer access to goods and services, such as home delivery,
- video on demand via broadbandInternet,
- internet services such asbanking, or bill payment systems.
- new types of loans, for example loans with variable interest rates,
- introduction of magnetic cards and multi-use plastic cards.

Benefits from innovation in the opinion of entrepreneurs

- improvement of quality
- entering new markets
- enriching the offer
- reduction in labor costs
- rationalization consumption of materials
- reducing energy consumption
- compliance with legal requirements and standards
- tax benefits (reliefs)

Product innovation does not include:

- minor changes
- routine improvements
- regular seasonal changes (such as for clothing lines)
- customization for individual customers that does not contain significantly different characteristics compared to products manufactured for other customers
- changes that do not change the function, use, or technical characteristics of a good or service
- simple resale of new goods and services purchased from other companies

Innovations on the "macro" scale are mainly of a technological and organizational nature. Although the direct causative factor is primarily creativity and an idea or improvements or improvements to the surrounding reality, but the implementation processes, due to the specificity of production, are long-term processes, counted in tens (or even longer) years. On the other hand, production technological innovations are often a source of very important impulses for the creation of innovations on a micro scale, improving (less often conditioning) the implementation of technology

CHAPTER 3

PROCESS INNOVATION

Process innovation (process innovation)[21]process innovation means introducing new or significantly improved production or delivery methods into practice in a company. This category includes significant changes to technology, hardware and / or software. Process innovations can be aimed at lowering the unit costs of production or delivery, increasing quality, producing or delivering new or significantly improved products. Production methods are techniques, devices and software used to produce goods or services. An example of new production methods is the implementation of new devices that automate the production process within the production line or the implementation of computer support for the development and development of products. The delivery methods relate to the company's logistics and include devices, software and techniques used to acquire inputs, allocate resources within a company, or deliver end products. An example of a new delivery method is the introduction of a goods flow control system based on bar codes or RFID (radio frequency identification of goods) technology. Process innovations include new or significantly improved methods for creating and delivering services. They can consist of significant changes to the hardware and software used in service companies or changes to the procedures or techniques used to provide the services. An example is the introduction of GPS-based location devices in transport services, implementation of a new booking system in a travel agency and development of new project management techniques in a consulting company. Project innovations also include new or significantly improved techniques, devices and software in ancillary activities such as procurement, accounting, IT and maintenance. The implementation of new or significantly improved ICT technologies is a process innovation if its aim is to increase the efficiency and / or quality of ancillary activities.

Examples of process innovations:

Okay:

- installation of new or improved production technology, such as automation equipment or real-time sensors that can better tailor processes to your needs,
- new equipment related to the production of new or improved products,
- laser cutting tools,
- automated packaging,
- computerized production quality control equipment,

[21] Oslo Manual, op.cit, p. 51

- improved testing of production monitoring equipment.

Delivery and operations:

- portable scanners / computers for registering goods,
- introducing barcoding or radio frequency identification (RFID) chips to track materials flowing through the supply chain,
- tracking GPS system in transport equipment,
- introduction of software to identify optimal delivery routes. New or improved software, procedures for purchasing, accounting, warehousing,
- introduction of electronic billing systems,
- introduction of an electronic labeling system, - new or significantly improved computer networks
- introducing a new method of organization in the company's business practices, workplace organization or external relations

Distinguish between product and process innovations

The distinction between products and processes is straightforward in the case of products. In turn, in the case of services, the situation may be less obvious becauseproduction, delivering and consumption multiple services can take place at the same time. Here are some differentiation tips:

- If the innovation is about new or significantly improved featuresservice-soffered to customers, it is an innovation within the product.
- If the innovation concerns new or significantly improved methods, devices and / or skills used to provide the service, it is a process innovation.
- If the innovation concerns significant improvements both in the characteristics of the service offered and in the methods, devices and / or skills used to deliver the service, it is a product and process innovation.
- In many cases, a service innovation will be of only one type. An example is business which offers a new service or a new feature of the service without a significant change in the method of its provision.
- Likewise, it may happen that significant process improvements, for example aimed at lowering delivery costs, do not change the characteristics of the service offered to customers.

CHAPTER 4

MARKETING INNOVATION

Marketing innovation (marketing innovation)[22]is the implementation of a new marketing method involving significant changes in the design / construction of the product or in the packaging, distribution, promotion or pricing strategy. The aim of marketing innovations is to better meet the needs of customers, open new markets or new positioning of the company's product on the market to increase sales. The feature that distinguishes marketing innovations from other changes in the scope of the company's marketing instruments is that they consist in implementing a marketing method that has not been used by a given company so far. It must be part of a new marketing concept or strategy that represents a significant departure from the marketing methods used so far. The new marketing method can either be developed by the innovative company on its own or adopted from other companies or entities. New marketing methods can be implemented for both new and existing products. Marketing innovations include significant changes to product design as part of a new marketing concept. The aforementioned changes in the design / construction of products consist in a change in the form and appearance of products that does not change their functional or utility characteristics. This group also includes changes in the packaging of products such as food, beverages and cleaning products, where packaging is the main determinant of the appearance of the product. An example of a marketing innovation in the design / construction of a product is a significant change in the design of a series of furniture to give them a new look and greater attractiveness. Product design / construction innovations may also include the introduction of significant changes to the form, appearance or taste of a food or drink, such as the introduction of new tastes of a foodstuff to attract a new customer segment. An example of a marketing innovation in the field of packaging is the use of a completely new bottle of juice, which is to give the product visual distinction and attractiveness from the point of view of a new market segment. New marketing methods in the field of product placement mainly consist in introducing new sales channels. Sales channels here mean methods used to sell products and services to customers, but not logistic methods (transport, storage and reloading of products), as the latter are primarily associated with increasing efficiency. Examples of marketing innovations in product distribution are the introduction of a franchise system for the first time, direct or exclusive retail sales, and the introduction of product licensing. Innovation in the field of product distribution also includes the use of new concepts for product display.

New marketing methods in the field of product promotion involve the use of new concepts for promoting the company's products and services.

[22] The Oslo Manual, op.cit, p. 52

For example, a marketing innovation is the first use of significantly different carriers / media or techniques - such as product placement in movies or TV broadcasts, or the use of a known person portrayed as a product user (celebrity endorsement). Another example is branding, i.e. creating and introducing a completely new brand symbol (as opposed to regular corrections in the visual layer of the brand) to position the company's product on a new market or give the product a new image. The introduction of a system of personalized information, e.g. obtained on the basis of loyalty cards, in order to adjust the presentation of products to the needs of specific customers, can also be considered a marketing innovation. Innovations in the field of pricing (pricing) consist in the application of new pricing strategies for the sale of a company's products or services on the market. An example may be the first use of a new method of adjusting the price of a product or service depending on the demand (e.g. when the demand is low, the price is also low) or the introduction of a new method that allows customers to select the desired product features on the company's website and then check the price of the selected product. combination of features.

New pricing methods the sole purpose of which is to differentiate prices for particular buyer segments are not considered innovations. Seasonal, regular or other routine changes to marketing tools are generally not considered marketing innovations. In order for them to be included in this category, they should relate to marketing methods not used by the company so far. For example, a significant change in the design of a product or packaging based on a marketing concept previously used by the company for other products is not a marketing innovation, nor is it an innovation to use existing marketing methods to reach a new geographic market or a new customer segment (e.g. to a group of buyers with specific socio-demographic characteristics).

Examples of marketing innovations:

Design and packaging:

- introducing a significant change in the design of the furniture line
- a new look and wider application,
- introducing a fundamentally new design of e.g. body lotion bottles to give the product an exclusive look.

Distribution (sales channels):

- first use of product licensing,
- first use of direct sales or exclusive distribution channels,

- introducing a new product presentation concept, such as furniture sales rooms where the furniture is viewed by customers in fully decorated rooms,
- introducing a personalized information system, incl. loyalty cards.

Price strategy:

- introducing a new method that allows customers to choose products with the desired specifications on the company's website with a calculator of the individual product price,
- first use of the method of price differentiation of a good or service depending on the demand for it,
- the first application of a special store offer that is only available to store loyalty card holders.

Special offer:

- first use of trademarks,
- first use of product positioning in movies or TV shows,
- introducing a new symbol of the brand of products that the company intends to place on the new market

Marketing innovations of "all time"[23]:

3400 BC Label on the product

The first known product labels were in the form of a clay seal with cuneiform script (Mesopotamia).

2500 BC Signboard

The custom of using it was most likely born in Crete. Minoan shopkeepers painted paintings on the walls of the buildings depicting the goods sold or informing about the services provided.

[23] Quote from: https://marketingprzykawie.pl/artykuly/15-najwiekszych-innowacji-marketingowych-wszech-czasow/

1609 Press advertisement

The first advertisements of this type were simple advertisements, which only boiled down to presenting the basic features of the offer, without any persuasive elements. With time, they only started to be accompanied by illustrations, and even elements that were supposed to entertain viewers.

1870 Model of freemium

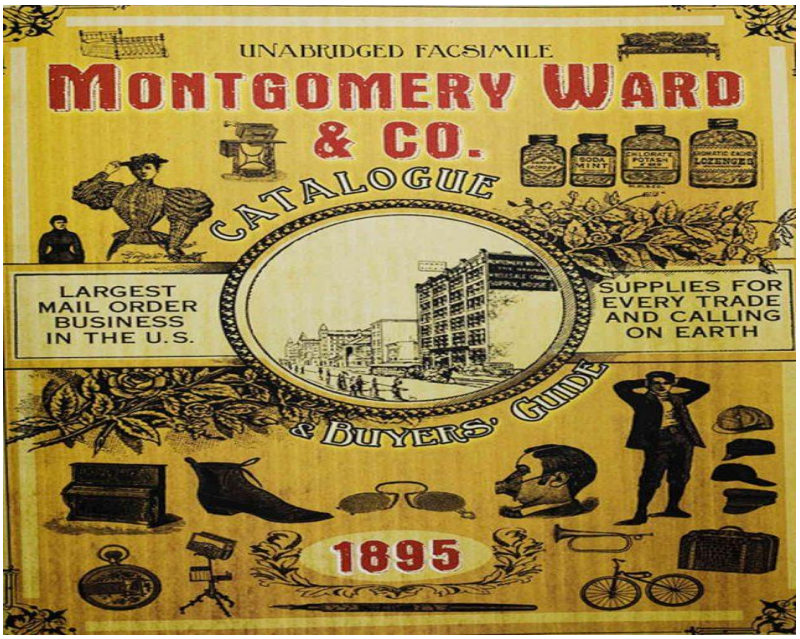
As early as the Victorian era, the razor company began distributing blade handles to customers. The idea is credited to razor blade inventor King Camp Gillette, but in fact Gillette was one of the last to implement this marketing model.

Gillette ad from 1912.

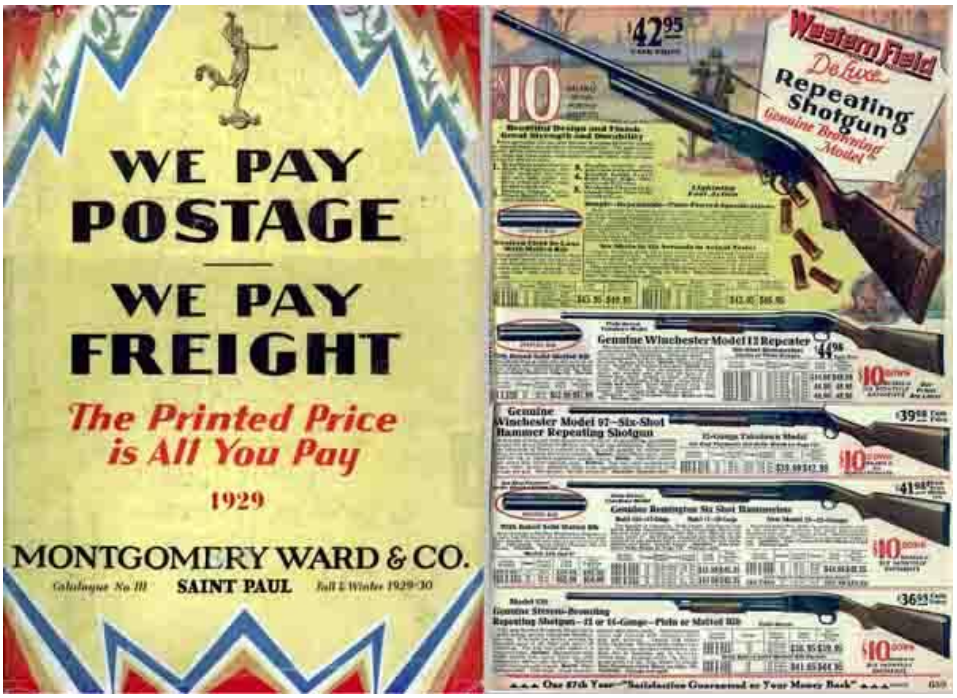
During World War I, Gillette sold razors to soldiers (at a very low price) and also to banks that added them to the sold deposits. But the only razor of this brand distributed for free was the Trac II model in the 1970s.

1872 Direct marketing

The first product catalog was sent out by the American Aaron Montgomery Ward, who could be called the Jeff Bezos of his time. Ward's plan was to create a new world of consumers in the American countryside, which, due to the enormous distances between individual settlements, was devoid of many products.



The cover of a catalog from 1895.



1929 Weapons Catalog

1890. Telephone sales

The patenting of the telephone by Alexander Bell (1876) opened a new sales channel. However, the date of the first transaction in this way is not known exactly. This branch of marketing has developed into several varieties and it clearly works in many industries.

1918 Designers' labels

When Coco Chanel revolutionized fashion by designing her collections, labels were still new. You didn't buy clothes just because of the designer. Chanel changed that, and what's more, it also introduced other products bearing its own name - for example the iconic perfume Chanel N ° 5 (1921).

Sculpture of an anonymous Dadaist from 1921, dedicated to Coco Chanel (from the company's collection)

1923 Radio advertisements

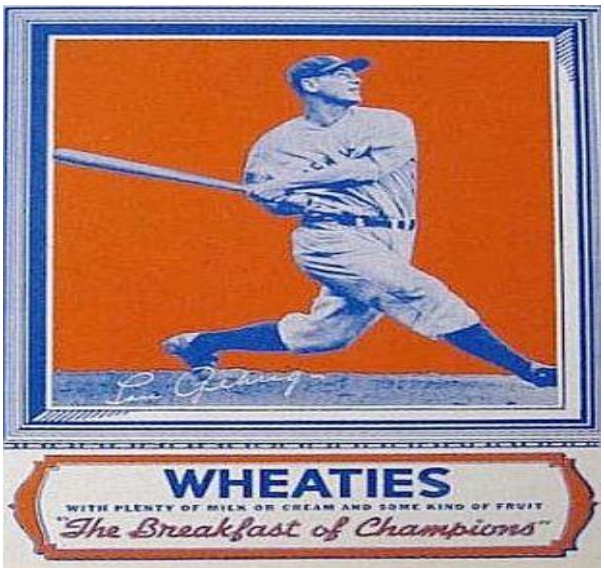
The first radio ad reportedly aired on doctor John Brinkley on KFKB in Kansas. It concerned the method of treating impotence by implanting goat glands into male testicles. Other reports, however, say that a year earlier, five times, beginning on August 28, 1922, announcements from the Queensboro Corp housing estate had appeared at the New York City WEAF station. It was a form of sponsorship of programs, not a typical advertisement.

1926 Electric billboard

In the 1920s, tourists and newlyweds admired the evening sky of Paris, against which shone the word Citroen, formed from millions of light bulbs hung on the Eiffel Tower. The tower itself was illuminated in 1925 on the occasion of the Exhibition of Decorative Arts. More electric billboards appeared in Times Square in New York and Tokyo.

1927 Sports sponsorship

Wheaties, a producer of cereals, launched The Breakfast of Champions series, in which for decades, the images of America's greatest sports stars could be seen on the packaging of the product. In 1927, the slogan itself was created (it was formulated for the needs of a local sports event).

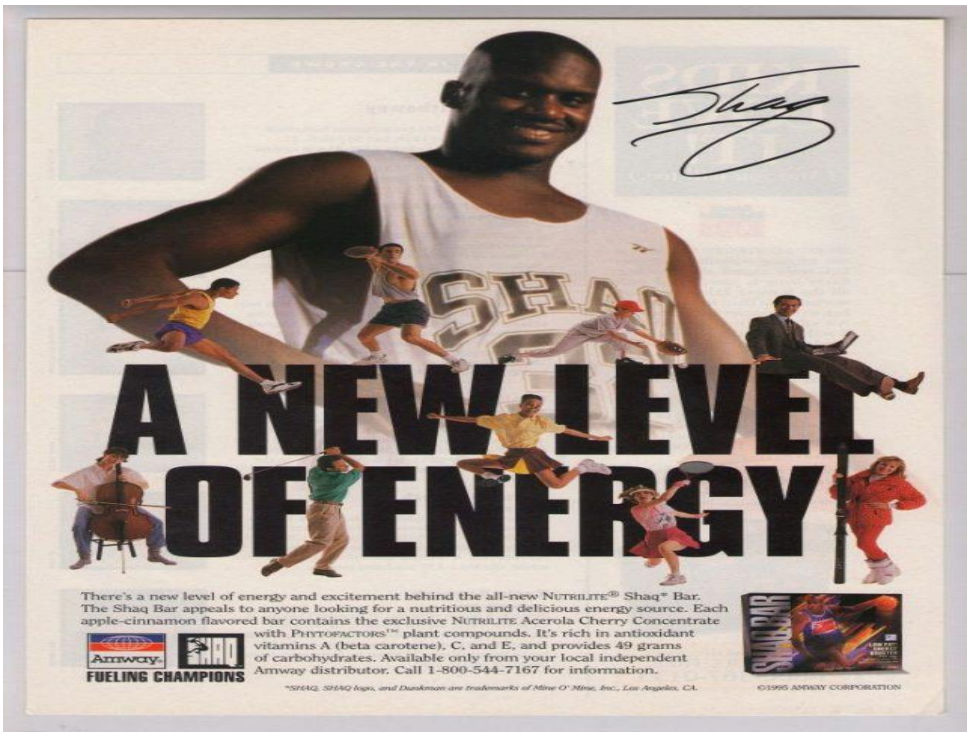


Baseball player Lou Gehrig first appeared on a Wheaties pack in 1934.

1945 Multiple-Level Marketing

Charles Ponzi developed a model of the pyramid, later called the Ponzi scheme after his surname. The association of Ponzi's name and the financial

pyramid he created with multi-level marketing raises controversy, because both systems work completely differently. According to some sources, however, MLM is a deep modification of the Ponzi idea: it is about real products, not financial operations, it provides a fairer distribution of profits, and is legally allowed.



Shaquille O'Neal in an advertisement for an Amway product (1995)

1969 Spectacular motivational solutions

Top sellers have always been able to count on adequate performance bonuses. But the new Cadillacs as rewards to the top employees of Mary Kay's direct-selling cosmetics company were especially imaginative. They have become a kind of showcase of the brand. The color of the car can be chosen - as long as it is pink.

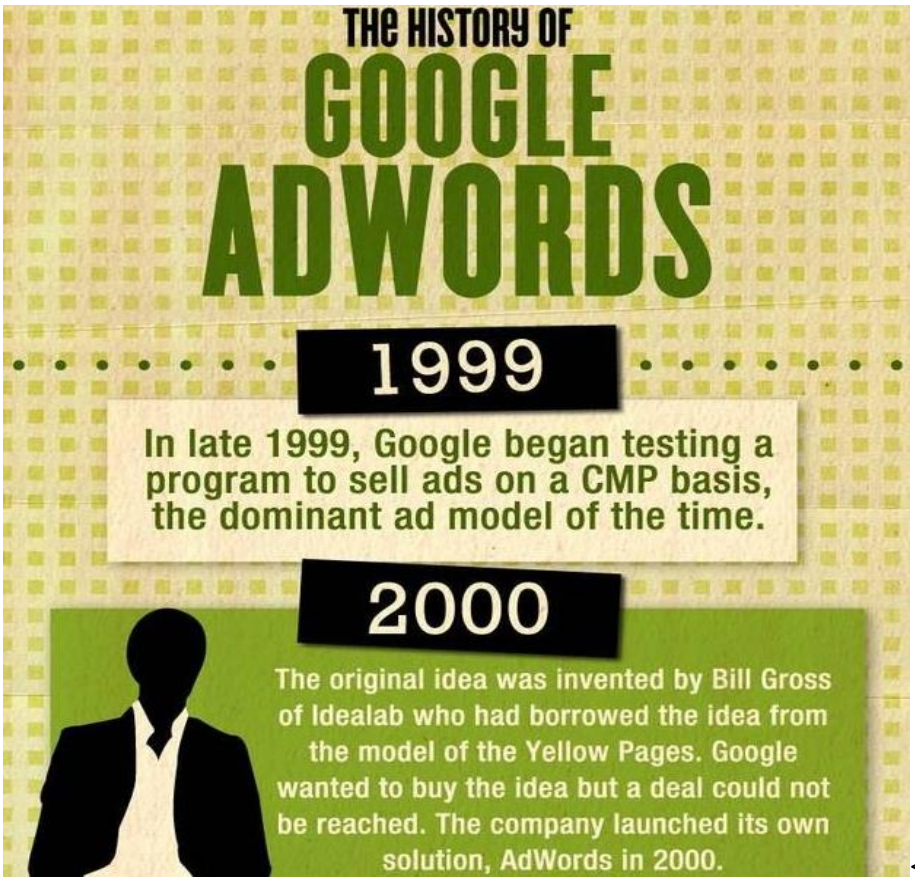
1984 Guerrilla marketing

This strategy was described by Jay Conrad Levinson, causing that marketing communication ceased to mean only large-budget, mass activities carried out by corporations. Nevertheless, guerrilla marketing very quickly caught the attention of these corporations, and today the most spectacular and loudest examples come from them. Viral distribution came to the rescue here - interesting, though modest means, implemented campaigns have enormous potential in this respect.

1994 Pay Per Click

In the early days of the Internet, the only way to make money was to sell. However, the example of pornographic sites has shown that what brings in profit can also be website traffic and income from the targeted sites.

The first-ever online ad was sold in September 1993 to a law firm in the Silicon Valley. It took another year for a real web banner to arrive, when AT&T began to persuade people to use its services on the website of the Wired magazine. It was an advertisement in the open-air model. The payment model for various types of activities (clicking, leaving data, purchasing) resulting from redirecting traffic to the seller is currently the most popular in e-commerce, sales of financial services, and above all - in the Google AdWords advertising, introduced on October 23, 2000.



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A fragment of an infographics showing the history of Google AdWords

2000 Internet Virals

In the 1990s, such materials were just curiosities. Their importance began to increase after 2000. And with the arrival of YouTube in 2005, virally distributed videos became the standard of mass marketing.

CHAPTER 5

ORGANIZATIONAL INNOVATION

Organizational innovation (organisational innovation)[24]it is the implementation of a new organizational method in the operating principles adopted by the company, in the organization of the workplace or in relations with the environment. Organizational innovation may be aimed at achieving better outcomes by reducing administrative or transaction costs, increasing job satisfaction (and therefore productivity), gaining access to non-traded assets (such as uncoded outside knowledge), or lowering delivery costs. The distinguishing feature of organizational innovation in comparison with other organizational changes in the company is the use of such an organizational method (in the operating principles adopted by the company, in the organization of the workplace or in relations with the environment), which has not been used in a given company so far and which results from strategic decisions made by its management. Organizational innovations in the field of business practices adopted by the company consist in the implementation of new methods of organizing routine activities and procedures regulating the company's work. This includes, for example, the implementation of new practical principles to improve the learning and sharing of knowledge within the company.

An example is the first implementation of the practical rules for codifying knowledge, e.g. creating a database of best practices, lessons learned and other knowledge in a way that allows other people to access this database as easily as possible. Another example is the first implementation of practical rules for employee development and the improvement of staff retention (retention), for example in education and training systems. Yet another example will be the first introduction of production or supply management systems, such as supply chain management systems, as well as thorough business reengineering, lean production systems and quality management systems.

Examples of organizational innovations:

Business practices:

- setting up a new database of best practices, lessons and other knowledge to make it more accessible to other people,
- the first introduction of an integrated system for controlling the company's operations (production, finance, strategy, marketing),

[24] Oslo Manual, op.cit, p. 53

- first introduction of management systems to primary production or delivery operations, such as supply chain management, business re-engineering, production slimming, quality management system,
- the first introduction of training programs to create an effective and functional team that integrates employees of various departments and areas of responsibility.

Organization of the workplace:

- first introducing decentralization of labor responsibility for company employees, such as giving more control and responsibility to employees in production, distribution or sales,
- first establishing formal or informal work teams to improve access and knowledge sharing of employees from different departments, such as marketing, research and production.

External Relationships:

- first introduction of quality control standards for suppliers and subcontractors,
- first use of research or production outsourcing,
- first collaboration with universities or other research organizations.

Innovations in the field of workplace organization) consist in the implementation of new methods of division of tasks and decision-making powers among employees in order to divide work within divisions and between divisions (and organizational units).

Such an innovationis also the implementation of new concepts of structuring activities, such as the integration of various types of business activities. An example of organizational innovation in workplace organization is the first implementation of an organizational model that gives the company's employees greater autonomy in making decisions and encourages them to share their ideas. This can be achieved by decentralizing group activities and management control, or by setting up formal or informal working groups where the job responsibilities of individual employees will be defined more flexibly. Organizational innovations can also consist in centralizing activities and increasing accountability for decisions made.

Organizational innovations There are no such changes in the adopted principles of operation, workplace organization or in relations with the environment that are based on the organizational methods used by the company before. It is also not just the formulation of a management strategy that is innovative. On the other hand, organizational changes implemented in response to the new management strategy constitute an innovation if it is the first implementation of a new organizational method in terms of operating principles, workplace organization or relations with the environment. For example, the introduction of a written strategic document to improve the effectiveness of the use of knowledge in a company is not in itself an innovation. Innovation, on the other hand, takes place when when this strategy is implemented through the use of new software and information documenting principles to stimulate the exchange of knowledge between different departments of the company. Mergers with other companies and acquisitions of other companies are not considered organizational innovations, even if the company is merging or acquiring for the first time. However, mergers and acquisitions can be associated with organizational innovation if the company develops or introduces new organizational methods in the process.[25]

An excellent example of organizational innovation in agriculture are Short Food Supply Chain (SFSC), which shorten the distance between the producer and the consumer and minimize the number of intermediaries. The solution supports understanding and communication between the producer and the consumer, which fosters loyalty and increases the value of agricultural products. Some of the breakdowns only apply under certain conditions. Thus, the competitiveness of food products depends, among others, on from the efficiency of supply chain management. This requires the company to apply modern management concepts that introduce the philosophy of partnership in supply chains and decisions made by participants in market processes. They mean such innovative activities as: fast rotation in the chain,

[25] The Oslo Manual, op.cit, pp. 49-55

CHAPTER 6

OTHER TYPES AND FORMS OF INNOVATION

Absolute innovation

Among the many types of innovation, the concept of absolute innovation also stands out, which boils down to the ability to create and then implement an absolute novelty (organizational, technological, product, etc.). Innovation of this type is associated with high uncertainty and risk, but in the event of success, it provides the implementer with a "priority bonus"[26].

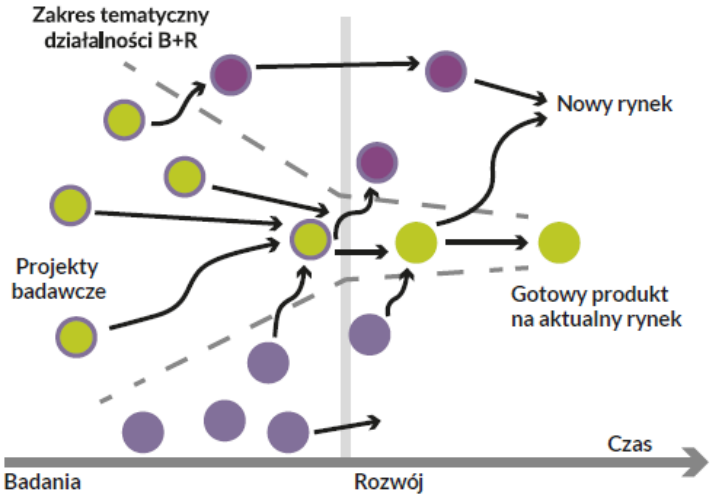
Another type of innovation is **relational innovation**, consisting in the ability to implement specific solutions that are new only in a specific context, place and time. An example of this type of innovation is e.g. the implementation of procedures or technologies in an organization that are new to this organization (see the example of the Kaizen ideology mentioned above or ISO series standards). Relational innovation is closely related to imitative modernization.

Another type of innovation are **ground-breaking innovations, otherwise known as radical**. Their characteristic feature is that they appear very rarely, but when they do, they completely change the market situation. These are completely new products / services, which have not been available on the market so far or similar to the existing ones, but based on a completely new technology, allowing for new possibilities of operation. Examples of such innovations are e.g. mobile phones or 2D ultrasound machines. A breakthrough innovation that will be "caught" by the market is then refined in the form of successive incremental innovations. Incremental innovations are the result of systematic modification and improvement of the existing product / service so that it meets the needs of potential customers to an ever greater and better extent (e.g. 3D and 4D ultrasound machines). These types of innovations appear much more often than breakthrough innovations,

A different type of innovation are **open innovations**the essence of which is the use of valuable knowledge resources or technologies generated outside the organization. This type of innovation allows the efforts of customers, consumers, researchers and others to be combined in a single innovation process. It creates the possibility of greater openness of interested entities to new, innovative ideas, facilitates access to complementary resources and the use of the effect, synergy, but also reduces the risk of undertaken actions / investments[27].

[26] Drozdowski R., Zakrzewska A., Puchalska K., Morchat M., Mroczkowska D., Supporting pro-innovation attitudes by strengthening the creativity of the individual, Polish Agency for Enterprise Development, Warsaw 2010.
[27]Good innovative practices. Entrepreneur's handbook, Office of the Marshal of the Mazowieckie Voivodeship, Warsaw 2010. Retrieved on January 5, 2015 from **http://www.msodi.mazovia.pl/pliki/e3f18d16ab7eea55a894d20c4a4a90b1.pdf**

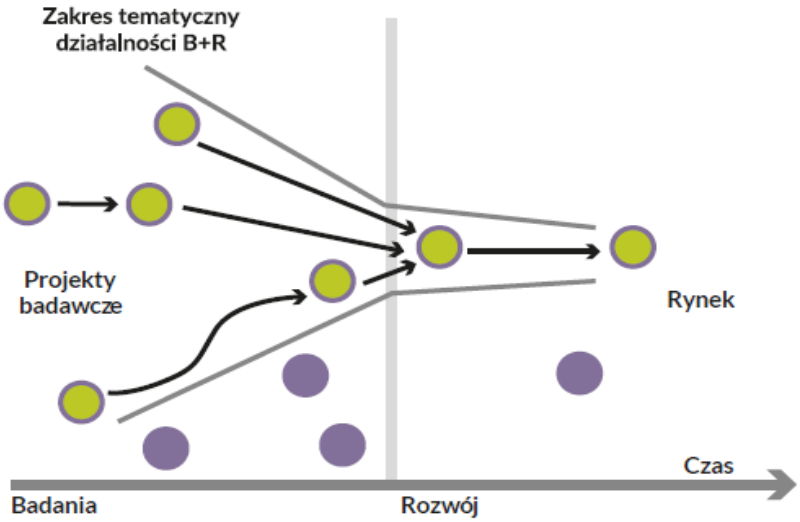
Figure 1: The process of creating open innovations



Source: Saari S., Haapasalo H., Process in Product development - Theoretical Analysis in Small Technology Parks. Technology and Investment, 2012, 3, 36–47; http://dx.doi.org/10.4236/ ti.2012.31006 Published Online February 2012 (http://www.Scirp.org/journal/ti).

The opposite of open innovations are **closed innovation**, created by a specific entity, for a specific market or addressed to a specific group of recipients (e.g. e-services).

Figure 2: The process of creating closed innovations



Source: Source: Saari S., Haapasalo H., Process in Product development - Theoretical Analysis in Small Technology Parks. Technology and Investment, 2012, 3, 36–47; http://dx.doi.org/10.4236/ ti.2012.31006 Published Online February 2012 (http://www.Scirp.org/journal/ti).

Mix innovationsare an alternative to open innovation. They are used to skillfully combine the possibilities of developing innovation within the organization,

while taking advantage of the possibilities of cooperation with other external actors, they are used in the framework of open innovation. An organization that intends to implement innovations can do it in two ways: ˛undertake creative activities and develop innovations on its own (alone or with external partners), ˛adapt innovations created by other companies or institutions to its own conditions.

The first method focuses on the R&D activities of the organization.

It may conduct research to:

- gain new knowledge,
- targeting specific inventions,
- aimed at modifying existing techniques.

The second method, referred to as other innovative activity, focuses on conducting activities aimed at, inter alia,.:

- obtaining a new concept of products / services through the marketing activities of the entity / entities and its relations with users,
- obtaining a new concept of products / services through the ability of entities to conduct design and development works,
- obtaining a new product concept by monitoring the competition,
- purchase of know-how,
- purchase of other consulting services, ˛internal and / or external training of employees, the effect of which may be to generate innovation,
- reorganization of the company's operating methods (management systems) in order to generate innovation, ˛developing new methods of marketing and / or selling its products / services.

Innovative activityit can lead to both the production and implementation of innovations in the short term and to increasing the innovative capacity of a given entity. By creating and implementing innovations, the unit learns, gains valuable messages from contacts and marketing activities, and also increases its innovative capacity thanks to organizational changes[28].

[28] Source: A guide to building a local innovation strategy developed as part of the project "Network of Regional Specialist Observatories", Central Mining Institute, Katowice 2015, pp. 21-23.

Incremental innovation- now they are gaining more and more importance (apart from radical innovations). Some authors also refer to them as continuation technologies and industry-interrupting technologies[29]. A radical innovation or a disruptive innovation is an innovation that significantly affects the market and the companies operating in it. In this case, the emphasis is therefore not so much on the novelty aspect as the effects of introducing such an innovation[30].

Innovations in the field of pricingrely on the application of new pricing strategies to sell the company's products or services on the market. An example may be the first use of a new method of adjusting the price of a product or service depending on the demand (e.g. when the demand is low, the price is also low) or the introduction of a new method that allows customers to select the desired product features on the company's website and then check the price of the selected product. combination of features. New pricing methods the sole purpose of which is to differentiate prices for particular buyer segments are not considered innovations.

IMPORTANT

Sectors with a low and medium share of technology are characterized by incremental innovation and the absorption of innovations produced elsewhere. For this reason, innovation activities often focus on the areas of production efficiency, product diversification and marketing activities (e.g. food products, land cultivation methods, fertilizers, etc.).

An important aspect of innovation in these sectors is the fact that they are more complex than the simple assimilation of new technologies. In many cases, innovative activity in sectors with low and medium share of technology consists in introducing technologies and high-tech products. The flagship example is the use of ICT solutions or the achievements of biotechnology (e.g. in food processing) to create new products and production processes. Applying and introducing advanced technologies in these sectors may require more skills from employees and affect the organizational structure of companies and their interactions with other companies and public research institutions.

[29]C. Christensen, The Innovator's Dilemma. When New Technologies Cause Great Firms to Fail, Harvard Business School Press, 1997.
[30] B. Dobiegała-Korona, Value for customers as a generator of enterprise value, [in:] B. Dobiegała-Korona, A. Herman (ed.), Contemporary sources of enterprise value, Difin, Warsaw 2006.

CHAPTER 7

INNOVATION AS A FEATURE AND FORM

Innovation it should be considered broadly as it is a process with a high degree of uncertainty and complexity. It is also not very orderly and is subject to many different changes, which is manifested in the difficulty of measuring it. According to S. Kline and N. Rosenberg[31]innovation must be considered as a sequence of changes in the production, market and social system. The basic problem related to innovation concerns its adoption in the environment in which we operate. It should be accepted by the culture and society in which we live. One should also take into account the ability and motivation to constantly seek and implement new ideas and ideas, which in turn leads to the demonstration of the so-called technological gap[32]determining the differences in the wealth of individual countries. The issue of innovation can be considered, like entrepreneurship, on a micro scale, i.e. at the enterprise level, and on a macro scale in relation to the entire economy, country or region. Innovativeness of the economy is defined as the ability and motivation of entrepreneurs to constantly search for and use in practice new ideas, ideas, inventions as well as the results of research and scientific and research works.[33]. The premise of the innovativeness of the economy is the functioning of as many innovative enterprises as possible in it. Innovation is the process of creating and implementing innovation in such conditions that allow the implementation of innovative strategies in enterprises. It can be interpreted as an enlargement or improvement of the assortment owned by the enterprises and as the creation of new methods in management, production or other areas of the enterprise's activity. On the other hand, innovation at the microeconomic level means distinguishing and specifying a specific activity connected with feedback, which is the result of an intellectual network process and the subjective and institutional links evolving over time.[34].

Definition of innovation it is often referred to as:

- technological changes, where innovation is defined as a predisposition to absorb new technological changes[35], the possibility of developing new technologies or as the ability to take actions that go beyond the current state of knowledge,

[31] S. Kline, N. Rosenberg: An overview on Innovation, [in:] R. Landau, N. Rosenberg: The Positive Sum Strategy: Harnessing Technology for Economic Growth, National Academy Press, Washington 1986, pp. 275-306.
[32]J. Bogdanienko, Innovations as a factor of competitive advantage, [in:] J. Bogdanienko, M. Haffer, W. Popławski: Innovativeness of enterprises, Wyd. Nicolaus Copernicus University, Toruń 2004, pp. 7 - 62.
[33]W. Wiszniewsk, Innovativeness of Polish industrial enterprises, "Orgmasz", Warsaw 1999, p. 9; W. Janasz, K. Janasz, A. Witek, J. Wiśniewska: Innovative strategies of enterprises, Wyd. University of Szczecin, Szczecin 2001, p. 299.
[34] K. Janasz, Capital and innovative decisions in an enterprise, Przegląd Organizacji No. 10/2009, p. 35
[35] S. Kitchell, Corporate Culture Environmental Adaptation, and Innovation Adoption: A Qualitative / Quantitative Approach, Journal of the Academy of Marketing Science, vol. 23 (3) / 1995, pp. 195 et seq.

- behavioral changes, where innovation is equated with the speed of adaptation to changes and with the possibility of creating new ideas and openness to changes,
- tendency to change in the area of production and creating products or providing services[36].

Innovation is also defined as a multidimensional phenomenon. It means predispositions and a positive attitude to creating and practicing changes in every area of socio-economic life of enterprises and the company's ability to deal with and enter into new ideas, ideas or inventions, the result of which are new products and services.[37].

It applies to all economic entities that have the ability to conduct research and development, effectively develop new ideas for the production / improvement of processes, products or services, and are able to apply these ideas in practice. In order for enterprises to be able to effectively introduce and commercialize innovations on domestic and foreign markets, they must apply the principle of targeted innovation in their activities as well as management and entrepreneurial strategies, because innovation is a tool of entrepreneurship.[38]. Innovation must be a feature of every enterprise, because those economic entities that have a significant share in innovative activities and use all market mechanisms are competitive in the market.

It can also be viewed at the individual, organizational and macroeconomic level[39].

- **At the individual level** innovativeness is defined by innovative competency, which determines the characteristics of an individual, conditioning his attitude in the process of change.
- **Organizational innovation** it is considered through the prism of its innovative potential, which is understood as the economic entity's ability to develop projects, implement and disseminate innovations.
- On the other hand, the innovativeness of the economy / regions is characterized as the ability and willingness of entities of this economy / regions to constantly seek and use in economic practice the results of scientific research and research and development, new concepts,

[36]Source: G. Foxal, Corporate Innovation: Marketing and Strategy, St. Martin's Press, New York 1984, p. 35.
[37]GT Lumpkin. GG Dess, Clarifying the Entrepreneurial Orientation, Construct and Linking It to Perfermance, Academy of Management Rewiev, vol. 21 (1) / 1996, pp. 135 et seq.
[38]Quote from: L. Kwieciński, K. Moszkowicz, J. Sroka, Innovation and internationalization of Lower Silesian small and medium-sized enterprises, Ed. A. Marszałek, Toruń 2007, p. 11.
[39]Matusiak KB (ed.), 2005: Innovation and technology transfer. Dictionary of terms. Polish Agency for Enterprise Development, 1st Edition, Warsaw, pp. 74–77.

ideas, inventions, and improvement and development of the used technologies of material and non-material production (services), introducing new methods and techniques in organization and management, improving and developing infrastructure and knowledge resources[40].

Thus, innovation, which by its nature is based on novelty, is strongly related to the supply of new knowledge. It is the demand for knowledge, and consequently the use of knowledge in economic processes, that led to the formulation of the concept of "knowledge-based economy (KBE)". In this concept, modern strategies of economic growth, company development and finally the shaping of the welfare of nations are created around innovation.

As the authors of the dictionary "Innovation and technology transfer" write: there is a dynamic shift of the structures of developed economies towards industries and services based on knowledge[41]. Since this phenomenon has not only been observed in the most developed countries, but is also confirmed by the way developing economies function, we can no longer speak of single events, but entire sectors and industries in which innovation and innovations become a way of life.

Based on this trend, also in Poland, the most dynamic, competitive-oriented companies create new products, patterns of conduct, technologies and finally services. It should be remembered that these processes very rarely take place in one, even the largest enterprise[42]. They usually run in specific cooperative systems, which include enterprises and their networks, scientific and research institutions, local government, public administration and the government, as well as non-governmental organizations and civic initiatives. In a knowledge-based economy, the responsibility for stimulating growth dynamics through support mechanisms, e.g. financial, is increasingly falling on the regions. The interdependence of the obtained effects in the form of the pace of regional development and regional policies are more and more visible[43].

Companies (organizations / institutions) that do not introduce innovations are in danger of stagnation and elimination from the market. Of course, innovation processes vary in intensity in different industries and regions, which in short reflects the size and nature of competitive pressures.[44].

[40] A. Wasilewska, M. Wasilewski, State, directions and effectiveness of innovation in agri-food processing enterprises, SGGW, Warsaw 2016, p. 31.
[41] Collective work edited by: KB Matusiak, Innovations and Technology Transfer, dictionary of terms, Warsaw 2008.
[42] Then we are dealing with the phenomenon of closed innovation.
[43] A. Brzęska-Mikoda, Innovations in the Company - Opportunities for Creative People, Chorzów 2009.
[44]Oslo Handbook. Principles of collecting and interpreting data on innovation. Joint OECD and Eurostat publication, 2005. Third edition in Polish: Ministry of Science and Higher Education, 2008, p. 17.

This distinction is not only a formal procedure, but has significant substantive consequences.

- In the first sense, innovation is treated as a result, the result of applying the advancement of knowledge, an invention.
- In the second sense, innovative phenomena include not only the final result of the implementation of a specific technical solution, but also activities preceding its creation. In this sense, innovation is a process that includes, in the broadest sense, the emergence of an idea, research and development and design, production and dissemination. Treating innovation as a process is a consequence of the observed in practice changes in the relationships and dependencies between science, technology and production that take place in the modern economy, which are reflected in the approach of these types of activity.

CHAPTER 8

INNOVATIVE ACTIVITY

Innovative activity. According to the Oslo Manual, all activities (projects) of a scientific (research), technical, organizational, financial and commercial (commercial) nature are aimed at developing and implementing innovations. Some of these activities are innovative in themselves, while others may not contain a novelty but are necessary for the development and implementation of the innovation.

Innovative activityit may be run by the enterprise itself on its own premises (inside the company - in house) or it may consist in the purchase of goods and services, including knowledge or consulting services, from external sources. This is sometimes referred to as the acquisition of external technology in an embodied or disembodied form.

Innovative activity is a high-risk activity and not all innovative projects end with success, i.e. the implementation of innovations, but the very fact of undertaking such activity by an enterprise is of great practical importance, contributing to increasing its knowledge and skills, which may result in the implementation of innovations in the future.

The Oslo Manual distinguishes between three kinds of innovation activity carried out by a company over a given specific period of time:

- successful innovation activity, i.e. the implementation of innovation (regardless of whether the implemented innovation was commercially successful or not);
- activity not yet completed with the implementation of innovation, i.e. continued activity, which is still in progress in a given period (ongoing innovation activity) and
- innovative activity, for some reason, interrupted or even discontinued before the implementation of innovations (abandoned innovation activity).

Therefore **innovation activities**it is the totality of scientific, technical, organizational, financial and commercial activities that actually lead or are intended to lead to the implementation of innovations. Some of these activities are innovative in themselves, while others are not new, but are necessary for the implementation of innovation. Innovative activities also include research and development (R&D) activities that are not directly related to the creation of a specific innovation. The common feature of innovations is the fact that they have been implemented. A new or improved product is implemented when it

is introduced to the market. New processes, marketing methods or organizational methods are implemented when they are actually used in the company's operations. Innovative activity may be of a very diverse nature depending on the specificity of the company. Some companies carry out clearly defined innovative projects, for example by creating and introducing a new product, others, in turn, primarily make continuous improvements in their products, processes and activities. Both types of firms can be considered innovative: an innovation can be the implementation of one significant change or a series of smaller, incremental changes that together constitute a significant change. S. Christow notices three factors determining innovation: the potential for innovation (knowledge in general), the propensity to introduce innovation (inventiveness in general), and the propensity to adopt innovation (openness in general). Both types of firms can be considered innovative: an innovation can be the implementation of one significant change or a series of smaller, incremental changes that together constitute a significant change. S. Christow notices three factors determining innovation: the potential for innovation (knowledge in general), the propensity to introduce innovation (inventiveness in general), and the propensity to adopt innovation (openness in general). Both types of firms can be considered innovative: an innovation can be the implementation of one significant change or a series of smaller, incremental changes that together constitute a significant change. S. Christow notices three factors determining innovation: the potential for innovation (knowledge in general), the propensity to introduce innovation (inventiveness in general), and the propensity to adopt innovation (openness in general).

We can imagine a situation where companies operating in Poland are the authors of innovative ideas, but Polish consumers do not want to buy them. Then the only solution is export. However, the Polish internal market is large enough to allow for the development of less innovative businesses: many domestic companies are satisfied with lower turnover on the Polish market. This peculiar "lack of ambition" is a certain barrier to innovation[45]. The most important will be those innovations that concern social needs (which means that the ability to meet the needs of society will be more important in assessing the value of innovations than their ability to generate profits for creators / sellers).

R&D activity (research and development) as a specific type of innovative activity. Specific types of innovative activities that can be used by organizations to create or acquire innovations are R&D and / or many different activities, incl.[46]:

[45]S. Christow, What is innovation for me? What do we intuitively call innovation ?, January 16, 2011, unpublished text. [after:] J. Fazlagić, Is your company innovative? How to look for innovations in the service sector? Hints for the Ministry of Treasury, PARP, Warsaw 2012, pp. 30-31.
[46] See the Oslo Manual, op.cit, pp. 38-39

R&D activities which includes the following:

- The organization may conduct basic and applied research in order to acquire new knowledge and research directly aimed at specific inventions or modifications to existing techniques;
- The organization may develop new product or process concepts or other new methods to assess whether they are feasible and economically rational; at this stage, the following may appear: a) development and testing, and b) further research to modify technical designs or functions;[47]

Innovative activities other than R&D

- The organization can undertake many activities that are not R&D but are part of innovation. These activities can strengthen the organization's ability to innovate or its ability to successfully incorporate innovations developed by other companies or institutions;
- The organization can obtain new concepts for products, processes, marketing methods or organizational changes:
    - through its marketing activities and user relations,
    - by identifying opportunities for commercialization resulting from own basic or strategic research or from such research carried out by other entities,
    - by its ability to conduct design and development work, d) by monitoring competition as well
    - by using the services of consultants.
- The organization can purchase technical information by paying fees and charges for patented inventions (which usually requires research and development to adapt and modify the invention to suit its own needs) or purchase know-how and skills in the form of engineering and construction services or other consultancy services;
- Human skills can be developed (through internal training) or acquired (through hiring new people); covert and learning by doing skills may also be involved;

[47]Cf. The Frascati Handbook. Measurement of scientific and research activity. Proposed standard procedures for research and development surveys. OECD - Organization for Economic Co-operation and Development. Ministry of Science and Higher Education, 2010.

- The organization may invest in equipment, software or means used indirectly for production, containing the effects of innovative activities of other entities;
- The organization can reorganize its management systems and the entire system of its activities;
- The company may develop new methods of marketing and selling its products and services.

The ultimate goal of all these types of innovation activity is to improve the organisation's performance. The purpose of the activities may be the development and implementation of new products and processes, new methods of promotion and sale of products and / or changes in the organizational practices and organizational structure of the company[48].

Types of innovative activity according to the time factor

Innovative activity conducted in a given period may be of three types:

- activity completed with success, i.e. successful implementation of innovation (although there is no requirement that it should also be a commercial success);
- ongoing activity, i.e. activities in progress that have not yet resulted in the implementation of innovation;
- activity discontinued before the implementation of the innovation.

[48] The Oslo Manual, op.cit, p. 39

CHAPTER 9

INNOVATIVE PROCESS AND MODELS OF THE INNOVATIVE PROCESS

The innovative process is internally diverse and multi-stage. The nature of the innovation process is not fully explained. This concept should be understood as a creative activity consisting in creating, designing and implementing innovations. In other words, the innovative process can be defined as all activities necessary for the creation and practical application of new technical solutions, which include new or modified products, manufacturing processes and organizational changes. A similar content is assigned to the concept of innovative activity. However, when it comes to a specific technical solution and its application in the economy, then we can speak of an innovative undertaking.

Linear models of innovation ("from research to production")are early models of the innovation process. According to modern theories, although R&D activity is a very important and undisputed source of innovation, innovation and innovation are concepts and phenomena that are more complicated and much wider than the R&D activity itself, with which until recently they were identified as described in the above-mentioned linear models of innovation (linear model of innovation - "from research to production"). These models dominated until the mid-seventies. They emphasized the causal role of scientific and technical achievements (discoveries, inventions).

Models referred to as: *a simple linear model of "science-driven innovation" (technology-push) or a model of "market-driven innovation" (need-pull)*.

According to the first model, achievements in the field of basic research through applied research lead to the development of new industrial techniques (new products and technological processes), followed by various stages of production, and finally market activities. The last phase, i.e. diffusion, means the process of infiltration (absorption) of innovations into subsequent enterprises, as well as the infiltration of innovations at the scale of a single enterprise.

An example of a truly linear innovation is programs for the development of a specific product, group of products or technology. In the latter case, the innovative process is also multi-phase and usually includes:

(1) identification of market opportunities and opportunities,

(2) designing and testing a new product,

(3) implementation

(4) placing a new product on the market.

According to this model, technical innovations are the result of perceiving market or social needs. The market is perceived as a source of ideas and inspiration for R&D. The company's success therefore depends on following mainly short-term market needs, looking for market opportunities for creating a set of modified products.

In linear models, we deal with a more or less passive role of the user of innovation and the market, who are simply passive recipients of the results of scientific and technical progress or current signals from the market.

Innovation policybased on such models, the main emphasis is on supply factors (scientific and technical possibilities), or on demand factors (market and social needs). Most innovations, however, do not follow linear models. Their application in the practice of enterprise management was one of the reasons for many failures of innovative undertakings, mainly due to the long period of implementation and numerous organizational barriers.

Dynamic interactive models of the innovation processthey were already replacing linear models in the late seventies. They are more complicated and contain numerous interactions and feedback loops in the period of emergence and diffusion of innovation. They explain innovation both as a result of the feedback between technical possibilities (generated by science and technology) and needs (generated by the market or production), and the rich set of interactions between science, technology and implementation activities within the company.

Their characteristic feature is the assumption that innovative processes can take place inside the company, without referring to research and professional

advice of other specialists outside the organization. On the other hand, at every moment of the innovative process, it is possible to reach the accumulated knowledge generated by science, as needed. Nowadays, innovation is becoming more and more clearly a network and system process in which innovation is the result of numerous complex interactions between individuals, organizations and the environment.

This is evidenced by the rapidly growing number of various types of horizontal agreements in the form of strategic alliances, cooperative relationships in the field of R&D and new product development, as well as vertical ties between enterprises. The role and importance of ties with suppliers in the product and technology development strategy of many companies has increased in particular. The share of small innovative companies is growing in these rapidly growing and increasingly complex external links. The innovative process has specific features that distinguish it from regular industrial production. It is a particularly complex, complicated and difficult process. This is mainly due to the fact that innovations, binding together like braces the four spheres: science, technology, production and the market, thus concentrate the features of all these spheres.

The basic features of the innovative process understood in a modern way are as follows[49]:

1. Innovation is an interactive and multidisciplinary process.
2. Innovation only in exceptional cases depends solely on technological know-how. In most cases, apart from R&D work, the source of innovation is also acquired specific experience and knowledge, including managerial and general level of education, contacts with users and suppliers, competitors, etc.
3. Innovation processes are localized. This means that the formation and diffusion of innovation takes place in a specific space, which is associated with the presence of high-quality development and other location factors resulting from agglomeration and urbanization processes.
4. Innovation is an integration process. This means that the efficient and effective implementation of innovations requires high skills in the field of

[49]Source: Green Paper on Innovation, European Commission ECSC-EC-EAEC, Brussels / Luxembourg 1996; S. Kwiatkowski, Innovative Society, PWN, Warsaw 2000; SJ Kline, N. Rosenberg, An Overview of Innovation [in:] R. Landau, N. Rosenberg (ed.), The Positive Sum Strategy, National Academy Press, Washington, DC 1986; Technology and Economy. The Key Relationships, OECD, Paris 1992; M. Dodgson, R. Rothwell (ed.), The Handbook of Industrial Innovation, Edward Elgar Publishing Ltd, Aldershot-Brookfield, 1994; J. Guinet, National Systems for Financing Innovation, OECD, Paris 1995; Oslo Manual. Guidelines for Collecting and Interpreting Innovation Data, Third Edition, OECD / Eurostat, Paris 2005, [after:] Innovation and Technology Transfer. Dictionary of terms, ed. KB Matusiak, PARP, Warsaw 2011, pp. 52-56.

business management. This includes the integration of goals, tasks, and functions that span marketing, research and development, design, procurement, and production.

5. Innovation is a learning process. This means that innovation is the result of the accumulation of specific knowledge and information useful for the company's operations. It is an interactive process that uses internal and external sources.
6. A relatively long and a priori difficult to define innovation cycle (research and implementation).
7. Innovation is costly and risky. Innovation expenditure is characterized primarily by: uniqueness resulting from the essence of the innovative process itself, a relatively long freezing period, unevenness.

The feedback modelis one of the most commonly used models of the innovation process in developed countries today. From the point of view of this model, innovation is a logically cyclical, but not always continuous, process that may consist of a series of functionally separate but interconnected and interdependent phases. It does not really matter in which of the phases of the feedback model an idea for a specific innovative venture emerges. It is important, however, that the company combines the technological potential with the needs of the market at the earliest possible stage of the innovation process.Polandthe economy is characterized by the fact that innovative processes are currently taking place in it according to the model of innovation "pushed" by science and "pulled" by the market. However, the first model is the most common. In a situation where the Polish economy achieves the fully market status, then the feedback model of the innovation process will most often be chosen.

The "I" model of creating innovation in the 21st century

Innovations in the 21st century will be created within the framework of the "I" model: i.e.[50]:

1. Innovations will be created by individuals (individuals) as well as small enterprises. This is due to the simple fact that there are no economies of scale in creating knowledge. For example, a small biotechnology company with 50 researchers can create more innovation than a multinational pharmaceutical company. This is due to the fact that the creativity of teams does not increase in power along with the increase in the number of creative teams.

[50] GE Global Innovation Barometer 2011. An Overview on Messaging, Data and Amplification, General Electric, 2011, p. 20.

2. Integrated Solutions - innovations should deliver value to the whole society, not only to selected groups of consumers. A classic example of this type of innovation are innovations related to ecology, road safety and health care.
3. Innovations with real benefits (Impactful Innovations) - a valuable innovation should solve the problem and not only bring profits to the manufacturer. For example, a store that offers ringtones for cell phones can be very profitable, but at the same time contribute little to any real improvement in the quality of life of a society.
4. Innovation should be created in partnership networks (incorporating partnership). Cooperation of small innovative companies will give better results than creating innovation within large corporations.

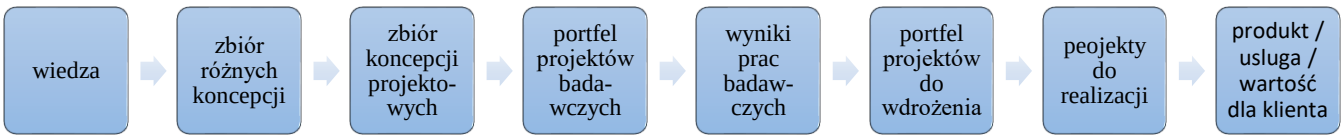
CHAPTER 10

INNOVATIVE COMPANY, INNOVATIVE COMPANY

An innovative company *innovative companies*is a company that implemented an innovation during the period in question. Such a broad definition of an innovative company will not always meet the needs of public policy or research activities. In many cases, a narrower definition can be useful, particularly useful when making comparisons of innovations across sectors, firm size categories, or across countries. An example of a narrower definition is the one that refers to companies that innovate products or processes.

A company that innovates in products / processes (product / process innovative companies)is a company that implemented a new or significantly improved product or process during the period in question. This definition, which includes all companies that have implemented a product or process innovation, is similar to the definition of "TPP innovative company"[51]. A simple diagram shows the path from the resource of knowledge to the market product and value for the company and the customer.

Diagram 3: The path from knowledge to product and value for the company and the customer



Source: own study

The diagram above shows in a simplified manner the full course of the process of creating and implementing innovations, which in the conditions of a market economy should be successful for all participants of the process, in the form of value for the company and the customer. Thus, the process of commercialization of scientific research results is accompanied by the chain of creating value for the client in the university and in the enterprise.

A modern enterprise should be innovative, open to novelties, able to find signals from the market and ready to introduce innovative changes. It is inextricably linked with developing one's innovativeness through professional and competent management and creating such working conditions that will be

[51] Ibid., Pp. 48-49.

interesting and attractive for people. With the emergence of innovativeness, the competitiveness of the enterprise grows, so it can be considered that it is one of its features, characterized by: searching for, creating and implementing various types of innovations, the ability to make decisions in the event of risk or uncertainty, the ability to constantly observe the market, signals and quick reaction to market needs, the ability to observe and predict the actions of competitors, or breaking innovative inertia. An innovative enterprise is one that can create, acquire and absorb innovations and obtain information about innovative solutions. The innovativeness of an enterprise is the introduction of a new solution in the field of organization and management, technology or marketing44. The innovativeness of the enterprise can also be defined here as the improvement and development of operational and production technologies related to services, the sphere of organization and management, as well as the collection, processing and sharing of information. The innovativeness of an enterprise is the introduction of a new solution in the field of organization and management, technology or marketing44. The innovativeness of the enterprise can also be defined here as the improvement and development of operational and production technologies related to services, the sphere of organization and management, as well as the collection, processing and sharing of information. The innovativeness of an enterprise is the introduction of a new solution in the field of organization and management, technology or marketing44. The innovativeness of the enterprise can also be defined here as the improvement and development of operational and production technologies related to services, the sphere of organization and management, as well as the collection, processing and sharing of information.[52].

Innovative enterprise (according to the OECD methodology) is an economic entity that has implemented at least one innovation (product or process) in a specific, usually three-year, period of time, also provided that it is new to it. An innovative enterprise is defined as an intelligent organization that continuously generates innovations and implements innovative projects to produce products and services that are appreciated by recipients due to the high level of modernity and competitiveness. It can be said that the concept of innovation defines the results of an enterprise's innovative activity at a given time and in a given place.

[52] S. Gopalakrishnan, Unraveling the Links Between Dimensions of Innovation and Organizational Performance, The Journal of High Technology Management Research, vol. 11 (1) / 2000, pp. 137 - 153.

According to another definition: an innovative enterprise is one that[53]:

- conducts research and development works in a vast area or buys projects of new products / technologies, allocating relatively large financial outlays for this purpose,
- systematically implements new scientific and technical solutions and constantly and continuously introduces innovations to the market,
- it has a significant share of new products in the total number of products or services.

Innovative enterprises are most often called[54]:

- innovators, i.e. individuals that are the first to adapt new ideas and regularly introduce innovations,
- early adapters, more cautious in their actions than innovators, but characterized by a high propensity to introduce innovations,
- a late majority - they adapt innovations with a long delay, usually under the influence of economic calculations or market pressure,
- slackers, i.e. organizational units that introduce innovations at the latest among units of a given type of activity.

The enterprise itself should develop the form and pattern of innovative behavior, both internal and in contacts with the environment. The most important attributes of an innovative enterprise are:

- ability to generate innovation,
- creativity,
- the ability to use the innovative potential to maintain a competitive position,
- high competences,
- the ability to predict changes in the environment,
- the ability to recognize customer needs and meet them,
- having a team of innovators,

[53] Source: AH Jasiński, Przedsiębiorstwo Innowacyjne, KiW, Warsaw 1997, p. 25.
[54] Source: J. Duraj, M. Papiernik - Wojdera, Entrepreneurship and innovation, Difin, Warsaw 2010, p. 88.

- flexibility and the ability to adapt to a changing and turbulent environment.

The company is innovatively active(innovation-active firm) is a company that conducted innovative activities in the period in question, which also includes ongoing and discontinued activities. In other words, innovation active companies are companies that carried out innovative activities during the period in question, regardless of whether their activity led to the implementation of innovation or not. New firms may emerge during the period covered by the statistical survey, whether entirely from scratch or as a result of mergers, divisions or other types of reorganization. The innovativeness of these companies (innovative company or innovation active company) is defined in the same way as for all other companies.

Assessment of the degree of innovation of the company

It can be defined in several ways. The basic definition of an innovative company is that it is a company that has implemented at least one innovation, while a product or process innovator is defined as a company that has implemented a product or process innovation.

Other ways of classifying innovative firms are also possible, depending on public policy and research needs.

Such classifications can be used to determine what percentage of firms (by size class, sector, country or other factor) implement each of the four types of innovation, or implement a combination of several types of innovation (for example, product and marketing innovations, or process innovations with organizational innovations). Classification according to the criterion of innovation may also take into account other information (for example, data on the entity that is the innovation creator) that can be used to identify companies that only absorb innovations in products and processes developed in other companies. It may happen that during the period in question, companies will conduct innovative activities, but will not actually implement innovations.

All activities related to the development or implementation of innovations, including implementations planned for the future, are classified as innovative activitiesj.

Enterprise innovation is considered as a one-dimensional phenomenon, denoting the ability of a person / group to generate and effectively apply new ideas[55] or as the company's ability to constantly seek, put into practice and

[55]RB Bouncken, Cultural diversity in innovation teams: surface and deep level effects, International Journal of Business Research no. 4/2009, pp. 17-26.

disseminate innovation, leading to an increase in its modernity and strengthening its competitive position on the market[56] and as a successful introduction to practice of a new thing or method[57].

[56]A. Pomykalski, Innovativeness of the organization, Wyd. Wyższa Szkoła Kupiecka, Łódź 2009, p. 8; E. Stawasz: Main areas of driving forces and tensions in the system of technology transfer and commercialization in Poland, [in:] Conditions for the development of knowledge-based entrepreneurship, Scientific Papers No. 642, Economic Problems of Services No. 64, University of Szczecin, SOOIPP Annual, Szczecin 2011, p. 13.
[57] R. Richard, R. Katz, Managing Creativity and Innovation, Harvard Business School Press, Boston 2003, p. 2.

CHAPTER 11

THREE LEVELS OF NEW PRODUCTS AND THE DIFFUSION OF INNOVATION

The minimum criterion for a change in a company's products or functions to be considered an innovation is that it is new (or a significant improvement) to the company. All innovation must - by definition - contain an element of novelty.

The value of understanding the value of new innovations is:

- novelty for the company or the market,
- novelty on a global scale and
- the so-called disruptive innovations.

There are two main reasons for using the "new to the company" (organization) criterion as a minimum requirement for an innovation to occur.

- First, innovation is important to the innovation system as a whole. It consists in the flow of knowledge to companies absorbing innovations. In addition, the learning process during the implementation of an innovation may result in the improvement of a given innovation and the development of new products, processes and other innovations.
- Second, the main impact of innovation on business is due to the diffusion of primary innovation to other firms.

Data on the creator of innovation also relate to the element of novelty and diffusion, indicating whether the innovations are primarily created within the enterprise (organization), or are created in cooperation with other enterprises or public research institutions, or perhaps they are primarily created outside the enterprise (organization) .

New to the companyis the minimum criterion for the occurrence of an innovation. It may happen that a given product, process, marketing method or organizational method has already been implemented in other companies, but if they are new to the company considered in the study (and in the case of products and processes - if they are significantly improved), then we deal with innovation in this company.

New to the market and **new to the world**indicate whether a given innovation has already been implemented by other companies, or it is the case that the company in question has implemented a given innovation as the first on the

market, in the sector or worldwide. Companies that are the first creators of innovation can be considered as engines of the innovation process.

These companies generate many new ideas and new knowledge, but their economic impact will depend on whether other companies also implement the innovation. Information on the degree of novelty can be used to identify developers and adopters of innovation, to study diffusion patterns, and to identify market leaders and followers.

We say that innovation is new to a given market if the company is the first to introduce a given innovation in its market. The market definition is simple: it is the company and its competitors, and the market may be a geographic region or a product line. The territorial scope of novelties for the market depends, therefore, on how a given company perceives its market of operations, which means that the market may include both domestic and foreign companies.

Innovation is a novelty on a global scale, when a company introduces a given innovation first in all markets and in all sectors, both nationally and internationally. A novelty on a global scale therefore means a qualitatively higher degree of novelty than in the case of new products for the market. In many studies, questions about novelty to the market will give sufficient data on the degree of novelty of an innovation. The question of what is new on a global scale, in turn, gives an additional opportunity to collect information in those statistical surveys aimed at in-depth research on the novelty aspect of innovations.

Radical innovation / disruptive innovation- it can be defined as an innovation that has a significant impact on the market and the economic activity of companies in this market. This concept focuses on the effects of innovation, not the novelty aspect. These effects can, for example, change the structure of the market, create new markets or render existing products obsolete. However, it may happen that the breakthrough of an innovation will not be visible for long after its implementation. This fact is an obstacle in collecting data on breakthrough innovations during the period covered by the statistical survey.

Diffusion of innovation and the degree of novelty

Thanks to innovation, new knowledge is created, which is then diffused, expanding the economy's potential to create new products and more efficient methods of operation. Such beneficial phenomena depend not only on technical knowledge, but also on other forms of knowledge that are used to create product and process innovations, as well as marketing and organizational innovations.

There can be significant differences between specific types of information in terms of the impact they have on the performance of firms and on economic

change. For this reason, it is important to be able to determine that an innovation has been implemented and what effects each type of innovation has brought about[58].

Diagram 4 presents the proposed measurement system from the perspective of the company, i.e. the target respondent of statistical surveys in the field of innovation.

An organization that wants to change its products / services has two options. It may invest in creative activities and develop innovations on its own - alone or jointly with external partners - or it may adopt innovations developed by other companies or institutions through a diffusion process.

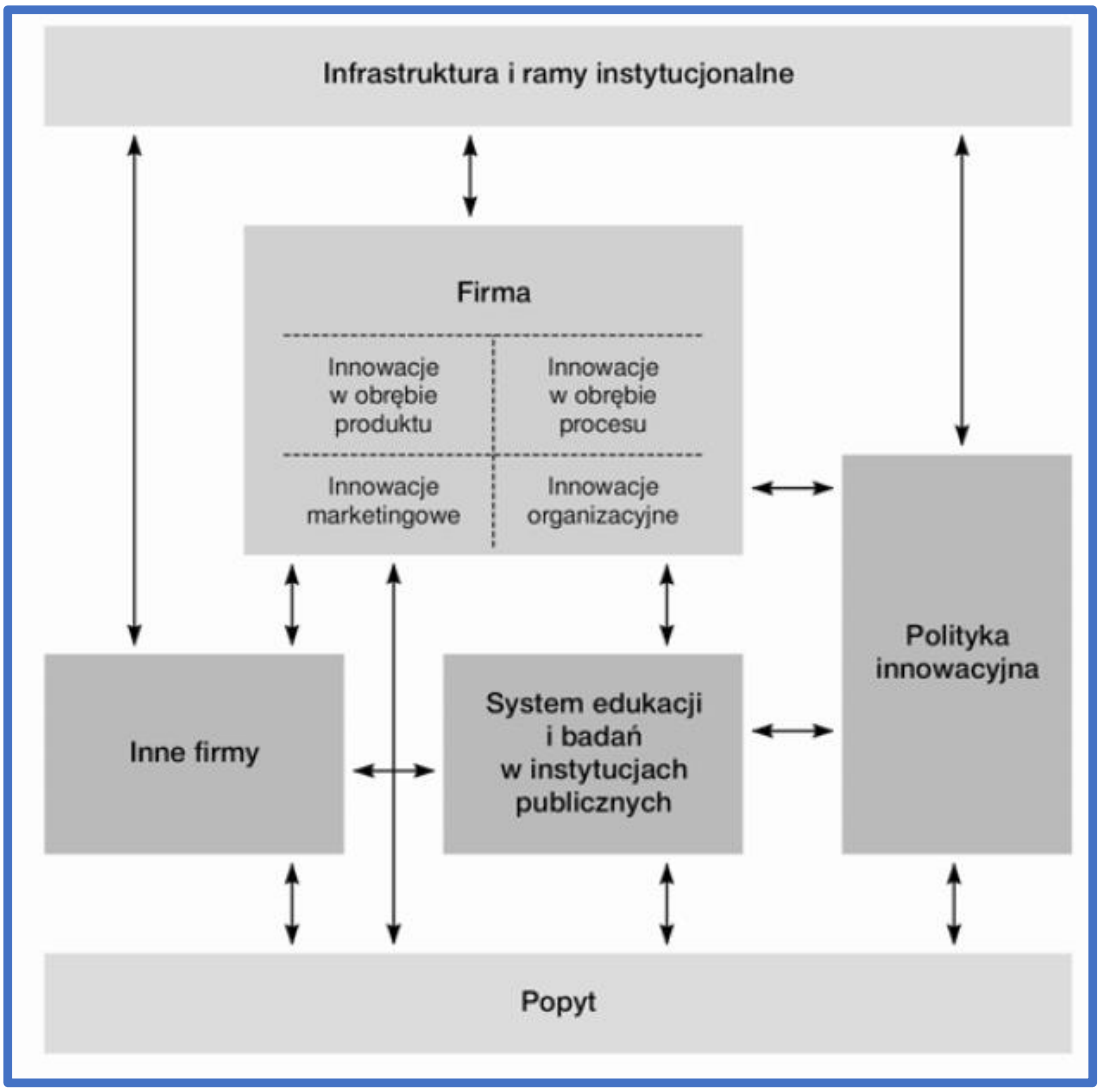
It should be noted, however, that innovations do not necessarily have to be created by the company in-house, but forms can be acquired by innovations from other companies or institutions through the diffusion process. Diffusion means how innovation is disseminated, through market and non-market channels, from initial deployment to exposure to different consumers, to presence in different countries, regions, sectors, markets and companies.

Without diffusion, innovation would not be economically significant.

Diffusioncan be captured by taking into account in the research innovations that are new to the company. It should be noted that the manual does not mention the diffusion of the new technology to other divisions or parts of the same company after its initial introduction or commercialization. For example, the first implementation of a new production technology in one of the five factories owned by the same company is considered an innovation, but the implementation of the same technology in the other four factories is not an innovation.[59].

[58] See the Oslo Manual, op.cit, p. 35
[59] OECD 2005, Oslo Manual, op. Cit.

Diagram 4: Framework for measuring innovation



Source: Oslo Manual 2005.

CHAPTER 12

THE CLUSTER AS A CREATOR OF INNOVATION

It is a specific form of production organization, consisting in the concentration of flexible enterprises running complementary economic activities in a close space. These entities cooperate and compete with each other at the same time, they also have relations with other institutions operating in a given sphere. The basis for the creation of the cluster are cooperative relations between entities, generating the processes of creating specific knowledge and increasing adaptive abilities.

A cluster can be understood as a spatial concentration of enterprises, institutions and organizations interconnected by an extensive network of formal and informal relations, based on a common development trajectory (e.g. technological, common target markets, marketing strategy, etc.), simultaneously competing and cooperating in certain aspects of operation.

The cluster is a cross-industry network of formal and informal connections between producers, their suppliers and recipients, institutions of the science and technology sector. The cluster is characterized by intense flows of information and knowledge as well as a high level of simultaneous competition and cooperation. Innovation and technology transfer[60].

Clusters are defined as strong and highly competitive clusters of enterprises with a specific business profile together with the surrounding institutions (research, service, administration). The basic mass of the cluster is made up of companies, and its presence is determined, among others, by based on the presence in a given area of an above-average - in relation to the rest of the country or region - cluster (concentration) of specific companies and employment. The linking of the companies in the cluster results mainly from the fact that they deal with a similar activity (market or product), although sometimes at a different stage, the so-called value chain.

For example, in the Pomeranian amber cluster we have companies dealing in the production of amber jewelry, as well as suppliers of raw materials (including silver and amber), machines, packaging, as well as specialized branches of courier companies, insurance companies and industry media.

A cluster is more than just a cluster of the entities mentioned - it is also a network of connections and interactions that gives the ability to generate a sustainable competitive advantage within a given location.

The advantage resulting from the effective use of locally available resources and their appropriate specialization as well as cooperation and coordination

[60]Quote from: Dictionary of Concepts. (ed.) KB Matusiak, ed. Polish Agency for Enterprise Development, Warsaw 2011, p. 137.

of various activities. An important determinant of the cluster is good communication and the ability to cooperate between enterprises, administration and environmental institutions, including educational and research and development units.

The intensity of various types of ties and relations between these entities and the presence of network and cooperative ties determine the strength of the cluster. This strength is also determined by the level of development of social capital (trust, openness, community of values, local patriotism, etc.), which translates into a willingness to cooperate and lower transaction costs.

However, clusters are also very diverse. We are dealing with both mature, extensive clusters, which can be easily defined on the basis of statistical data, and clusters that are just emerging and are not subject to this type of analysis. We have both industrial and service clusters as well as clusters with more dispersed structures (dominated by small and medium-sized enterprises) - independent or satellite1 - or structures concentrated around one or more leading and large entities (such as "axle and spokes"). Some clusters are more traditional in nature, where cooperation between companies may be of greater importance, while others are based on the development of technology and cooperation between companies and the R&D sphere. After all, some clusters have strong connections and global importance, while others are strictly local or regional in nature.

Nowadays, individual countries and regions are trying to strengthen their competitiveness by supporting factors that were important for the success of leading clusters - namely interactions, networks and willingness to cooperate. The aim of these policies is the development of clusters in the normative approach - i.e. such clusters of companies and institutions of the environment that will be characterized by an appropriate critical mass (accumulation of economic potential in the form of companies, employees and environmental institutions), intensive interactions (both in the area of competition and cooperation) and high competitiveness and innovation (confirmed, among others, by the ability to sell to external markets - domestic or foreign)[61].

"Most people want to take, not give. In relation to people or companies that want to join the cluster, you need to ask for answers to two questions: what do you expect from the cluster, but also: what can YOU give the cluster? The Association has learned to base its work on those who want to do something and are able to benefit from it. Sometimes it is money, sometimes satisfaction and adventure are enough. It is impossible to force anyone to cooperate for a long time, the example of success and the idea of your own benefits can be mo-

[61]For: Creating and managing a cluster initiative. The manual was commissioned by the Marshal's Office of the Wielkopolska Region, IBnGR, Gdańsk 2009, pp. 5-6.

tivating. For the integration of the cluster, not only spectacular successes publicized in the media are important, but also small, systematic, successful projects. Common failures also cement, if we are able to draw conclusions from them and recognize that "what does not kill us, makes us stronger".

Barbara Szymoniuk, Organic Food Valley

"A jointly developed vision that will allow us to look into the future is essential. In order to obtain the best results, it is necessary to rebuild the awareness of entrepreneurs in the field of cooperation with competitors and to realize the benefits of cooperation, as well as to reach entrepreneurs with this message. (...) The fear of losing sovereignty through participation in a cluster or cooperation with competitors is in many cases a stimulus that strongly inhibits the development of cooperation. "

Andrzej Spychalski, Food Cluster of Southern Greater Poland

"The process of creating and building an initiative is a delicate process that requires sensitive management. This process is still a new one in Poland and requires great and constant support, including social support. It is not an easy process, it is not a harmonious process, there are tensions, and there are also bad experiences. It requires patience and is a long process. The key to success is a common understanding of what is important. You have to be aware that in fact, in a sense, each time we find ourselves at the "beginning of the road". We constantly overcome mental barriers, the barrier of distrust, the barrier of ensuring the protection of the common heritage (...) "

Michał Kuberka, Pleszew Kotlarski Cluster[62]

[62]Quote from: Selected opinions from the study: Creating and managing a cluster initiative. The manual was commissioned by the Marshal's Office of the Wielkopolska Region, IBnGR, Gdańsk 2009, pp. 25-27.

CHAPTER 13

THE ECONOMICS OF INNOVATION

Research on the issue of innovation combines a number of disciplines, while economic concepts alone are based on several different theoretical perspectives, each of which is a source of valuable insights. They can be seen as alternative directions or as complementary elements. This section provides an assessment of the various theoretical approaches to innovation and their implications for public policy and the data collection process. The point is to construct research on the issue of innovation in such a way that it becomes a source of data useful both from the point of view of theory and public policy.

The aforementioned theories relate to a number of issues related to innovation policy and to measurement issues, such as the causes of innovation in companies, the engines of innovation and factors inhibiting these processes. Related issues are the inner workings of companies and the operating principles used to support innovation. Another important aspect is the nature of knowledge, the way it is collected and the way it flows between the actors of the entire process. And finally, it is about the development of innovative processes at the level of the sector, region and the entire country. It is essential to learn about the causes of innovation in companies. Ultimately, it is about increasing the efficiency of the company's operation, for example by increasing demand or reducing costs.

In the case of process innovations, contributing to increasing efficiency, the company gains a cost advantage over its competitors, which allows it to increase the margin at the most common market price or - depending on the elasticity of demand - to use a lower price combined with a higher margin than the competitors to increase market share and the level of profits.

In the case of product innovationa company can gain a competitive advantage by introducing a new product, which allows it to increase demand and profit margins. Firms can also increase demand by diversifying products, reaching into new markets and shaping the demand for existing products.

Changes in organizational methodscan increase the efficiency and quality of operations, thereby increasing demand or reducing costs. Innovation can also increase the efficiency of companies' operations, increasing their innovative capacity. For example, increasing the efficiency of production processes can create an opportunity to develop a new series of products, and new organizational practices can increase a company's ability to acquire and create new knowledge that can be used to develop further innovations. Mainstream or neoclassical economics views innovation through the prism of asset creation and market experimentation. According to this approach, innovation is an aspect of a business strategy or a component of a set of investment decisions

leading to the production of product development capacity or efficiency gains.

The concept of sunk costs - recently, attention has been focused on the costs of irrecoverable funds committed in connection with entering new markets or creating competitive advantages by repositioning production or production results along the value chain.

Obtaining ownership of the benefits of it is an important factor in an innovative activity. This is because research results and new technologies often exhibit public good features, as the costs of making them available to a large group of users are low compared to the cost of producing them. Once the innovation has been disseminated, users cannot be denied further access to it. In such cases, the company is not able to obtain all the benefits of its own innovations, which reduces the enthusiasm to invest in innovation activities. Hence, the ability to protect innovation will have a significant impact on innovative activity. Other works, especially those devoted to the theory of organization in industry[63], emphasize the importance of positioning in relation to the competition. Companies innovate to defend their current competitive position and to seek new competitive advantages. Or, a company can adopt a reactive attitude and innovate to avoid losing market share to an innovative competitor. Or, it may take a proactive approach to gain a strategic position in the market against its competitors, for example by developing higher technical / technological standards for its products and then trying to impose them on other market participants.

Decision to undertake work on innovation under conditions of considerable uncertainty[64].

Future economic and social development in terms of knowledge and technique / technology, markets, product demand and potential technology applications can be highly unpredictable, although the level of uncertainty varies by sector, product life cycle and many other factors.

The introduction of new products or processes or new marketing or organizational methods is also subject to uncertainty. Moreover, searching for and collecting relevant information is often very time-consuming and costly. Uncertainty can make firms hesitant to implement meaningful changes even as they face a changing environment that creates increasing pressure to introduce new products, seek new markets, and implement new technologies, practices, and organizational methods into production processes.

[63]For example, J. Tirole, The Theory of Industrial Organizations. Cambridge, MA, MIT Press, 1996.
[64]Source: N. Rosenberg, Exploring the Black Box: Technology, Economics and History. Cambridge 1994, Cambridge University Press.

Uncertainty may also make it difficult for companies to obtain financing for innovative projects from external sources. Literature on the issues of organizational innovation[65]it focuses on the role of organizational structures, learning processes and adaptation to technological and environmental changes (the latter is about institutional frameworks and markets). The organizational structure of the company may affect the effectiveness of innovative activity, with some structures better suited to the specific environment. For example, stronger organizational integration can help to improve the coordination, planning and implementation of innovation strategies. Organizational integration can be particularly effective in those types of activities that are characterized by incremental changes in the area of knowledge and technology. A looser and more flexible form of organization, giving employees greater autonomy in making decisions and defining tasks, can contribute more effectively to creating more radical innovations. The learning process within an organization depends on the adopted principles and practices of operation, patterns of interactions inside and outside the company, as well as the ability to use individual classified knowledge and support interactions.

Learning can be stimulated through the careful construction of working practices, consistent behaviors and relationships, or through a more flexible, 'fluid' organization in which individuals are encouraged to generate new ideas and ways of doing things. Marketing theories focus on consumer behavior, market exchange between buyers and sellers, and normative concepts. Since neither buyers nor sellers are homogeneous, companies face the difficult task of adapting their products to demand.

Due to the heterogeneity of consumers, product diversification is often as important to customer acquisition as new product development. Demand may depend not only on the objective characteristics of the products but also on their social characteristics and image, and firms can use the latter two to shape the demand for their own products. Normative marketing theories focus on implementing marketing methods.

An example is the Marketing Mix Model, which focuses on the so-called 4xP concept: product, price, promotion and distribution (product, price, promotion, placement). The diffusion of new knowledge and technology is an essential element of innovation. The diffusion process is often about more than the acquisition of knowledge and technology, as companies learn from new knowledge and technology and build upon them in their further activities.

Diffusion theories focus on factors influencing companies' decisions to introduce new technologies, access to new knowledge and the ability to absorb it. Economists' views on diffusion tend to focus on the costs and benefits of adopting new technologies. These potential benefits can often be strategic in terms

[65]J. Lam, Enterprise Risk Management, From Incentives to Controls. USA: John Wiley & Sons 2003.

of keeping up with or gaining an advantage over competitors. Access to knowledge and technology can depend to a large extent on the links between companies and other actors. This is especially true of implicit knowledge accumulated in people's minds, and of information built into routine ways of doing things. To access this kind of knowledge, direct interaction with people with such classified knowledge or access to routine modus operandi is necessary. Much of the knowledge has been codified, and it is possible to access and use it without directly interacting with its source.

Codified knowledge transfers account for a large part of technology diffusion, while activities to promote knowledge codification can have a significant impact on productivity, growth and innovation. An example is the work on creating technical standards. Even in the case of publicly available information, finding it can be a serious challenge, especially since searching for new information can be very costly. Hence, a very important role in diffusion is played by the ease of communication and effective channels of information and skills transfer, both within a given entity and between different entities. The approach of innovation systems analyzes the impact of broadly understood external institutions on the innovative activity of companies and other participants in the process.

They emphasize the important role of the transfer and diffusion of ideas, skills, knowledge, information and various signals. The channels and networks through which this information is circulated are embedded in the social, political and cultural background that guides and constrains innovation activity and capacity to innovate. Innovation is seen as a dynamic process in which knowledge accumulates through learning and interaction processes. These concepts were originally introduced in connection with national innovation systems, but also apply to regional and international systems. Systemic concepts of innovation shift the focus of public policy towards interactions between institutions and focus on interactive processes in the creation, diffusion and application of knowledge. They emphasize the important role of conditions,

CHAPTER 14

THE PROCESS MODEL OF INNOVATION

The process model of innovation creates a set of processes, and from the point of view of the company, the following processes can be called conventionally:

Ideas => R + D => Transfer => Implementation => Commercialization => Diffusion

What is important:

- these are not phases (stages) of the innovative process, but rather processes that make up contemporary innovative activity;
- this sequence of steps is not always the case. For example, in the course of scientific research, an idea for a new product may come up, even accidentally, that has not been considered before;
- some processes, such as "Ideas" and "R&D", can run in parallel;
- the innovation may or may not be based on an invention that arose during research and development;
- implementation and commercialization are part of the aforementioned process of transforming research results into practical applications;
- activities that make up the transfer of technology (knowledge) and diffusion of innovation are not typical work included in the innovation process, but accompanying it;
- in the case of a specific innovation process, not all phases have to occur, some may not occur at all;
- the only process that must take place is implementation, as it is this that determines whether or not (technical) innovation will emerge.

Nowadays, innovation is one of the key factors influencing its competitiveness for an enterprise, therefore it can be said that it is one of the conditions determining its survival and development. It requires not only the so-called instrumental rationality[66], i.e. the assessment and analysis of changes implemented in the enterprise, but also the so-called strategic prudence[67]that is, developing entrepreneurial activities, increasing the ability to undertake challenges or solving problems, as well as taking up new market challenges that will bring positive results in the future. Enterprises can become innovative, both as a result of making groundbreaking discoveries and inventions, but also as a result of minor

[66]J. Penc: Innovations and changes in the company. Transformation and control of the development of the enterprise. Principles of operation. Conditions for Success, Placet, Warsaw 1999, p. 13.
[67]Quote from: M. Bratnicki: Enterprise Transformation, Wyd. AE in Katowice, Katowice 1998, p. 88.

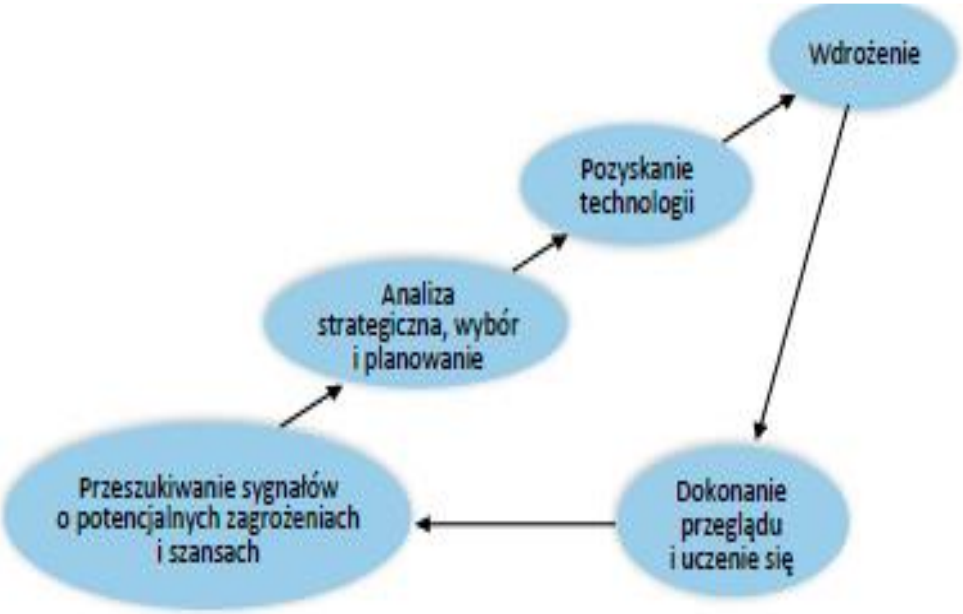
improvements, modifications and corrections. While the first way is difficult, complicated and rarely happens, the second is very often "within reach" of enterprises, you just need to be able to use it. Therefore, innovation should become the basic way of existence and functioning of the enterprise, the value and possibilities of which all employees know about. It should also be the main force of originality, creativity and creativity for him,[68].

Stages of the innovation design management cycle

It is a systemic process - the importance of the element of chance in this issue is much smaller or does not exist. The selection of methods, techniques and used in this complex process should be consistent with the cycle of designing innovative products and processes in the enterprise.

System-based innovation design management cycle in an enterprise - can be included in several activities, which can be presented in five stages, carried out concurrently (the first two) and sequentially (the remaining) - each of them requires special tools (diagram 5).

Diagram 5: The management cycle of designing innovative processes



Source: own study

[68] Source: AH Jasiński, Innovativeness in the Polish economy Models, barriers, support instruments, University of Warsaw, Warsaw 2014, pp. 24-25.

The stages of the cycle's operation that require constant attention and analysis of the company's environment are:

- Searching for signals about potential threats and opportunities.
- Strategic analysis, selection and planning.
- Acquiring technology.
- Implementation.
- Reviewing and learning.

From the point of view of economic theory, innovation currently plays an extremely important role in organizing economic growth. They are also gaining more and more importance as a subject of scientific research. In addition, they are also an important object in practical activities, the aim of which is to start a more extensive use of innovations in the implementation of specific intentions important from the point of view of modern man and related to his activities. The significant increase in the importance of innovations and the increase in the frequency of their application, which can be observed in recent years, are primarily the result of the continuous expansion of knowledge about the structure of innovative processes. To a large extent, they also result from the well-founded belief that innovation has a very strong impact on the entire economic and social development. Assuming the degree of complexity of the innovation process,

Understood in this sense, the innovative process is composed of individual stages of technological changes, which include:

- Invention, that is, a specific idea;
- Innovation, that is, a specific invention;
- Diffusion, i.e. the way of impact (dissemination).

Time is the most important factor for the entire course of the innovation process. It takes into account both the moment of the appearance of a given innovation and the duration of the entire process, i.e. all its stages: from the moment when a given idea comes into existence to the moment when it takes the form of a given product,servicesor technology. Each innovation has a so-called life cycle, i.e. its specific duration.

CHAPTER 15

THE LIFE CYCLE OF INNOVATION

The cycle begins when research begins, and then continues through the basic research stage and the implementation research stage until the implementation of innovation begins, which is the beginning of the life cycle of a product, service or technology on the market.

Conducting the observation and analysis of innovation processes has contributed to the distinction of certain specific regularities:

- The innovation life cycle is individual. It depends on various factors,
- the most important of which are: the level of economic development, as well as the location of innovation, i.e. a specific area in which the innovation process takes place;
- The innovations emerging nowadays are much more often the result of activities undertaken as part of teamwork than in the past;
- In some cases, it is not possible to appoint one separate author of a given innovation;
- Along with the evolution of civilization towards development and progress, the innovative process of a given product, service or technology is shortened. The formation of the so-called next generations of products.

Stages of technical progress in the enterprise sector

In the most general terms, technical progress is a process that consists in introducing specific changes in the technologies used, manufactured products, as well as in the material work environment. It is important that the result of the changes made is the achievement of appropriate economic and social benefits. It is important to keep an appropriate time horizon as well as a relatively complete economic impact zone. Innovation is the basic means of enabling the implementation of a process that consists in modifying and improving the technique. This process applies to all factors of production involved in a productive activity, i.e. man, as well as objects and means of work. Certain phenomena bear witness to this. First of all, people are moved away from manual labor by replacing them with machines. This leads to an increase in productivity and technical tools to support the work. At the same time, certain intellectual and psychophysical features and skills, as well as managerial predispositions, begin to play a more important role.

Technical progress in the sector enterprises consists of several basic stages, which include:

1. Basic research - contributes to the development of selected scientific disciplines, mainly due to discoveries and formulated theories. Moreover, they are a source of ideas that may prove useful in practice;
2. Applied research - transformation of scientific ideas into invention, ie ideas of useful application of scientific ideas in practical and useful solutions. This stage includes: studies on technical development, laboratory tests, as well as preparation of design guidelines for the new solution;
3. Development works - their task is to turn inventiveness into innovation, which is manifested in the production of a prototype, i.e. the first fully functional copy of a given device;
4. Implementation works - aimed at contributing to the application of the new solution on an industrial scale. This is to happen thanks to the creation of an appropriate production technology, the necessary documentation of the production process, as well as by checking the new solution for correctness, which is to be done by producing a trial batch of the new product.

The second to fourth stages are collectively referred to as the technical and organizational preparation of production. They consist of the phase of future production development, i.e. the specification of specific development assumptions. For this purpose, research on the current state of the art and directions of technology development are used as the basis for the findings. Planning of production also includes design and technological development as well as organizational preparation of the production process.

Carrying out an analysis of the innovation process allows for specific conclusions to be specified:

- Each of the models of the innovation process has a different number of phases, a different scope, and sometimes also a different content;
- Both the subject of innovation and the scope of the changes made affect the shape and organization of the innovation process;
- The changes in social needs have the greatest impact on the formation of the innovation process in an enterprise - then it has the character of a social process;
- Proper separation and characterization of specific phases in the innovative process, which are different in terms of goals, methods and area of implementation, gives the units conducting this process the

opportunity to adjust measures and methods of operation to the nature of these phases. In addition, it allows for the specification of specific technical and economic criteria, the fulfillment of which would be a condition for the transition to the next phase of the innovative process.

The successive phases of the innovation process are interdependent, and also condition and complement each other. The constant sequence of phases of the innovation process is not always maintained. As part of individual items of literature on the subject, especially by people dealing with empirical research on the issue of the development of innovation in an enterprise, the innovative process is usually analyzed as a single-phase conceptual set, and only the final result of this process is taken into account, excluding its subsequent phases. Such an attitude significantly reduces the possibility of finding out about the strength of the impact of various factors on the implementation of the innovative process and is the main reason for drawing incorrect conclusions. In order to carry out an analysis of the influence of various factors on the growth of the company's innovativeness, it is necessary to consider the individual phases of the innovation process separately. When choosing such a procedure, an analysis is made of which factors and how contribute to the efficient course of the subsequent phases of the innovation process, from the research phase to the diffusion phase.

From the system perspective, efficient organization and effective operation of the implementation process depend on a comprehensive approach to management functions, which include:

- planning,
- organization,
- motivating,
- control.

Planning process covers all of two issues:

- formulation and clarification of goals,
- determining the course of action.

The formulation and specification of goals consists in determining the tasks to be accomplished. In turn, the determination of the method of action is expressed by setting the conditions and measures to achieve the intended goals. Thus, in great simplification, it can be said that the basic planning functions of

the implementation process are most accurately illustrated by the following formula:

- WHAT? - assumption, goal, task (What are we going to implement?);
- WHO? - contractor, executor (Who will implement?);
- WHEN? - implementation time, specific deadline (When will we implement and how much time is there for implementation?);
- WHAT? - resources, means (What measures and resources are needed to carry out the implementation? Where can these measures be taken from?).

If we take into account that, in a fairly large generalization, the innovation implementation project is a set of answers to the above questions, it can be noticed that planning an implementation project is an ideal opportunity to trace and analyze the chances of making an implementation task come true. This plan also allows you to find out about the costs and deadlines associated with the implementation of the new solution.

Organization of the implementation- it is a certain set of activities that together make up the implementation process. However, it should be assumed that the basic assumption of these activities is to create appropriate conditions enabling the implementation of the implementation plan.

The most important activities that make up the process of organizing the implementation include:

1. Selection of units managing the implementation project;
2. Obtaining the necessary resources;
3. Coordination of activities, i.e. ensuring the cooperation of units that carry out partial tasks;
4. Determining the supervision, control and task acceptance system appropriate for a given implementation process;
5. Determining the method of information flow;
6. Organizing staff training;
7. Preparation of a detailed implementation program;
8. Development of accurate and precise instructions for the implementation of extremely important
9. and complicated tasks;

10. Appointment of the implementation team or teams and assigning them to specific tasks.

Coordination,which is considered to be one of the most important elements of the implementation process, is treated as the harmonization and standardization of all partial activities. Usually, each implementation process includes several smaller, separate projects aimed at implementing a specific fragment. Such a situation occurs even in the case of an uncomplicated implementation project carried out within one enterprise, where there are several implementation stages, which are carried out in separate organizational units. For the implementation to run smoothly and effectively, it is necessary to properly synchronize the subsequent stages.

With regard to synchronization, there are two main aspects to consider. First of all, it is about the precise timing of all activities and activities in order to implement a given innovation as quickly as possible. The second aspect concerns the proper planning of tasks, which should be organized in such a way that the same activities are not repeated several times.

Guaranteeing effective coordination is possible thanks to:

- precise schedules for carrying out subsequent stages and performing individual tasks;
- detailed implementation instructions;
- proper information flow;
- an appropriate coordination team, which consists of representatives of units performing partial tasks.

If you want to emphasize the importance of control in managing the entire innovation process, you should also pay attention to its importance as one of the key management functions in the implementation phase of a new solution. One of the reasons for the importance of control is that the implementation phase requires much more serious resources than in the case of other phases of the innovation process. In order to effectively and efficiently use these funds, it is necessary to systematically supervise the implementation process in order to identify any shortcomings and irregularities, and then eliminate them.

The main focus of controlling the implementation of an innovative project should be the three most important factors that characterize the innovative process:

- results achieved;
- deadlines for the implementation of the next phases of the project;
- costs incurred in connection with the implementation of the project.

As part of the control of the obtained results, parameters such as: weight, quality, usefulness, efficiency, technical effectiveness, etc. are taken into account. Carrying out such comparisons is the basis for making decisions on reducing expenditure, changing the plan, etc. Control of project implementation deadlines consists in checking how much time it takes to perform individual tasks, as well as determining the starting and ending times of specific tasks.

CHAPTER 16

PROCESS IMPLEMENTATION METHODOLOGY

Methodology for implementing process management should be based on the following principles:

1. start with formulating a strategy,
2. focus on processes,
3. link the strategy with processes,
4. analyze the level of customer satisfaction,
5. integrate the processes and their course with IT systems.

The effectiveness of introducing the methodology of process management into business practice is determined by the application of the following principles:

1. pervasiveness, which means the need to understand and implement the principles and assumptions of process management throughout the organization;

2. ownership, which means that all processes should have a clearly defined owner who manages the process team and is responsible for the review of the continuous improvement of the process;

3. documentation, which means the need to define document standards (i.e. internal measures of processes, ways of document circulation and information flow) that should meet the expectations of process participants. All elements of the methodology should be described in a complete, detailed and unambiguous manner in the form of the so-called the Process Handbook Manual, which is the equivalent of organizational regulations in structured management, consisting of the following parts:

- methodological foundations of process management - concepts and general principles,
- organization of work related to process management,
- process design,

- process implementation,
- supervision over the implementation of the process,
- recommended methods and techniques of process management;

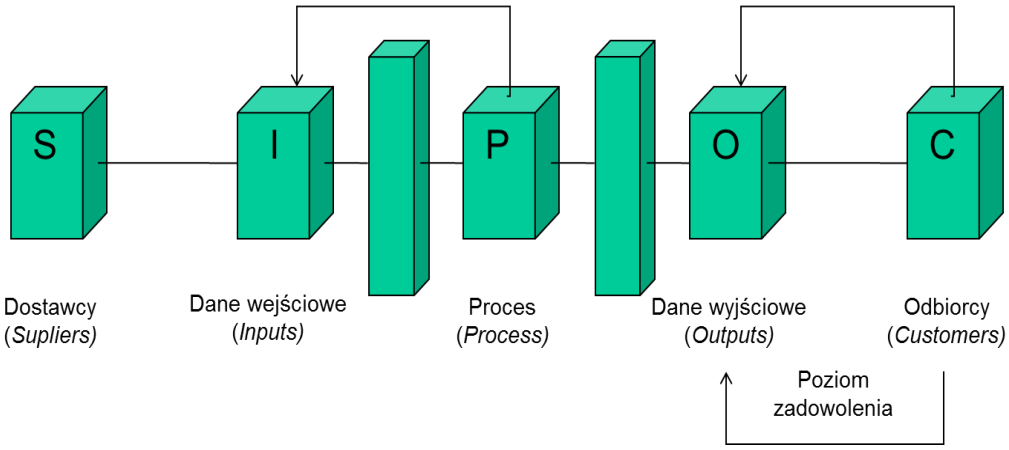
4. measurement, which means the need to evaluate the process using measures classified into the categories of quality, cost and time,

5. inspection, which means making the process owner responsible for monitoring activities, identifying gaps in the implementation of the process and eliminating them.

Process design it is a particularly difficult undertaking in organizations, especially when it is done for the first time. It is also related to the need to redefine the picture of the company's operation. Identification of processes carried out according to the adopted criteria, in fact, makes members of the organization aware of the new division of the enterprise into areas whose boundaries are determined by the inputs and outputs of processes, and not, as before, the boundaries between sets of tasks and functions. Designing the internal structure of the process, i.e. the set of activities it consists of, requires a specific transformation of the functions and tasks performed into sequential sets of operations (activities), linked together by a chain of sequence. It would be good if the process designer would arrange the next elements of the action preferably from the end, i.e. from the effect expected by the recipient (client),

In designing processes according to the SIPOC model (Supliers, Inputs, Process, Outputs, Customers), it is assumed that the project of the organization's operation is fully in line with the expectations of the recipients.

Diagram 6: Designing an organization towards processes - the SIPOC model



Source: own study.

An important factor for the effective process design effect is the precise definition of the needs and expectations of recipients. These expectations determine the effect of the process and its course, and their change means each time the need to reconfigure the internal process structure and the potential of the necessary supplies. As the processes form a network of interrelated contractors, a change in the configuration of one process, influenced by new customer expectations, may affect the course of other, closely related processes.

Innovations in small and medium-sized enterprises

Small and medium-sized enterprises (SMEs) are inevitably more specialized in their activities. This means that in their case, the role of effective interactions with other companies and public research institutions in the field of R&D, knowledge exchange and - potentially - commercialization and marketing activities is greater. In the SME sector, the factor determining innovative activity may be financial considerations, as this sector often suffers from a lack of internal resources enabling the implementation of innovative projects and, compared to larger companies, encounters much greater difficulties in obtaining external financing.

Criteria according to which it can be assessed whether a product / service is innovative

There are very general criteria against which to judge whether a product / service is innovative. The most important starting point for this assessment is the statement that "innovations in an organization refer to planned changes in the activities of a given organization aimed at improving its performance". Thus, the innovation will concern changes characterized by the following features:

- Innovation is related to the uncertainty as to the outcome of the innovative activity. It is not known in advance what the results of the innovative activity will be, e.g. whether the research and development work will lead to the successful development of a salable product, and how much time and resources will be needed to implement a new production process, marketing or organizational method, and to what extent the effort will end. successfully.
- Innovation requires investment. The necessary investments may relate to the acquisition of fixed assets or intangible assets and other activities (such as payroll or purchase of materials or services) that may bring potential profits in the future.
- Innovation involves transfer. The benefits of creative innovation are seldom fully exploited by the source company. Firms whose innovation activity relies on the absorption of innovations from outside may benefit from knowledge transfer or the use of original innovations. In the case of some types of innovative activity, the costs of imitation are much lower than the costs of producing it on their own, therefore it may be necessary to develop an effective mechanism for acquiring rights to innovation, providing an incentive to work on their creation.
- Innovation involves the use of new knowledge or a new application or combination of existing knowledge. New knowledge may be generated by the innovative company in the course of its innovative activity (i.e. through internal R&D) or acquired outside through various channels (e.g. purchase of a new technology). Applying foreground or combining existing knowledge requires an innovative effort that can be distinguished from standard, routine activities.
- Innovations are aimed at improving the efficiency of the company's operations by gaining a competitive advantage (or simply by remaining competitive), shifting the demand curve for the company's products (e.g. improving product quality, offering new products or gaining new markets or customer groups) or the company's cost curve (e.g. reducing the unit costs of production, purchasing, distribution or transactions) or increasing the company's innovative capacity (e.g. increasing the ability to develop new products or processes or to acquire and create new knowledge)[69].

[69] See the Oslo Manual, op.cit, p. 37

According to the Oslo Manual on the principles of collecting and interpreting data on innovation, in order to determine whether a product / service is innovative, a relationship should be found between innovation and production / service and economic changes, which determine the factors stimulating innovation, the important role of activities not only within products, processes , but also marketing and organizational activities, the role of linkages and diffusion, and considering innovation as a system.

Bearing in mind the above considerations regarding the features and key criteria allowing to conclude that the product / service is innovative, the current assessment should take into account the criteria for assessing innovative solutions of companies, determined under the Intelligent Development Operational Program 2014-2020. When assessing the criteria for determining that a product / service is innovative, the definition of innovation specified in the OECD / Oslo Manual is adopted, according to which innovation should be understood as introducing a new or significantly improved solution to the practice in the economy in relation to the product (good or service).), process, marketing or organization[70].

Therefore, as part of the "novelty" features, it is assessed whether the product / technology / service is new at least in the Polish market, in the context of its new features and functionalities, compared to the solutions available on the market.

- **In the case of product innovation** - novelty (at least in the Polish market) is understood as a significant change, i.e. the assessment takes into account qualitative and quantitative indicators that distinguish this product from products with a similar basic function available on the market.
- **In the case of process innovation**- novelty is understood as introducing technological changes (at least in the Polish market). As part of the assessment of this criterion, it is verified whether the technology used in the process is new on the Polish market and whether we are dealing with a significant change in the field of technology, devices and / or software. When making the assessment, one should take into account the emergence of innovative products / technologies / services that are not yet available on the Polish market or those that are available, but offer new, innovative functionalities at least on the Polish market scale.[71].

[70]Intelligent Development Operational Program 2014-2020. Ed. Ministry of Infrastructure and Development. Department of Competitiveness and Innovation.
[71]See Project selection criteria. NBCR Intermediate Body. Intelligent Development Operational Program 2014-2020 Measure 1.1 R&D projects of enterprises. Sub-measure 1.1.1 Industrial research and development works carried out by enterprises.

CHAPTER 17

INNOVATIVE ACTIVITY OF POLISH COMPANIES

"Only 0.003% of inventions patented in Europe come from Poland (...) only 3% of our exports are technologically advanced products (...). Almost the entire Polish industry uses foreign scientific achievements, because domestic innovations are mostly technologically archaic ideas (...). Proportionally, Poles submit to the National Patent Office sixty times less inventions than the Japanese and twenty times less than the Americans ".

M. Zajączkowski after S. Sieradzki

"The main US export today is patents ... with annual revenue of around $ 40 billion. (…) Oil, steel and industrial products are no longer the most valuable raw materials of the global economy. The strategic raw material is thought. "

M. Zajączkowski after E. Bendy

Innovative activity in the enterpriseit depends in part on the diversity and structure of its links with sources of information, knowledge, technology, operating practices, and human and financial resources. Links play the role of sources of knowledge and technology for innovative activities of enterprises, and their form can be different: from passive sources of information for suppliers of material and non-material knowledge and technology to partnerships based on cooperation. The linkages can apply to any of the four types of innovation (i.e. within products, processes, marketing and organizational methods).

Each linkage connects the innovative enterprise with other actors in the innovation system: state laboratories, universities, public policy departments, regulators, competitors, suppliers and customers. Innovation surveys can provide information on the prevalence and importance of different types of linkages, and on factors influencing the use of specific linkages. If we indicate the existence of connections in innovative activity, we obtain proof of its complexity, but we will not obtain the information necessary to create a dynamic model, including positive and negative feedback loops and non-linear effects resulting from changes. Such information,

From the point of view of controlling innovation processes in an organization, the beginning of the innovation process should be the creation and accumulation of inventions regardless of their place of origin. The next steps include selecting those that have a chance of success, deciding how to implement them and implementing them, and thus specific practical actions enabling the introduction of innovations to the organizational reality. Creative changes, i.e.

innovations, also differ from non-creative changes in that they take place in two basic phases - conceptual (creative) and application[72].

The final effect of the creative phase is a new, creative and appropriately detailed idea, generally called invention or solution, and in the application (implementation) phase, the invention is used for specific practical (production) purposes, i.e. transforming it into innovation.

The effect of this two-phase nature is the need to distinguish between two concepts:

- Innovation, i.e. invention applied in practice;
- Invention - is a new, appropriately detailed idea (set of ideas) of any nature in a given system, not resulting directly from the existing state of affairs and suitable for application.

Such a division was proposed, inter alia, by K. Wandelt, based on the Schumpeter's concept of innovation, describing it as the use of discoveries and inventions that are an expression of invention for specific production purposes. Invention, in turn, is a search and research aimed at the development and verification of cognition[73]. It is therefore a conscious, planned effort aimed at solving technical and organizational as well as economic and financial problems. Innovations, as the main factor conditioning both the development of enterprises and the economy, performed different functions in different periods. There are six generations of the development of innovation systems.

Europe 2030 requires strengthening the level of innovation in both the manufacturing and services sectors. The experience of highly developed countries shows that a significant element of their success to date are structural changes in the economy and transformations observed in the service sector. Services related to the creation and implementation of innovations, as well as the generation and dissemination of information and other knowledge assets make a special contribution to the acceleration of economic development. The growing importance of services has become an economic regularity and a requirement of civilization progress in all countries, regardless of the level of their development. A specific feature of the service sector is that its importance increases with economic development[74].

[72]After: A. Francik, Controlling innovation processes in an organization, Wyd. AE in Kraków, Kraków 2003, p. 4.
[73] Source: S. Marciniak, Innovations and economic development, Oficyna Wydawnicza Politechniki Warszawskiej, Warsaw 2000, p. 31.
[74]Quote from: J. Wiśniewska, Innovative activity of the service sector in Poland, [in:] Innovations in the sustainable development of the organization (ed.) W. Janosz, Difin; Warsaw 2011, p. 179.

Innovations implemented in service and industrial enterprises in Poland

Differences between innovation processes in industrial and service enterprises is presented in Table 3.

Table 3: Comparison of industrial and service innovations

Industrial innovation	Service innovation
• Creation of new or improved products • Introduced new or improved production technology • Applying a new way of selling or buying • Opening a new market for the sale of products • The use of new raw materials or semi-finished products • Introducing changes in the organization of production	• Creation of new or improved services • Introduced new or improved methods of service delivery • Applying a new way of interacting with customers and suppliers • Opening a new market for the provision of services • Use of new materials or tools • Introducing changes in the organization of the service provision process

Source: P. Niedzielski, Innovation management in service enterprises, [in:] Service company. Management, (ed.) B. Filipiak and A.Panasiak, PWN; Warsaw 2008, p. 232.

Sources of innovation in the case of service innovations - they are mainly employees, their creativity, entrepreneurship and the level of knowledge, including qualifications and competences. Therefore, in the service activities in the agri-food sector, more emphasis is placed on training employees and acquiring new knowledge.

Innovations implemented in service enterprises, scale and dynamics

Statistical data confirm that in the service sector, as in industry, the share of innovative enterprises increases with the size of operating entities. Among small enterprises from the service sector, entities dealing with financial intermediation are the most innovative. In the group of medium-sized entities, innovations are most often introduced by enterprises from the IT department, while among the so-called large companies, the post and telecommunications departments show the highest share. Both in industry and in the service sector, active innovative entities more often introduce process innovations than product innovations - this is illustrated in Table 4.

Due to the specificity of service activities, enterprises operating in this area implement innovations within the organization or marketing much more often than product or process innovations. The share of service enterprises that introduced this type of innovation in Poland and the EU-27 is presented in Table 5.

Table 4. Innovative enterprises in the service sector and industry in Poland by type of introduced innovations

Description	**Enterprises that have introduced product innovations and / or process in% of all enterprises**			
	Overall	**New or significantly improved products**	**Including new to the market**	**New or significantly improved processes**
Years 2004-2010				
Overall industry	26.1	16.3	9.4	22.1
Total services	26.7	15.1	9.7	20.1
Years 2011-2018				
Overall industry	29.3	18.4	10.9	17.0
Total services	18.6	10.3	8.2	15.7
Wholesale and commission trade, except for motor vehicles and motorcycles	15.6	9.3	8.9	12.3
Transport, Activities related to tourism	14.1	8.9	2.8	11.5
Post and telecommunications	37.6	29.7	20.6	24.1
Financial intermediation	41.1	37.2	18.8	36.1
Informatics	39.8	29.7	24.7	29.7
Architectural and engineering activities. Research and analysis	19.5	17.8	16.1	17.2

Source: own study

Table 5: Organizational and marketing innovations in service enterprises in Poland and the EU-27

Years	Enterprises that have introduced innovations organizational and / or marketing		
	Overall	Organizational innovations	Marketing innovations
	in% of total enterprises		
UE-25			
2004-2010	26.0	25.6	16.2
POLAND			
2011-2014	35.6	29.7	20.7
2015-2018	23.6	19.2	18.7

Source: own study.

The decrease in the share of service entities implementing innovations in the total number of service companies in Poland was also accompanied by a decrease in the percentage of enterprises that incurred expenditure on product and process innovations. Such a situation certainly had a negative impact on the increase in the level of innovation in the sector. The increase in the value of expenditure on innovative activities should be assessed positively.

Table 6. Changes in the structure of expenditure on innovative activities in the service sector in Poland

Description	% of expenditure on business innovative				
	1999	2003	2006	2008	2018
R&D activities	4.5	28.3	11.2	7.4	11.2
Purchase of ready-made technology in the form of documentation and rights	8.9	6.2	4.1	2.0	3.4
Software	4.7	7.8	11.5	11.1	15.6
Innovative outlays on buildings, structures and land	11.9	12.2	12.5	24.6	32.9

Investment outlays on machinery and technical equipment	62.3	37.8	47.3	48.7	67
Staff training	2.4	1.7	1.3	0.6	1.4
Marketing	3.3	2.5	4.9	2.9	5.3
the remaining	2.0	3.5	7.2	2.7	2.8

Source: W. Janasz, Innovative industrial development strategies. Foundation of the University of Szczecin, Szczecin 1999, p. 191; GUS data.

As shown in the table above, in the expenditure on innovative activities in the service sector in Poland, similarly to the industry, for many years the largest share was spent on machinery and technical equipment. The low share of expenditure on research and development, which has been falling since 2003, is alarming. This situation proves the predominant exogenous nature of the on-going innovative changes. Well-educated staff is the basis for the processes of generating innovation within the entity, and is also one of the key elements of building the absorption capacity in the case of implementing solutions sourced from the outside. According to the research carried out under the CIS-4, the lack of qualified personnel is an important factor hampering innovative activities for 9.6% of enterprises in the EU-27 service sector.

CHAPTER 18

ASSESSMENT OF THE STATE OF INNOVATION IN POLAND

The sphere of research and development (R&D) in Poland - like other areas of socio-economic life - is assessed in international statements. There is no single collective ranking or publication that would give an assessment only in this field.

Typically, R&D indicators are components of a composite synthetic indicator used in international rankings and scoreboards for innovation as well as - but to a lesser extent - for country competitiveness.

The main (and most frequently used) international rankings are the Innovation Union Scoreboard (known as the European Innovation Scoreboard until 2009) and the Global Innovation Index. The source of a lot of valuable data on innovation is the Science, Technology and Industry Scoreboard published by the OECD.

Although the information is not included in the ranking, the way it is presented allows comparisons between countries.

Bloomberg Innovation Index- is one of the youngest rankings, published only in an electronic version. It also includes R&D indicators. The remaining innovation rankings are regional in nature or do not contain detailed information on R&D, but they are also an element of the assessment in the rankings of the competitiveness of countries. An example is the Global Competitiveness Report ranking published by the World Economic Forum.

*** The R&D sphere in Poland underwent major transformations in the years 2007–2020, which was reflected in the indicators published by the Central Statistical Office. The most important indicators, the increase of which was significant, include the share of expenditure on R&D in GDP; its growth started to accelerate since 2007 (from 0.57% of GDP in 2007 to 1.04 of GDP in 2018).

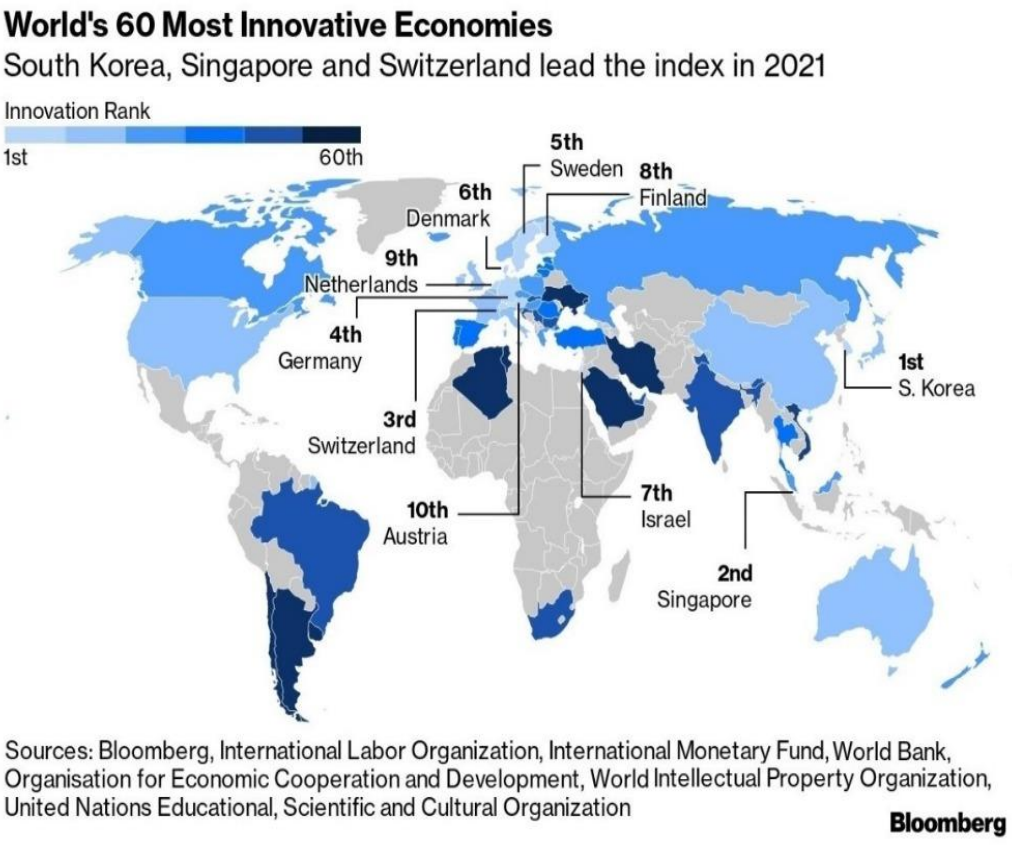
The share of the private sector in R&D expenditure also increased significantly (from 24.5% in 2007 to 47% in 2018, and measured in terms of GDP share from 0.17% to 0.64% of GDP). High dynamics was also characteristic for other countries at a similar level of development. For example, R&D expenditure in 2007–2014 in Slovakia increased by 98%.

In 2019, Poland took 22nd place in the ranking of the most innovative countries in the world (Bloomberg Innovation Index).This is a decrease by one place compared to the previous year. South Korea remains the leader of the ranking.

The Bloomberg ranking takes into account several factors, including percentage share of expenditure on research and development in the Gross Domestic Product, labor productivity per employee, percentage share of companies from high-tech industries in total domestic companies, coverage of higher education, percentage of people involved in research and development in the total population and local activity patent.

According to the Bloomberg Innovation Index, the most innovative country remains, similarly to last year, South Korea. Germany took second place - Bloomber points out that Germany's advances in research and development resulted in both countries receiving almost equal results (87.38 out of 100 and 87.30 out of 100 points, respectively). According to experts, Germany owes its results to the activities of companies such as Volkswagen AG, Robert Bosch GmbH and Daimler AG. Finland came third, up four places. Sweden dropped out of the ranking during the year. The country fell from second to seventh. The United States returned to the top ten in the ranking, taking eighth place. Last year, the country took 11th place. Israel also made a visible advance - from 10th to 5th place. According to Bloomberg, Tunisia and Ukraine turned out to be the biggest losers in the ranking. Both countries dropped out of the 50 Bloomberg Innovation Index.

Figure 7: Bloomberg Innovation Index for 2021



In 2021, Poland moved up two positions in the ranking and took 23rd place in the overall ranking, directly ahead of Russia and leaving behind e.g. New Zealand, Malaysia, Spain and Iceland. In the listings regarding the added value of production and the concentration of technologically advanced companies, we are in 19th place. We are a bit worse in terms of the production capacity of the Polish economy (34th position), higher education (28th position), research and development expenditure and patent activity (33rd and 30th respectively)[75].

Bloomberg 2021 Innovation Index

2021 Rank	2020 Rank	YoY Change	Economy	Total Score	R&D Intensity	Manufacturing Value-added	Productivity	High-tech Density	Tertiary Efficiency	Researcher Concentration	Patent Activity
1	2	+1	S. Korea	90.49	2	2	36	4	13	3	1
2	3	+1	Singapore	87.76	17	3	6	18	1	13	4
3	4	+1	Switzerland	87.60	3	5	7	11	15	4	18
4	1	-3	Germany	86.45	7	6	20	3	23	12	14
5	5	0	Sweden	86.39	4	21	12	6	7	7	21
6	8	+2	Denmark	86.12	8	17	3	8	22	2	23
7	6	-1	Israel	85.50	1	30	18	5	34	1	8
8	7	-1	Finland	84.86	11	12	17	13	14	10	10
9	13	+4	Netherlands	84.29	14	26	14	7	25	8	9
10	11	+1	Austria	83.93	6	9	15	23	16	9	15
11	9	-2	U.S.	83.59	9	24	5	1	47	32	2
12	12	0	Japan	82.86	5	7	37	10	36	18	11
13	10	-3	France	81.73	12	39	12	2	26	21	16
14	14	0	Belgium	80.75	10	23	16	15	43	14	13
15	17	+2	Norway	80.70	15	49	4	14	5	11	24
16	15	-1	China	79.56	13	20	45	9	17	39	3
17	16	-1	Ireland	79.41	35	1	2	12	42	17	39
18	18	0	U.K.	77.20	21	44	25	17	4	20	22
19	20	+1	Australia	76.81	20	55	8	16	10	31	7
20	19	-1	Italy	76.73	26	15	28	21	41	25	12
21	22	+1	Canada	75.98	22	35	21	25	37	22	5
22	21	-1	Slovenia	73.64	18	8	27	41	11	16	27
23	25	+2	Poland	73.38	33	19	34	19	28	33	30
24	26	+2	Russia	72.84	37	32	41	20	21	24	25
25	29	+4	New Zealand	72.57	27	41	29	26	40	15	29
26	24	-2	Czech Rep.	71.55	19	4	24	45	32	19	26
27	28	+1	Hungary	70.73	23	14	32	24	53	28	48
28	23	-5	Iceland	69.99	16	40	1	54	12	5	34
29	27	-2	Malaysia	69.68	24	10	46	27	50	42	31
30	30	0	Greece	68.47	34	48	43	29	9	26	47
31	33	+2	Spain	67.91	31	33	33	38	19	27	37
32	32	0	Romania	66.72	57	22	30	22	20	50	40
33	35	+2	Turkey	66.68	39	13	50	35	31	46	20
34	37	+3	Latvia	65.91	49	46	31	30	6	40	49
35	31	-4	Luxembourg	65.59	32	45	11	47	60	6	6
36	40	+4	Thailand	65.42	36	18	52	33	30	45	35
37	34	-3	Portugal	64.63	28	34	40	49	3	23	46
38	39	+1	Hong Kong	64.06	42	60	10	31	46	30	17
39	36	-3	Estonia	63.77	25	28	19	54	8	29	51
40	38	-2	Lithuania	62.74	40	16	22	54	2	34	55
41	42	+1	Bulgaria	61.34	47	31	47	37	39	36	50
42	47	+5	Malta	59.51	51	51	23	42	24	37	38
43	44	+1	U.A.E.	58.89	29	36	26	50	49	43	41
44	41	-3	Slovakia	58.23	43	11	35	53	51	35	52
45	43	-2	Croatia	57.68	38	37	38	52	33	38	54
46	46	0	Brazil	57.21	30	59	54	32	48	51	43
47	50	+3	S. Africa	54.06	44	53	53	34	58	57	28
48	NR	-	Serbia	53.74	41	38	51	48	45	41	57
49	48	-1	Cyprus	53.64	52	58	42	36	38	48	59

Source: Bloomberg Innovation Index 2021

While South Korea's top ten position is not surprising in the context of its results so far, the fall of the United States from the top ten is interesting. The US has achieved a good result in the concentration of high-tech companies - American brands such as Zoom Video Communications Inc. have gained exceptio-

[75] https://startup.pfr.pl/pl/aktualnosci/ranking-bloomberg-innovation-index-ktore-kraje-sa-naj Most-in/

nal popularity last year due to the pandemic reality. or the vaccine manufacturer Pfizer Inc. The weakness of the United States is its poor performance in higher education, which has been made worse by problems with student migration triggered by a more restrictive visa policy followed by a pandemic.

Application 1

Despite the use of different methodologies and the reliance on different partial indicators, it is worth noting the convergence of the results of all rankings, including the competitiveness ranking and the OECD Scoreboard (to a lesser extent than the others, which results from greater diversity of data and a different structure). In the case of the indicators included in the list, it can be noticed that the R&D measures constitute only a small part of those that make up the collective indicators of innovation or competitiveness (16% in the Innovation Union Scoreboard, 5% in the Global Innovation Index, 2% in the Global Innovation Index). Competitiveness Index) and aggregated summaries (8.5% in the OECD STI Scoreboard).

Conclusion 2

Most of the R&D indicators are input indicators, only a small part of them are output indicators, as well as qualitative indicators (measuring, for example, the assessment of the quality of cooperation between science and industry). The latter two types of indicators are the results of the Executive Opinion Survey and data from other sources (e.g. from the Thomson Reuters database on VC contracts). The primary data sources are national (indirect) or international (direct) bodies or statistical databases (OECD, UNESCO, Eurostat).

Conclusion 3

In the case of Poland, the R&D indicators place our country higher than the place in the ranking (the total indicator)[76]. This is the case in the Union Innovation Scoreboard (except for the product and process innovation index) and the Global Innovation Index (except for the university-industry collaboration index). In the Global Competitiveness Report, Poland ranks lower in R&D indicators than in the overall ranking. Moreover, in other rankings, similar indicators rank Poland higher.

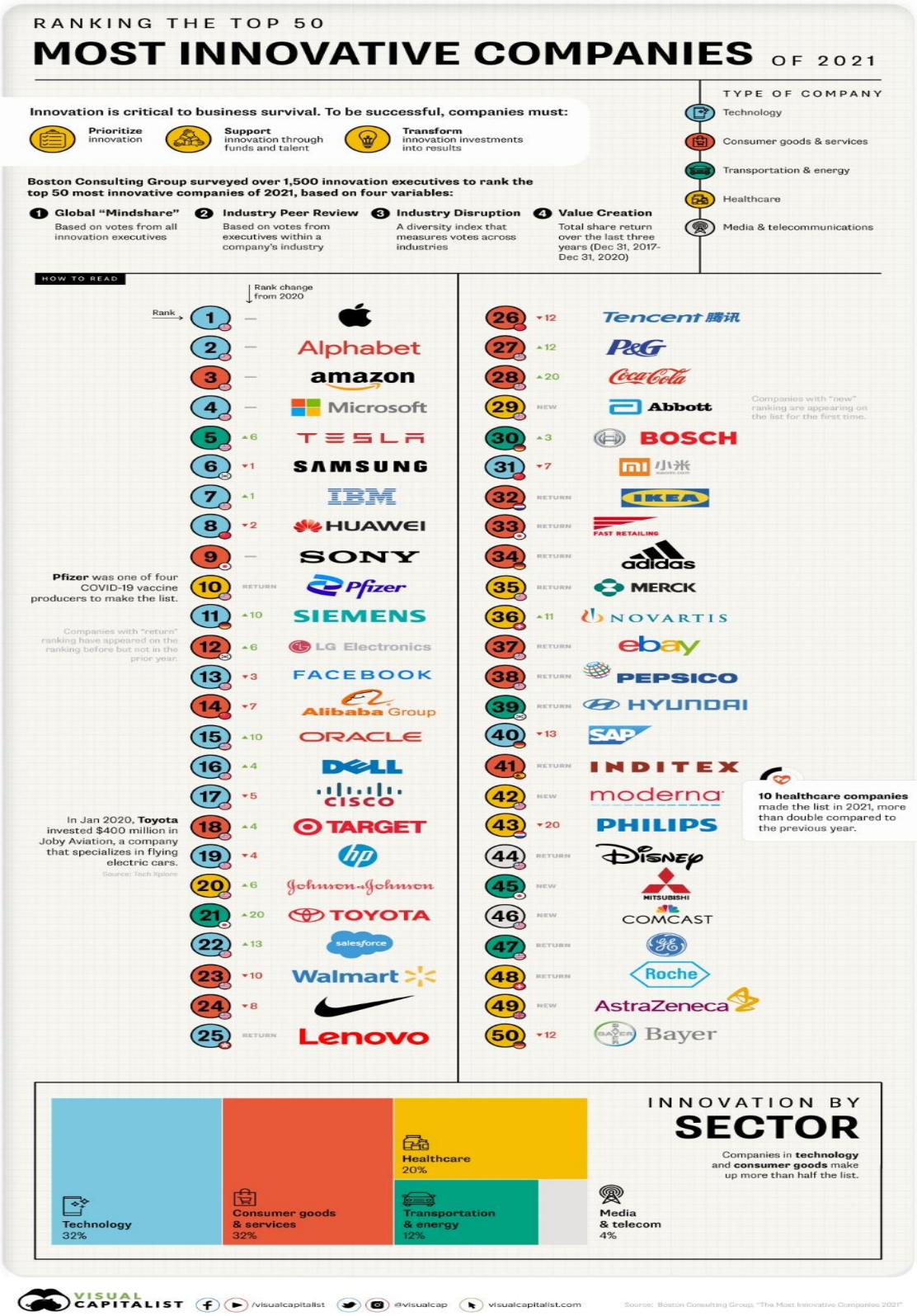
Conclusion 4

[76]Quote from: M. Baranowski (ed.), Research, development, innovation. Selected issues, NCBR, Warsaw 2017, p. 11.

In all summaries, the vast majority of R&D indicators show a gradual improvement in the situation compared to other countries in publications from 2007–2019. It is also worth noting that the higher position of Poland in the case of input-related indicators (and such are most of the R&D indicators used) than the result or synthetic indicators may indicate a low absorption of R&D funds and their poor impact on the economy and its innovation[77].

[77]Source: European Innovation Scoreboard (EIS) 2009-2021, European Commission, Luxembourg 2010-2021; European Innovation Scoreboard 2007 = 2-17: Comparative Analysis of Innovation Performance, European Commission, Luxembourg 2008-2018; European Innovation Scoreboard 2008-2018: Comparative Analysis of Innovation Performance, European Commission, Luxembourg 2009-2018; Hollanders H., Janz N., Scoreboards and Indicator Reports, in: Handbook of Innovation Indicators and Measurement, Gault F. (eds.), Cheltenham, Northampton 2013; Innovation Union Scoreboard (IUS) 2010-2018, European Commission, Bruxelles. Innovation Union Scoreboard 2011-2018, European Commission, Bruxelles; Innovation Union Scoreboard 2012, European Commission, Bruxelles. Innovation Union Scoreboard 2014, European Commission, Bruxelles. Innovation Union Scoreboard 2015, European Commission, Bruxelles; OECD Science Technology and Industry Scoreboard 2007-2018, OECD, Paris 2007-2018; The Global Competetiveness Report 2009-2018, Schwab K. (ed.), World Economic Forum, Geneva 2009-2018.

Diagram 8: The most innovative companies in 2021



Source: https://mobirank.pl/2021/07/27/ranking-50-naj Most-innowacyjnych-firm-w-2021-r/

Table 7: The 10 most innovative companies

	business	industry	country	yoy change
1	Apple	Technology	USA us	-
2	Alphabet	Technology	USA us	-
3	Amazon	Consumer Goods	USA us	-
4	Microsoft	Technology	USA us	-
5	Tesla	Transport & Energy	USA us	+6 ⬆
6	Samsung	Technology	South Ko-reaKR	-1 ⬇
7	IBM	Technology	USA us	+1 ⬆
8	Huawei	Technology	China CN	-2 ⬇
9	Sony	Consumer Goods	Japan JP	-
10	Pfizer	Healthcare	USA us	return

Source: https://mobirank.pl/2021/07/27/ranking-50-naj Most-innowacyjnych-firm-w-2021-r/

Interesting fact 1

What distinguishes the best innovators?*"They were born in or learned to navigate the digital world perfectly. They develop new competences: advanced data analytics, the ability to quickly implement new technological solutions, focus on products and mobile competences as well as on the so-called Digital design. At the same time, they are much better than less innovative companies at acquiring data, prioritizing projects, reading market trends and finding external partners who are able to supplement their digital competences "- (opinion)*

Franciszek Hutten-Czapski, senior partner and head of BCG in Warsaw.

Interesting fact 2

In selected areas of innovation, the best results in the EU are achieved by:

- **Denmark**- human resources and an environment favorable to innovation;

- **Luxembourg**- attractive research systems;
- **France**- financing and support;
- **Germany**- corporate investments;
- **Portugal**- innovative SMEs;
- **Austria**- connections;
- **Malta**- intellectual assets;
- **Ireland**- impact on employment and sales volume.

The most innovative regions in the EUare Helsinki-Uusimaa (Finland) followed by Stockholm (Sweden) and Hovedstaden (Denmark). In 159 regions, performance increased over the nine-year observation period. This year's regional innovation ranking shows a strong convergence in terms of regional performance and a reduction in differences between regions.

Interesting fact 3

From a research by the consulting company Deloitte[78]in 2016, it follows that the percentage of companies declaring to spend over 3% on research and development (R&D) activities. its turnover decreased significantly (from 48 to 33 percent), despite an increase from 13 to 17 percent. the number of companies that spent more than 10 percent on this purpose. your income. The number of Polish enterprises spending over 3% on R&D turnover is significantly lower than the average for Central European countries (46%). More than half of the companies spend less than 5 percent on R&D. total capital expenditure. The above data mean that research and development is still not an important area of development from the point of view of enterprises. Probably, however, the amount of funds allocated for this purpose may be higher, but it is not reflected in records, reports and statistics, because many entities, due to the lack of appropriate incentives, not separating the costs allocated to R & D & I from the total funds spent on investments. The availability of qualified and experienced research staff is the second most important factor affecting the level of expenditure on R&D - it gives an opportunity to increase the scope and culture of cooperation between science and business in Poland - however, we still lack incentives (tax relief, mixed CIT rate). and / or subsidies) for enterprises to hire R&D personnel.

[78] Deloitte report, Poland Research and development in enterprises 2016, Warsaw 2017, p. 7.

CHAPTER 19

THE SCALE OF INNOVATIVE ACTIVITY BY POLISH ENTERPRISES

In 2016-2019, 36.2% of companies operating in Poland were innovative active (i.e. introduced or tried to introduce at least one innovation of any type). The percentage of innovative and actively innovative companies is significantly and positively correlated with the company's size[79]. 20.1% worked on product innovations, and 17.9% of the surveyed companies introduced them. As for process innovations, the percentage of active companies was 19.4%, and innovative - 16.3%. For organizational innovations, the percentage of innovatively active companies amounted to 10%, and innovative - 7.4%. On the other hand, 14.1% worked on marketing innovations, and 11.1% introduced them.

In the years 2016-2019, both production and service companies of all sizes, much more often introduced innovations based on solutions proven on the market (on the scale of the company) 30.1% than on the so far not offered (on the market scale) - 6.1% . Most of the innovatively active companies manage to successfully finalize their work and lead to the implementation of an innovative solution - this is indicated by the low differences (up to 3 percentage points) between the percentage of innovative and innovative entities).The dominant type of innovative activity carried out in 2016-2019 by innovation-active companies were investment outlays in tangible assets through the acquisition of, among others, machines and devices (including computer hardware), means of transport, tools, movables and equipment, as well as buildings (65% of all innovation active companies).Next, companies active in innovation incurred expenditure on the purchase of staff training related to the introduction of new or significantly improved products and processes (40%) and software related to the introduction of product and process innovations (36%); as well as marketing costs related to the introduction of new or significantly improved products (22%).

Research and development works are the least frequently conducted forms of innovative activity in innovation-active companies, both in terms of R&D performed on one's own (11%) and acquired from outside (6%).Large companies more than four times more often than the total number of innovatively active companies carried out R&D with their own resources - inside the unit (46% and 11%, respectively), and also purchased it from outside (29% and 6%, respectively). Medium and large companies significantly more often than smaller enterprises conducted other types of innovative activity: staff training (68% and 66%, respectively, compared to 40% of all innovation-active companies) and

[79] Monitoring of innovativeness of Polish enterprises Results of the 2nd edition of the survey 2019, PARP, Warsaw 2019, pp. 24-30.

other preparations for introducing new products (40% and 41%, respectively, compared to from 17% of all innovatively active companies). The companies' own funds were the main source (88% of all innovation active companies) of financing innovative activities in 2016-2018. In addition, in order to conduct innovative activities, external sources of financing were used: bank loans, loans or leasing (47%), funds from EU funds (24%), funds from the state budget (6%), funds from risk capital funds (2%) and funds obtained from abroad other than European funds (2%). Conclusions from the study: Conducting innovative activities (understood as incurring various types of expenditure on innovative activities), regardless of its type, is correlated with the size of the company: the larger the company, the more often various types of innovative activities are carried out and the expenditure on this activity. Innovative activities carried out by enterprises in Poland are aimed at expanding or renewing the machinery park, technology and knowledge transfer (purchases of machines and devices, training and software are the most popular type of innovative activity undertaken by companies - regardless of their size).

Sources of innovation and the course of the decision-making process in the field of innovation implementation[80]:

Business owners or managers are the main source of innovation in companies (this applies to 71% of all innovatively active companies). The second most important source is the external environment in the form of customers, suppliers and entities from the industry. This source of innovative activities is indicated by 63% of all innovation active companies.The strength of the impact of the external environment as a source of innovation varies depending on the size of the company. The impact of customers, suppliers and competition on innovations in large companies is significantly lower than among all innovative enterprises (it occurs in 46% of large enterprises covered by the study). Innovations in companies are also stimulated by the work of creative employees from outside the research and development team (23% of all innovative companies) and the work of a creative / research and development team appointed in the company for this type of task (11% of all innovative companies). The impact of creative employees (39% of this group) and the R&D team (36% of this group) on innovation is clearly greater in large companies. In micro and small companies, the share of creative employees in stimulating innovative activities is, respectively: 22% and 26%; share of own R&D team: 11% and 6%. Information and telecommunications technologies are important in generating innovation for 42% of innovatively active companies. Observations made as part of qualitative research suggest that external factors (the need to meet customer needs, obtaining orders and staying in the industry) are related to the internal / external

[80] Monitoring of innovativeness of Polish enterprises Results of the 2nd edition of the survey 2019, PARP, Warsaw 2019, pp. 24-30.

willingness and motivation to develop, the need for further expansion, competition (competition). , increasing the efficiency of work processes while providing higher quality products and services. Such a procedure serves to implement the postulate which is important for enterprises "faster, more and better with less expenditure". This type of stimulus to undertake innovative activities results directly from the company's strategies, goals and organizational values. Conclusions from the study: The owner of the enterprise, the people managing the company and the external environment of the company (customers, competition) are the main stimulants of innovation in enterprises. In large enterprises, a significant role in the area of innovation is played by creative employees or R&D teams. External factors as a stimulus to undertake innovative activities are of greater importance in micro and small enterprises than in large enterprises.

Carrying out innovative activities requires the possession of resources (financial, human capital and infrastructure). Having a resource of employees and having knowledge / intellectual capital secures the possibility of creating new values (products, services, processes) in the enterprise. The company's resources define the field of its operation in the area of innovation, their quantity and quality determine and limit the scale of this activity. This shows an obvious advantage of larger enterprises in undertaking innovative activities, which may involve greater resources in this activity (financial capital, infrastructure, human capital and knowledge capital).

Information and communication technologies (ICT). Key findings from the study. In 2016-2019, companies active in innovation used the following information and communication technologies (ICT): software for collecting information about sales (66%), electronic information exchange on supply chain management (39%), making a catalog of prices of their products available on the web (32%). %), cloud computing technology (19%) and ERP or CRM enterprise management software (16%).42% of innovatively active companies declare rather high and very high importance of the share of information and communication technologies in the preparation or testing of innovations in 2016-2019. Conclusions from the study: The use of information and communication technologies by companies is conducive to conducting innovative activities. Collaboration with other entities in the innovation process The most important results of the study:

- The largest percentage of enterprises declare cooperation in the field of innovative activities with clients (69% of all innovation active companies in 2016-2019).
- Slightly less than half of the respondents (46% of all innovatively active companies) cooperate in the area of innovation with suppliers of equipment, materials, components and software. Small companies (57% of

this group) most often declare cooperation with suppliers in the field of innovative activities. This type of cooperation is demonstrated by 53% of medium-sized enterprises, 55% of large enterprises and, significantly less frequently, 44% of micro-enterprises.

- A significantly smaller percentage of companies cooperated with other companies in the industry (with competitors) - 26% of all innovation active companies in 2016-2019.
- The smallest percentage of the surveyed enterprises shows cooperation for innovation with the science sector. The cooperation of companies with universities is declared by 4% of all innovatively active enterprises, with research institutes - only 1%, individual companies cooperated with PAN units. Medium and large enterprises show cooperation with this group of entities more often than micro and small enterprises.
- Contrary to micro and small enterprises, large companies have experience of joint action for innovation with enterprises operating within company unions or industry associations. Innovative companies cooperate with associated enterprises more often than those that did not introduce innovations in 2016-2019.
- The factor most often prompting enterprises to cooperate in the area of innovation is the need for contact, consultation, exchange of experiences with specialists who can bring intellectual potential (specialist knowledge and skills) to work on innovation.

Innovative companies significantly more often cooperate (within a cluster or enterprise organization) with other enterprises or institutions than non-innovative companies.

Conclusions from the study:

- The conducted research indicates a small scale of cooperation in the innovative process of entrepreneurs with other companies in the industry. This may lead to the conclusion that they have still limited trust in other enterprises that could contribute the missing, complementary qualifications to work on innovations.
- Qualitative research also confirms the incidentality of cooperation between enterprises and the science sector, diagnosed in the quantitative research. There is generally little awareness of the benefits that companies could derive from such cooperation.
- The stereotypical image of companies about the way in which scientific units operate is also significant here - in particular, expressed by the belief

that scientists operate in isolation from market practice, which, in the opinion of enterprises, is associated with the potentially low value of such cooperation for the commercial use of its effects.

Legal protection of solutions - the most important results of the study:

- Only 3% of innovative companies protected the developed solutions by obtaining patents for inventions, protection rights for utility models and trademarks, rights from registration of industrial designs or rights from registration of integrated circuit topographies.
- The vast majority of entrepreneurs participating in the qualitative research showed a low awareness of the purposefulness and methods of obtaining exclusive rights to the developed innovation. Despite the limitations related to the process of applying for protection noticed by entrepreneurs (including its time and cost-consumption), some companies that were innovative in their products and services declared at least considering applying for patents, utility models, etc.
- The second edition of the qualitative research highlighted - as an important - the theme of companies' efforts to secure (protect) their know-how. We cannot speak of legal protection of innovative solutions in the strict sense, but the intention behind introducing, for example, provisions in employment contracts aimed at preventing the transfer of knowledge and skills to competitors, brings entrepreneurs closer to the conviction that it is necessary to apply measures consisting in legal protection of the solutions developed. Conclusions from the study: Few companies decide to legally protect developed, innovative solutions. As in the first edition of the study, this is mainly due to the need to incur additional,

Benefits of innovative activity - the most important research results:

- According to innovative enterprises, the benefits of introduced innovations include the general development of the enterprise (this is indicated by 80% of innovative companies), improvement of the quality of products and services (76%), improvement of the organization and working conditions (76%) and increased work efficiency (75%).
- These companies also see benefits in terms of achieved financial results and their competitive position: increase in net profit (78%), brand strengthening (76%) and increase in sales (75%). Conclusions from the study: Innovative activity pays off.

- The surveyed companies indicate that their priority - and the most noticed benefits - are benefits in the form of improving the quality of products and services and adjusting them to customer expectations. The effect of this activity is also visible in the form of financial benefits and improvement of the company's competitive position[81].

INNOVATION CREATORS

The analysis of Eurostat data shows that in 2010–2019 in most EU countries there was a noticeable outflow of entrepreneurs from innovative activities, including Poland from 28% in 2009–2011 to 26% in 2012–2019. The latest GUS data for 2011–2019 is a slight rebound again, but only in the case of industrial enterprises (an increase in the share of innovators from 17.7% to 21.4%). Service enterprises again reduce their share among innovative companies (from 13.9% to 12.9%).

When the percentage of innovative companies in highly developed economies with accumulated innovation potential decreases, it does not pose such a threat as in the case of countries - such as Poland - where such a turn may be difficult to make up for. Despite the declining percentage of innovative companies, we observe an increase in outlays per enterprise among those Polish enterprises that are innovative, to the level of EUR 1.3 million in 2018, compared to 785 thousand. EUR in 2010. At the same time, the average level of innovative expenditure per company in Poland is slightly lower than the average for the 28 EU countries.For several years, it has been clearly seen that a small group of innovative companies is forming in Poland, which is constantly increasing outlays on innovative activities, including research and development activities. Moreover, the expenditures incurred are at a very decent level compared to the EU average, which suggests that these companies are competitive not only at the national level, but also outside it. Otherwise, they would not have such an incentive to increase their expenditures, having only domestic competition as the "opponent"[82].

Investments in research and development play an important role in innovative processes, they are an important element in the company's operations, because thanks to R&D works, the development of products, technologies and services takes place. We distinguish between external and internal R&D. The internal R&D activity covers all R&D activities carried out within the enterprise. It includes both R&D activities, which are intended to contribute to the development and implementation of product or process innovations or marketing or organizational innovations, as well as basic research not directly related to the creation of a specific innovation. On the other hand, external R&D activities

[81] Monitoring of innovativeness of Polish enterprises Results of the 2nd edition of the survey 2019, PARP, Warsaw 2019, pp. 24-30.
[82] Innovative activity of enterprises in 2011–2013, GUS, Warsaw 2015

of enterprises mainly include the purchase of research and development services available on the market. In Poland, among enterprises,

Comparing Polish enterprises with 10 to 49 employees with the leader, the presented figures differ significantly from the highest. The share of small enterprises in Poland conducting internal R&D activity constitutes 23% of the total number of companies conducting innovative activity. Apart from the aforementioned Slovenia (74%), Finland (75%), the Netherlands (73%) and Norway (71%) also have a very high share of small companies involved in internal research and development. The data presented in Table 5 concerning the percentage of enterprises conducting internal R&D activity among medium-sized enterprises indicate that in most countries the percentage of enterprises engaged in R&D activity is by about 10 pp higher than the statistics in this category as compared to small enterprises.

The highest percentage of medium-sized companies conducting R&D activity is in the Czech Republic (84%) and, interestingly, in Poland (81%). It is followed by Denmark and Spain with 79% and 78%. The result for Poland is surprising mainly because in the previous survey it was at the level of 33%. The lowest percentage of innovative medium-sized companies conducting internal R&D activity is recorded in Hungary, where only one in ten companies conducts internal R&D activities[83].In 2010, four out of five owners of micro-enterprises (83.4%) who participated in the PARP survey stated that the current business model is the target operating model[84]. Entrepreneurs did not seem to be ready to accept the need to introduce fundamental changes in running a business at the time. Even at the time of a crisis situation, preference was given to actions falling within the scope of the passive strategy, and the most numerous group of respondents (25.4%) stated that no actions were taken. With such an approach, the fact that over half (54.4%) of the owners of micro-enterprises in 2007–2009 declared the introduction of an innovative solution in their company is positively puzzling.[85]

[83] FJ Heunks, Innovation, creativity and success, Small Business Economics 10, pp. 263–272, 1998.
[84] P. Raźniewski, M. Juchniewicz, U. Tomczyk, J. Byczkowska-Ślęzak, Final report on the study: Market niche strategy as a specific element of the development potential of microenterprises, PARP, 2010.
[85] P. Zadura-Lichota, Innovative entrepreneurship in Poland The discovered and hidden potential of Polish innovation, PARP, Warsaw 2012, pp. 109-110, pp. 47-50.

Scheme 9: Types of innovations and their examples

Source: J. Kalinowski, P. Kusowski, M. Strojny, M. Trusiewicz, Innovative maturity of enterprises in Poland, KMPHG Report, Warsaw 2014.

Work on innovations in the last three years was undertaken by 79% of medium and large industrial companies and 78% of trade and service companies.

However, not all companies managed to successfully complete the work. Innovative solutions in any of the analyzed areas were implemented in 71% of enterprises. In this respect, industrial companies (72%) had slightly better results than trade and service companies (70%). Regardless of the segment, the key area of innovative activity are product and service innovations.

In the last three years, 58% of industrial companies and 50% of trade and service companies have implemented them. As many as 36% of industrial companies claim that among the innovative products and services they introduced were new solutions for the entire market. Works on innovative forms of marketing, advertising, promotion and PR are relatively rare. Work on marketing innovations was undertaken by 36% of the surveyed trade and service companies, and implemented by 31%.

In industry, this percentage was much lower (25% and 21%, respectively). In both sectors, marketing innovations are rarely treated as a priority - this applies to only 6% of innovatively active companies. In industry, work on innovative processes is very important - they were undertaken by 60% of companies. The

implementation was performed in 48% of enterprises, which means that the works were less effective than in the case of product and service innovations. In the trade and services sector, work on process innovations is of less importance. In both segments, new innovations in the scale of the entire market were much less frequent than in the case of products and services.

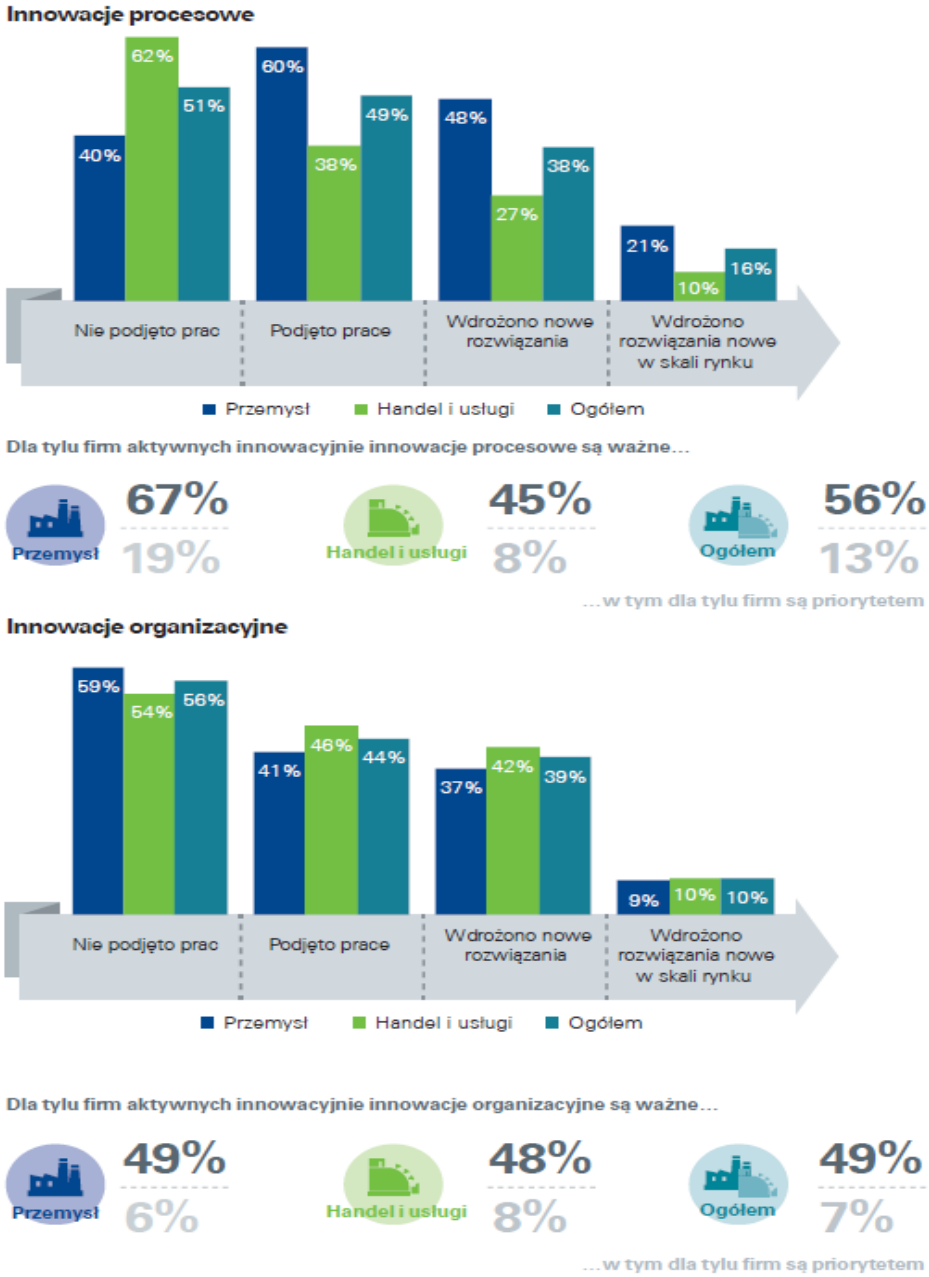
For 67% of innovation-active industrial companies and 45% of trade and service companies, process innovations are important, and only in industry are they treated as a priority - this was indicated by 19% of companies from this sector. In terms of organizational solutions, trade and service companies are more innovative - innovative activities in this area were undertaken by 46% of companies, and 42% implemented innovative solutions. It was the second most important area of innovative activity in this sector - after products and services. In industry, the percentage of companies innovatively active in the area of organization was lower by 5 percentage points. However, in both sectors they are very rarely treated as a priority. Although most companies undertake work on innovations and implement them, these are relatively rarely multilateral activities, focused on many aspects of the company's operation. While in the last three years, the most common work was undertaken in two (trade and services) or three (industry) of the four key areas of innovation, the most widespread phenomenon was the lack of implementation or the implementation of innovative solutions in only one area.

Multilateral and effective innovative activities are the domain of a relatively small group of mature innovators, including industrial companies. In industry, work on innovations in at least three of the four analyzed areas was undertaken by 38% of the surveyed companies, and 32% were successfully implemented. In trade and services it was a less frequent phenomenon - 31% of companies started work, and 25% completed it successfully[86].

The main reason why companies do not carry out innovative activities in certain areas is not so much the lack of availability of financing (at least not in trade and service companies), but rather the uncertainty as to the return on this investment - indicated by 44% of companies. Very often companies do not feel the need to conduct innovative activities, explaining that the business model or strategy does not justify it (42% of industrial companies and 45% of trade and service companies). Many respondents (34%) recognize that certain types of innovations (e.g. process, organizational) are the domain of large, complex organizations, so in their case the scale of activity does not justify undertaking innovative activity.

[86]Quoted after: J. Kalinowski, P. Kusowski, M. Strojny, M. Trusiewicz, Innovative maturity of enterprises in Poland, KMPHG Report, Warsaw 2014.

Diagram 10: Process and organizational innovations - results of the NPMG research



Source: KMPG

The main reason why companies do not carry out innovative activities in certain areas is not so much the lack of availability of financing (at least not in trade and service companies), but rather the uncertainty as to the return on this investment - indicated by 44% of companies. Very often companies do not feel the need to conduct innovative activities, explaining that the business model or strategy does not justify it (42% of industrial companies and 45% of trade and service companies). Many respondents (34%) recognize that certain types of innovations (e.g. process, organizational) are the domain of large, complex organizations, so in their case the scale of activity does not justify undertaking innovative activity.

The most frequently undertaken activity within the framework of work on innovations is the purchase of new or significantly improved machines, devices and software - it was made by 74% of the surveyed industrial companies and 67% of trade and service companies. Moreover, the effectiveness of the purchases of fixed assets and software in the context of generating innovations was assessed very highly.

A less common method is the purchase of intangible assets, such as licenses, patents, copyrights, industrial designs, goods or broadly understood know-how. In total, the above-mentioned investments are the dominant form of innovative activity in 31% of innovation-active industrial companies and 42% of trade and service companies. Contrary to stereotypes, it is widespread to work on innovations together with companies from the same industry and related industries. Half of the companies conduct this type of cooperation, and it is slightly more frequent among trade and service companies. The assessment of the effectiveness of cooperation with other companies (especially within the industry) is rather positive, with relatively few definitely good ratings.

Research and development remain the key form of innovative activity - they are carried out or commissioned by a total of 65% of industrial companies and 49% of trade and service companies. Most often, R&D works are carried out inside a company or group in Poland (48% of industrial companies and 32% of trade and service companies), and their effectiveness is assessed highly. Companies belonging to international capital groups often cooperate with foreign R&D units that are part of the group. In total, such cooperation is carried out by 17% of industrial companies and 10% of trade and service companies. According to their opinion, it is an effective cooperation. In industry, R&D is very often outsourced to universities or public institutions (35%) or commercial suppliers (30%). In trade and services it is less common, the works are more often transferred to commercial suppliers (25%) than non-commercial suppliers (15%). The effectiveness of cooperation with external entities was assessed as moderately positive, with slightly better ratings for R&D service providers from the public sector. Conducting or commissioning R&D works is the dominant form of innovative works in the case of 51% of innovation-active industrial companies and 35% of trade and service companies.

CHAPTER 20

AREAS OF INNOVATION IN POLAND - INNOVATIVE PRODUCTS AND SERVICES / TYPES, TYPES, INDUSTRIES /

Polish companies are more and more bold in the global competition for customers, providing interesting and innovative products. Politicians and experts dealing with the economy often emphasize that the Polish economy must become innovative or it will not be at all. Reason? Ultimately, countries that position themselves on the global market as a supplier of cheap labor (and this is the name most often referred to today as Poland) are losing. They become a subcontractor and an inexpensive assembly plant for other, more developed economies. That is why for years innovation has been stimulated in our country in various ways, most often in paper strategies and with the help of a valuable stream of money. However, innovation cannot be decreed. There are many sectors in the domestic economy where innovative products and innovative technologies are constantly developed,

Areas / sectors / innovative products

1. Computer and mobile games. Poles make great computer games - this fact is noticed even by politicians. It is no coincidence that Mateusz Morawiecki, deputy prime minister and minister of development in the PiS government, mentioned support for game producers in his strategic plan for the future of the Polish economy. Their work is appreciated all over the world, while promoting Poland as a country where you can create great productions in the field of computer and mobile entertainment. Techland, Ten Square Games,Createria- these are Polish companies that perform well in global competition.They confirmare foreign experts, eg the creator of "Doom" and "Quake" John Romero (..) Poles have the potential to conquer the computer games market. The Witcher is an example of how high-budget games should be made. But you're not only good at this sector. You also make great indie games, you don't really differ from other countries in terms of the level of performance. When I came here, I didn't think you were just starting to make games - you've been doing it for several years. And it shows. The efficiency of Polish computer game developers was also noticed by public institutions. In April this year. The National Center for Research and Development has announced the GAMEINN program, which provides PLN 80 million for companies producing games. The subsidy may amount to PLN 500,000. PLN up to PLN 20 million. You can allocate it asgivesNCBiR website, for "the development and development of technologies such as building multi-platform graphics engines, mapping real images, 3D modeling for vast virtual worlds or the use of artificial intelligence in games".

Startups. In recent years, Poland has managed to create a climate that is very favorable to startups. The environment is developing relatively dynamically, which was noticed by, for example, Google, opening its campus in Warsaw, where it offers support for innovative businesses. Similar assistance is offered by research and development centers built with European Union money, eg the Wrocław Research Center EIT +. There are also companies in Poland that have built their position from scratch and today enjoy global recognition on the market of new technologies and software. This includes Brand24 (dealing with internet monitoring) or educational platforms:Explain EverythingandBrainly.

Online sale of games. CD Projekt not only creates computer games, it also has a platform to sell them. This is Gog.com, in whose virtual shelves you can find many interesting titles and which has a lot of supporters, among others in Usa. In turn, another online store with computer games comes from Krakow, which serves customers from all over the world, i.e. G2A. The success of these businesses shows that Poles have managed to create companies worthily competing with big players on the market, e.g. with the Steam platform.

3D printing. Polish companies are also doing great in a very innovative segment of the technology market, i.e. the 3D printing sector. Perhaps the most recognizable one is Zortrax from Olsztyn, which a few years ago sold several hundred pieces of its 3D printing equipment to Dell. On his heels, he is followed by ZMorph from Wrocław, which in turn feels the breath of local competition, i.e. HBOT 3D, on his back. In the debate on the development of the 3D printing market and equipment that offers such opportunities, Polish companies enjoy a great opinion. In our country, such printers are created not only relatively cheaply, but also with an idea and they contain innovative solutions. Therefore, it seems certain that domestic enterprises operating in this area will carry the banner of the leader of innovative thought in Poland for a long time to come.

Modern internet banking. Polish banks are doing quite well in the world of innovative services. One may even be tempted to say that for many of them it is the quality of services based on the Internet and new technologies that is to be one of the most important hooks to attract customers. We have a constantly developed BLIK contactless payment network in Poland, a significant part of domestic banks have reliable mobile applications and offer decent internet banking services. In turn, Euro Bank, Pekao, Getin, BZ WBK and PKO BP are in the group of banks that enable HCE contactless payments, i.e. using the internet cloud and the NFC antenna on the smartphone. No wonder that Poland is at the top of the list of countries created by Google in which the Android Pay mobile payment system is to appear first.

Bitcoins. The internet cryptocurrency has gained considerable popularity in Poland. The best proof of this thesis is the fact that even the domestic airline, LOT Polish Airlines, noticed bitcoins. Public companies are not oases of innovation and often need a lot of time to absorb various technological novelties. In this

context, LOT's decision toallowregulating the payment for the flight using cryptocurrency shows that it has gone under the thatch. There are other, less spectacular, but practical evidence of its popularity. The first bitcoin machines in Poland have appeared in Warsaw, allowing both to buy and sell bitcoins for real cash. In turn, InPayhas implementeda service that allows you to use cryptocurrency by paying in popular Polish online stores.

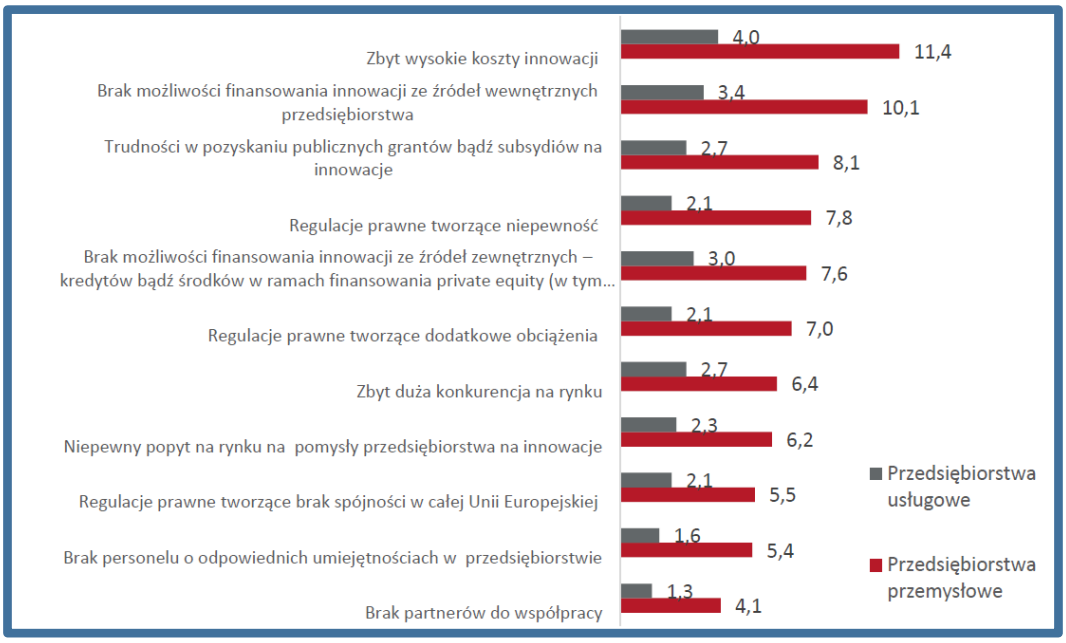
BARRIERS TO INNOVATION

Key barriers to innovationthey are mainly related to the high costs of innovation and the aspects of financing / raising funds for this activity. For industrial enterprises that are inactive in innovation, the greatest barriers are the excessively high costs of innovation - 11.4%, the inability to finance innovations from internal sources of the enterprise - 10.1% and difficulties in obtaining public grants or subsidies for innovation - 8.1%. In the case of service enterprises, the order of the first two barriers is the same, while the third most frequently mentioned was the inability to finance innovation from external sources - loans or private equity financing (including venture capital).

Diagram 11: Main reasons for not introducing innovations

Source: Report on the condition of the SME sector, PARP, p. 47.

Diagram 12: Barriers to innovation in the opinion of entrepreneurs



Source: Report on the condition of the SME sector, PARP, p. 48.

Barriers to innovation. In the Polish reality, a group of factors can be distinguished that have a decisive negative impact on the scope of innovative activity undertaken. These include the lack of sufficient financial resources, difficulties in obtaining external financing and its high costs, limited access to risk capital, lack of a developed venture capital market, high costs of R&D and technology. There is a strong group of factors inhibiting innovative activity:

- the enterprise does not use financial support for innovation from state and local government administration bodies, e.g. in the form of a tax relief;
- lack of own resources in the enterprise for costly innovative activities;
- a long payback period for innovation, which is a deterrent to innovation;
- difficulties in taking out a loan by the enterprise for innovative activities.
- An important and interesting issue from the research point of view is the issue of the effectiveness of created innovations. It is usually the result of two factors influenced by elements of the internal and external environment of the organization. The efficiency assessment mainly takes into account the ability and propensity to introduce innovations. The entity is capable of creating innovative ideas and then directing their commercialized version to the market only if it has appropriate (sufficient) resources, as well as an internal structure conducive to the creation of innovation. The issue of innovative effectiveness is largely determined by the approach to creating innovation, which in the evolutionary approach

was developed on the basis of linear models of the innovation process (e.g. demand, supply).

Technology is changing the way you do business, and the need to innovate has become strategically important. In recent years, technological changes have forced a paradigm shift in business and operational models towards innovation. However, despite well-described case studies, effective methodologies and framework programs, many companies and their technology leaders still have not developed effective innovative capabilities.

There are several barriers that generate problems with using the innovative potential of companies[87]:

- Too much choice can lead to a lack of decision. Well knownthe concept of behavioral economicsassumes that when many people are presented with too many options, the decision-making process may turn out to be hampered and slowed down.
- Many business leaders prefer to be defensive. Many business leaders view investing in unproven or disruptive technologies as high risk and feel more confident in allocating funds to improve existing technologies.
- Lack of coordination of activities within the technological and business strategy. Technology leaders are constantly looking for new and emerging technologies, but they should refrain from innovating for the sake of innovation. Collaborating with other companies in the industry can ensure that your innovation plans align with your corporate strategy.
- The business perception of IT may be wrong. Some IT teams do not reach their full potential due to the ineffectiveness of legacy systems or the perception of IT skills and staff. In addition, the department is likely to need to achieve operational excellence sooner to become an innovation unit.
- Organizational and cultural barriers can hinder innovation. When one cell is responsible for innovation, its activities can be very narrow and constrained by organizational and cultural barriers. Resistance to change and management's lack of commitment are the two main barriers to change. Successful innovation requires the support of the CEO, the support of the entire business, and consent to cultural change at the company-wide level.

[87] Quote after: How to develop innovations more effectively ?; https://www2.deloitte.com/pl/pl/pages/technology/articles/jak-rozwijac-innowacje-cio.html

Research conducted by Deloitte and experience in customer relations show that a disciplined, comprehensive approach allows for a better adjustment of innovation to the business strategy and risk appetite, bringing the most optimal overall value. Companies with successful innovation projects maintain a portfolio that includes three types of innovation initiatives: basic, adjacent, and transformational.
The most unreliable model for implementing innovation is the implementation of projects in response to business demand or accidental investments in breakthrough or small changes, solely for the purpose of experimenting. Just as funds are allocated to investments in various ways, companies can achieve different rates of return depending on the business environment, clients and industry.

Allocating investmentswithin an innovation portfolio is not a one-size-fits-all task. Instead, you should think about developing investment goals, making informed decisions that align with your corporate strategy, IT budget, overarching business goals, industry and market changes, and other relevant factors.

Very few technology leaders have implemented a systematic IT innovation development process that includes all of the above activities: observation / sentiment research, analysis and exploration, and experimentation and scaling. Instead, many of them are looking for innovation in various areas: trying modern technologies without thinking about their application and scalability, investing in start-ups without having a consistent strategy or relying too much on traditional ecosystems of partners and suppliers to provide their guidance .

Case study: TD Bank's innovation center in Israel

To strengthen its ability to create secure applications, Canada's TD Bank recently launched the Tel Aviv Innovation Center. Within 14 months, TD Bank went through the research, idea development and commissioning phase, including opening a new office space, hiring seven employees and starting its first research to confirm the validity of the adopted concept. Technology and business leaders worked together to develop the center's operational model, strategy, organizational needs, and management system, and established realistic KPIs, a schedule, and the level of expected return on investment.

The Center operates as part of the Tel Aviv innovation ecosystem to identify, evaluate and implement IT security solutions, monitor IT security in Israel and new technology startups in the financial sector, and hire employees for technology departments. The actions taken include:

- *learning about the needs of individual business units and their problems,*
- *market research, looking for possible solutions and making decisions about their use or rejection,*
- *assessing and adopting solutions and developing requirements,*

- *development and testing of solutions to confirm the validity of the adopted concept,*
- *implementing and incorporating technology into the TD Bank environment*

END

Innovative activity of enterprisesis a very broad concept and refers to scientific, technical, organizational, financial and commercial activities that lead or are intended to lead to the implementation of innovation. Some of these activities are innovative, while others are not new, but are necessary for the implementation of innovations. Innovative activities also include research and development (R&D) activities that are not directly related to the creation of a specific innovation. The phenomenon known as innovation is constantly changing and evolving.

The classic breakdown of innovation distinguishes between four types of innovation:

- innovations within products - placing a product or service on the market, which is new or significantly improved in terms of its features or applications. This includes significant improvements in terms of technical specifications, components and materials, embedded software, ease of use, or other functional characteristics. Product innovation may result from the application of new knowledge or technology or new applications or a combination of existing knowledge and technology,
- process innovations - implementation of new or significantly improved methods of production, distribution and supporting activities in the field of products and services. Process innovations include new or significantly improved methods of creating and delivering services. They can consist of significant changes to the hardware and software used for service activities or changes to the procedures and techniques used to provide the services. Process innovations also include new or significantly improved techniques, devices and software in auxiliary activities such as procurement, accounting, IT services,
- marketing innovations - implementation of a new marketing concept or strategy that differs significantly from the marketing methods previously used in a given enterprise,
- organizational innovations - implementation of a new organizational method in the operating principles adopted by the company (including knowledge management), in the organization of the workplace or in relations with the environment, which has not been used in a given company so far.

Among the main goals of innovative activities indicated by Polish enterprises is the improvement of the quality of products or services and an increase in the

range of products and services. The third place was taken by the goal of companies' expansion - entering new markets or increasing their market share. For some Polish entrepreneurs, one of the most important goals of innovative activity is to improve the health or safety of employees, as well as to reduce the harmfulness to the environment. The average share of innovative enterprises in the total number of industrial enterprises and the service sector in Poland in 2017 was 14.5%. For innovative enterprises, the enterprise itself is of the greatest importance among the indicated sources of information for innovation. For 47% of enterprises in Poland, the above-mentioned The source of information is assessed as high and this result is slightly below the EU average (49%). Suppliers are indicated in second place and this result is below the average for the EU countries, which amounted to 27%. In Poland, in third place, according to the frequency of indications, customers or consumers are indicated as a significantly high source of information for innovation. Obtaining knowledge from current or potential buyers of products is very important from the point of view of the sales strategy of innovative products. The next place as a potential source of information for innovation indicated by Polish companies was the activity of competitive enterprises, followed by information from scientific institutions (universities and research centers). Suppliers are indicated in second place and this result is below the average for the EU countries, which amounted to 27%. In Poland, in third place, according to the frequency of indications, customers or consumers are indicated as a significantly high source of information for innovation. Obtaining knowledge from current or potential buyers of products is very important from the point of view of the sales strategy of innovative products. The next place as a potential source of information for innovation indicated by Polish companies was the activity of competitive enterprises, followed by information from scientific institutions (universities and research centers). Suppliers are indicated in second place and this result is below the average for the EU countries, which amounted to 27%. In Poland, in third place, according to the frequency of indications, customers or consumers are indicated as a significantly high source of information for innovation. Obtaining knowledge from current or potential buyers of products is very important from the point of view of the sales strategy of innovative products. The next place as a potential source of information for innovation indicated by Polish companies was the activity of competitive enterprises, followed by information from scientific institutions (universities and research centers). customers or consumers are indicated as a significantly high source of information for innovation. Obtaining knowledge from current or potential buyers of products is very important from the point of view of the sales strategy of innovative products. The next place as a potential source of information for innovation indicated by Polish companies was the activity of competitive enterprises, followed by information from scientific institutions (universities and research centers). customers or consumers are indicated as a significantly high source of information for innovation. Obtaining knowledge from current or potential buyers of products is very important from

the point of view of the sales strategy of innovative products. The next place as a potential source of information for innovation indicated by Polish companies was the activity of competitive enterprises, followed by information from scientific institutions (universities and research centers).

Introducing innovations in enterprises is of particular importance, especially in the period of strong economic turbulence taking place in Europe or in the world. An important role in leading economies out of recession and in searching for new, sustainable sources of economic growth is played by dynamically developing enterprises by introducing innovations: new products, services, technologies, new organizational and marketing solutions.

The share of innovative enterprises (innovatively active in terms of products or services and innovative in terms of marketing and organizational innovations) is one of the basic dimensions of innovative activity and determines the level of innovativeness of enterprises in a given country. The level of innovativeness of economic entities is the result of, inter alia, goals adopted by enterprises, areas of innovative activity of enterprises, expenditure on innovative activities, as well as the result of the availability of public support for innovative activities.

Internal expenditure on research and development (GERD) in 2018 amounted to PLN 25.6 billion and increased compared to the previous year by 24.6%. Calculated per capita, this translates into the amount of PLN 668. The R&D intensity index (GERD), which is the share of gross domestic expenditure on R&D in GDP, amounted to 1.21%. (compared to 1.03% in 2017) and it was the largest increase in recent years. This proves that the Polish economy is turning into an increasingly innovative one, and entrepreneurs increasingly see the need to invest in R&D. This pro-innovative trend is the result of, among others two acts on innovation and a number of instruments (eg Start in Poland) to build and strengthen the culture of innovation in domestic business. In 2018 The largest level of internal expenditure on research and development was characteristic of the enterprise sector (including the 100 largest companies from the agri-food industry), which allocated nearly PLN 17 billion to research and development. This means an increase of 27.7 percent. compared to 2017. At the same time, the number of companies involved in research and development is also growing. In 2018, there were 5,000 of them. 779, i.e. by 13.3 percent. more than a year earlier. In the years 2016-2018, the percentage of companies that carry out an innovative project or introduced a product innovation increased. The percentage of industrial enterprises that implemented innovations in the production process also increased. At the same time, the share of revenues from the sale of new or significantly improved products in the total revenues of enterprises increased. In 2016-2018, innovative activity was shown by 26.1 percent. industrial enterprises and 21 percent. service enterprises. This is definitely more than in 2015-2017, when innovative activity was recorded by 20.2%. industrial enterprises and 11.9 percent. service enterprises "- it was written.

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