

**IMPLEMENTATION OF INNOVATIVE CHANGES IN POLISH ENTERPRISES
OUTLINE OF PERSPECTIVES, REVIEW OF RESEARCH**

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ABSTRACT

Changes of an innovative nature, most often of technical and technological, belong to the group of the most important changes experienced by enterprises today. They have a significant impact on all areas of the organization's functioning. The purpose of the article is to systematize knowledge about changes in enterprises, with particular emphasis on innovative technical and technological changes. The research was carried out using the desk research method. The evolution of the approach to change in management sciences was analyzed; typologies and sources of change were highlighted. The specifics of technical and technological changes were pointed out. The outline of business and market perspectives presents the possible directions of enterprises' activities.

Keyword: Technical and technological change, innovation, R&D activities

1. INTRODUCTION

The phenomenon of change in management sciences - concept and specificity.

Contemporary entities, in order to maintain their competitive position and successfully implement the mission and strategy, should flexibly and quickly respond to the changing market environment of each type. In practice, this means that every entity understood as an organization should be able to change dynamically. According to T. Kotarbiński, an organization is "a kind of whole because of the attitude of its own elements to it, namely such a whole, which all components contribute to the success of the whole" [Kotarbiński 1958]. Such a definition implies the existence of many different definitions of change in the literature. The complexity of the phenomenon means that in each of them we will find features important both for organizations that will be groundbreaking or particularly difficult to manage. Each organization is a social system with individual, unique specificity. This makes it difficult to make any modifications. Each time, therefore, an individual diagnosis of the situation is required, but at the same time it should be remembered that the organization is an integral part of the market with specific needs. Hence only the organization that "observes the disturbances occurring in it and constantly creates new forms of balance, introducing various changes and modifications into its structures and its functioning, leading to increasing its efficiency and the right choice of priorities that best correspond to the key objectives in a given situation" [Penc 2007] can be competitive. Together

with the development of business management science, many different definitions of change have arisen and evolved. Their cross-sectional characteristics is presented in the table below:

Table 1. The concepts of change in organization over the years 1918-2010

Author, year	Definition
Ch. Fremenville, 1918	"Transition from old to new organization"
T. Kotarbiński, 1961	"The change consists in the fact that a given thing at the beginning of a given period was such and such, and at the end of this period it is different"
C. Argyris, 1965	"The costs of change increase rapidly as the useful life of new ideas decreases"
W. Makarczyk, 1971	"Cultural, organizational or material value, which in given time and space conditions is treated by people as new"
Z. Pietrasinski, 1971	"Changes intentionally introduced by man or cybernetic systems designed by him, consisting in replacing existing states of affairs with others, evaluated positively in the light of specific criteria and contributing in total to progress"
T. Pszczołowski, 1978	"Event in which the final state is different from the initial state"
R. Woodman, 1989	"Organizational change is any significant modification of some part of the organization"
G.P. Huber, 1991	"A change is understood as a new state or a different position in relation to the previous one in which the organization operated"
J. Porras, R.C. Silvers, 1991	"Creating a higher organizational readiness to meet current needs or promoting change, helping the organization become better in the foreseeable future"
P. Drucker, 1994	"Change is always what creates an opportunity for everything new and different. Systematic change is the deliberate and organized search for change and systematic analysis of the opportunity for social or economic change that such a change would allow "
B. Nogalski, 1994	"Transition of the organization from the current state to a clearly different state "
G. Nizard, 1998	"It is a process, a statement of the difference between one state and another, without indicating its causes, forms or effects"
D.K.Carr, K.J. Hard,W.J. Trahant,1998	"Transition from old working methods to new ones that are to bring positive results"
J. Penc; 1998	"Planned changes combined with creative activities"

	allow to minimize conflicts and accelerate the adaptation of change"
B. Kożuch, 1999	"Purposeful and conscious action consisting in the organization's transition from the present state to another state, clearly different, which should take place in a planned and appropriately coordinated manner"
J. Antoszkiewicz, 2000	"It can be a conscious act. The concept of organizational change has long been seen as being in line with the rationality of the operation"
A. Stabryła, 2000	"Expresses the difference between two or more compared states of a system (object)"
R. Martin, 2000	"The change means taking other actions than before. Taking other actions than previously means choosing other solutions. Other solutions are causing change"
J.D. Antoszkiewicz, Z. Pawlak, 2000	"Each change as such is an individual, unique and unrepeatable phenomenon"
W.M. Grudzewski, I.K. Hejduk, 2001	"Consists in a substantial modification of any part of the organization. It can be caused by internal impulses or external factors"
E. Masłyk-Musiał, 2003	"Change is not the opposite of stillness - the state of change in the organization is an intensification of what exists in a state of its >>stillness<<"
R.W. Griffin, 2004	"Any significant modification of any part of the organization. According to this definition, the change may therefore apply to almost every aspect of the organization"
T. Proctor, K.T. Hua, K. Fuse, 2004	"Change is always a present phenomenon that organizations react to if they want to get a better chance of survival and prosperity"
E. Więcek-Janka, 2004	"Determinant of organizational development through internal adaptation or evolutionary imitation forced by changes in the environment"
K. Grzybowska, 2010	"Organizational change is a difference between one state (at time t1) and another state (at time t2) in management, business processes and the social area of the enterprise, without indicating its potential and real effects. This change is the result of an action that often has the form of a process. It can be caused by internal or external stimuli and applies to any area of the enterprise. It creates a new state with potentially increased order and better organization, it shapes a new paradigm of

	action"
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Source: own elaboration on the basis of: Grzybowska K., *Reorganizacja przedsiębiorstw. Zarządzanie zmianą organizacyjną*, Poznań 2010, p. 11; Maslyk-Musiał E., *Zarządzanie zmianami w firmie*, Wydawnictwo CIM, Warszawa 1996, pp. 32-34; Woodman R.W., *Organization in Change and Development New Arenas for Inquiry and Action*, Journal of Management 1989, 6 p. 205; Kożuch B., *Wstęp do teorii zarządzania*, Wydawnictwo Nauka-Edukacja, Warszawa 1999, p. 179; Drucker P., *Praktyka Zarządzania*, Czytelnik, Warszawa 1994, p. 39; Więcek-Janka E., *Zmiany i konflikty w organizacji*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006

In the 20th century, the static approach dominated, which assumed that change was a different state of an element of the organization. Currently, however, a dynamic approach is preferred, which assumes that we are dealing with a modification of broadly understood processes throughout the organization. Common features that can be identified as characteristic of this phenomenon are as follows:

- it is a process dynamically occurring in time,
- applies to every element of the enterprise,
- requires planned implementation if it is to be effective,
- is closely related to broadly understood transformations, which can lead to feelings of dissatisfaction, anxiety, and thus resistance among members of the organization.

It is possible to divide changes due to their dominant properties. Their typology is included in table 2:

Table 2. Typologies of changes taking into account the dominant characteristics.

Criterion	Types and characteristics of changes
Source (cause) of changes	<p>spontaneous change (voluntary, independent) - it is a situation when an organization sees the need for change, defines its direction and takes pre-emptive actions; its idea, impulse arises in the organization,</p> <p>imposed change (forced) –the need for its introduction and direction is set by the environment, and the organization only responds to the situation, preparing its conditions and implementation.</p>
Change size (change purpose)	<p>conservative change - its goal is to maintain the current level of adaptation of the organization to the environment, expressed by the level of its organization and efficiency of functioning,</p> <p>developmental change - characterizes those activities of organizations which purpose is to increase the level of organization and efficiency of functioning and to ensure the development of the organization by anticipating adaptation to external conditions.</p>
Change conducting	structure oriented changes -e.g. changes in the workflow,

strategy	decentralization, a change in the degree of formalization, changes in technology - work operations, procedures, technical equipment, etc., changing people - their qualifications, attitudes, motivations, relationships between them.
Scope of changes	overall changes - they cover the entire organization, fragmentary changes – they refer to specific, defective fragments of the organization of primary or subsidiary importance
Interdependence of organizational changes and changes in the environment	reactive changes - being a reaction to changes in the environment, made only after the need arises, therefore they often prove to be inefficient, preemptive changes –they anticipate future changes in conditions and prepare the organization for them before the need for organizational change; this creates an opportunity for the organization to eliminate the time gap between the need for change and the reaction to it.
Assessment of results (effects of changes)	positive changes - when as a result of measuring the effects of changes, the real useful result exceeds the expenditure incurred (then we talk about improvement), negative changes - when the useful results obtained are smaller than those associated with the change in costs, indifferent changes - when the useful results and costs incurred are equal or similar.
Power, shape and extent of change	gradual (normal) change - they are a permanent element of the organization's operation, because the individual elements of the organization are never perfectly matched; these changes are aimed at correcting small deviations, as well as responding to small changes in the environment, radical change - called in the literature a change that breaks the structure, it is revolutionary in nature, its basic element is the change in the strategy of the organization; the mission, goals, organization methods, power structures, communication networks, staff, etc. are also changing.
Implementrtation method	adaptive change - is the organization's response to emerging forces; rather gradual than comprehensive, planned change - has a larger scope than the adaptive change, is carefully planned and implemented in an orderly and timely manner and ahead of future events.
Scope of novelty	innovative (creative) changes - this is the implementation of new, original solutions not found elsewhere (technical, technological, socio-organizational innovations, in the sphere of management), adaptive (restorative) changes - it is the use of already existing, proven, used solutions and adapting them to the organization's conditions.

Source: Kmiotek K., Piecuch T., *Zachownia organizacyjne teoria i przykłady*, Wyd. Difin, Warszawa 2012, pp.131-132

Determinants of changes - extract.

The reasons for changes can be divided into external and internal in the simplest manner [Zarębska 2002; Kuc, Moczyłowska, 2009]. Internal ones are most often derived from management decisions that are aimed at further development of the organization. On the other hand, external are a derivative of events that occurred in the environment of the organization and caused the need to adapt. D. Torrington, J. Weightman and K. Johns included three additional situations that indicate disturbances in the functioning of the organization and the emerging need for optimization in this area in the group of internal factors of change [Michalak 2010]:

- "something" is going wrong - the organization is starting to function worse than before, removing defects and alleviating crisis situations is too time-consuming;
- voices of discontent appear at the level of the management staff, they are gradually transformed into projects of specific changes. It should be expected, however, that the changes imposed when the persons concerned are not involved in their preparation will cause social resistance;
- intention to have a constantly current market offer.

On their basis, they define the basic internal factors of change in the following way. These include above all:

- decrease in profits;
- personnel fluctuation;
- increase in operating expenses;
- conflicts and dissatisfaction among the team;
- reducing the quality level of manufactured products or services;
- unsatisfactory level of technology;
- wear of the machine park;
- insufficient level of employee qualifications;
- lack of funds for investments;
- decrease in work efficiency;
- small personal involvement of organization members in achieving its goals [Mikołajczyk 2003].

Thus, in their opinion, the ineffectiveness of organization management is the factor that most often causes and justifies the need for changing actions. A similar thesis was made by E. Masłyk-Musiał by comparing the symptoms of irregularities and Z. Mikołajczyk, who believes that ineffective management of individual functional areas such as: supply, production, sales and marketing activities, finances, people management, organization and management of the enterprise as a whole most often causes the need to implement changes [Mikołajczyk 2003]. Changes taking place in the organization's environment may also affect all areas of its functioning. According to J. Penc, "they force its specific transformation and adaptation to the structure and potential of this environment. They cause that an enterprise must often reject what

was effective in the past, and even "invent" the future, transform and re-create itself to be able to realize its intentions and better serve its environment and itself" [Zajac 2006]. Table 3 presents the most important external factors causing changes in the organization:

Table 3. External factors causing changes in the organization

Enterprise environment	Factors causing/shaping changes
International environment	<ul style="list-style-type: none"> • Political changes in Europe and the world • Resource crises • Integration and disintegration processes
Economic situation on an international and national scale	<ul style="list-style-type: none"> • Economies globalization • Markets virtualization • Strong competition increase • Increased customer requirements
Legal environment	Tax and customs regulations, labor law stimulating or inhibiting entrepreneurship and creating new jobs
Market forces	<ul style="list-style-type: none"> • Markets globalization • Markets virtualization • Strong competition increase • Increased customer requirements
Social and cultural trends	<ul style="list-style-type: none"> • Demographic phenomena • Social values • Lifestyle
Technological changes	<ul style="list-style-type: none"> • Rapid development of information technologies • New solutions in the scope of materials, processes and products
Proprietary changes	<ul style="list-style-type: none"> • Sales of enterprises • Takeovers, mergers • Privatization of enterprises
Ecology	<ul style="list-style-type: none"> • Changes in the natural environment • Pro-ecological legal regulations • Ecological movements

Source: own elaboration on the basis of Zajac Cz., *Społeczne i organizacyjne problemy przejęć i fuzji przedsiębiorstw*, Wyd. WAE Wrocław, 2006

Product and innovation changes are the most widespread. They lead mainly to the creation of new products. From the point of view of the literature on the subject, as well as business practice, they usually mean the launch of a product or service that is new or significantly modified (improved). According to the literature on the subject, we can talk about a new product when [Rutkowski 2007]:

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- it has a high degree of efficiency, durability and aesthetics, comparable with global standards and technical and economic parameters,
 - it is introduced to existing or creates new markets,
 - modification of the existing product increases its competitiveness and attractiveness for buyers,
 - it is offered for the first time on a given market and satisfies the new needs of recipients or meets the existing needs in a better way,
 - it is original, streamlined or modified, it is characterized by significant technical and technological changes and competitiveness, and meets the current or new needs of buyers to a greater extent,
 - it is produced in the research and development process and offered in distribution channels for no more than one year from its introduction on the market.

Product innovation is also defined as the idea, products or technology elements developed and offered to customers who consider them to be new or innovative. It is currently believed that they are a direct result of the application of new knowledge or technology, or may be based on the innovative use of previously used knowledge or technology. The above-presented approach to product innovations refers to both radical changes in the production process and small modifications, e.g. only in the area of technology. Generally speaking, it should be noted that the basic task of organizational innovations, regardless of the scope of the issue, is to optimize the company's activities in the field of conducting and managing the production process of a product or service through:

- reduction of administrative costs,
- reduction of transaction costs,
- increasing work efficiency, even by improving its conditions,
- reduction of delivery costs,
- gaining access to non-marketable assets.

It should be emphasized that the basic determinant indicating whether a given factor can be considered a technical and technological production innovation, and not just a reorganization, is the fact that it has not been used in the past. In other words, it means its first use in the enterprise. Many organizations on the market using this approach have achieved the following effects: greater operational efficiency, simplification of activities, faster response to changes, less bureaucracy, professionalism and lower costs, optimization of resources and production capacity.

Technical and technological changes - fundamentals and specificity

A technological change, according to the standards set by the OECD (Organization for Economic Co-operation and Development), relates to such a change in activities that leads to the production of a technologically new or possibly significantly improved object. It is sometimes referred to as process innovation, because it is the same as a change in the methods used by the company to manufacture products or provide services. It also means a modification of the way in which an enterprise reaches its customers with a product or service. They are often the result of

using new knowledge in a practical way, i.e. after implementing it in the manufacturing process. The effect will primarily be new production that has not been obtained so far, but also the delivery of new and improved products that would never have been manufactured or delivered using existing conventional methods [Karpacz, 2014]. An additional effect may be to increase production efficiency. An example of process innovation in the field of technology is the installation of a new, improved production technology (for example, automation of the production line) in the company's technological line. However, technical change, according to OECD research, is an innovation resulting from modification activities of the so-called R&D (research and development). These improvements arise as a result of innovative activities covering a number of research (scientific), technical, organizational, financial and commercial activities, with the provision that smaller - technical or flexible modifications of products and processes, not directly affecting performance, properties, costs or the consumption of materials, energy and components are not included in this type of innovations [CSO 2007]. A different approach, dedicated to the production process in the strict sense, to the definition of technical and technological change is represented by J. Penc [Penc 2003]. For this scientist, it is crucial if and how the change affects the production process. From this point of view, it is important whether its consequence is the introduction of a new production method, whether there is optimization, streamlining of production, and reduction of costs of this process [Penc 2003]. For J. Penc, technological innovations mean the introduction of new production methods, streamlining production and making it cheaper, as well as bringing improvement in working conditions and its environment. However, he defines technical innovations as changes in the physical appearance of a product or service, performance parameters or production processes [Penc, 2007]. To sum up, due to the different areas of innovation emergence, one should rather consider the view presented by the OECD as superior and more general. It shows that technological innovations are all necessary activities in the field of research and development (R&D) aimed at creating technological novelties. However, technical innovations are other activities of various types, aimed at introducing a new product to the market or absorption of a new production process by an enterprise. They include changes in product appearance, changes in packaging or taste, in the case of food products, creation of new distribution channels, use of new product presentation methods, creation of new brands, use of new marketing compositions which task is to introduce products to new markets, implement new product pricing methods. After many years of research and observation of various economies, the OECD has also developed and proposed a division of technical and technological innovations into:

- Process – mean the implementation of a completely new or improved production method; they often lead to lowering unit costs of production, increasing quality;
- Product - they consist in introducing completely new or significantly improved products to the market;
- Organizational - also called process-related, relate to aspects related to the production of products. it is assumed that they include: technology, equipment and production software [OECD 2005].

In 2005, the OECD also added marketing innovations to the above list, which were defined as process changes resulting in improved identification of customer needs and product positioning

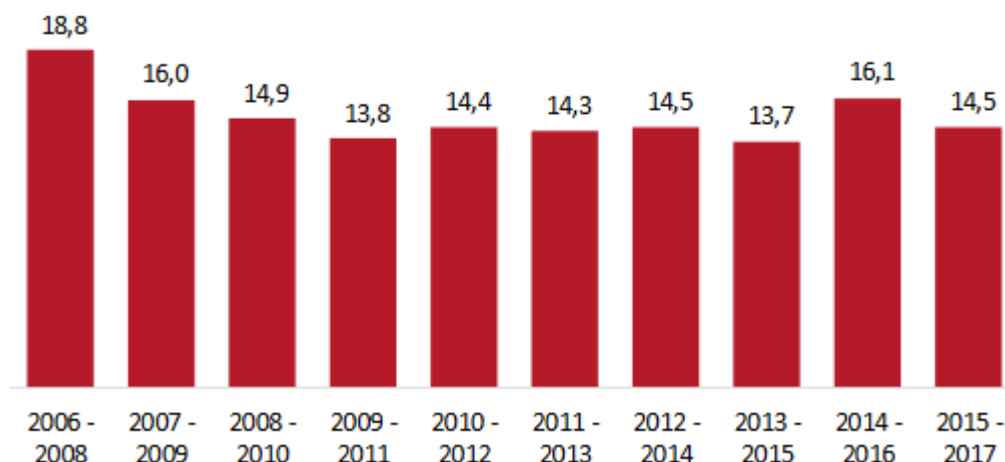
on the market. The manufacturer's success is primarily determined by the technical parameters and modernity of the products, and in the long run, success will be achieved by the producer who will be more productive than the others, i.e. his market share will be greater than the share in the potential of all producers operating on this market. Enterprises often have problems with the implementation of results of technological progress, which is due to limited resources and the level of preparation of managers for the implementation of results of technological progress [OECD, 2005]. The result is the so-called technological gap, which significantly negatively affects the level of competitiveness of such an enterprise in the sector. Organizations therefore have difficulties with the characteristics of the macroeconomic environment, as well as direct, close environment, and as a consequence, not only are they unable to design and implement innovative solutions, but also to maintain their position [OECD, 2005]. A good remedial solution is technology transfer or entering into a strategic alliance, i.e. cooperation and sharing experiences in the field of innovative changes. However, for this purpose, it is necessary to create and maintain awareness and the significance and role of technical and technological innovations as a pro-development factor. In the organization's economic practice, the company's development philosophy based on increasing production capacity - rather than optimizing it - still dominates; on the expansion of production halls and enlarging the machinery park or increasing employment or changing working time or organization of work based on cost reduction. Other enterprises operating in the sector are perceived as competitors rather than as partners who can be helpful in solving business difficulties.

Currently, the CSO has the most current data on the state of innovative investments made by enterprises in Poland. This is a consequence of the implementation by the State of an obligation (threatened with a financial penalty) to provide reports with various types of information by organizations. These reports have defined queries, data format and strictly defined deadlines by which they must be delivered - currently electronically. In addition, this work uses an interesting and very up-to-date study prepared jointly by the consulting company Deloitte, the National Center for Research and Development and the PKO BP Bank regarding the effectiveness of innovations, technical and technological solutions, their financing as well as opportunities and threats related to this issue.

Innovative enterprises - an outline of the market situation and perspectives.

The experience of highly developed countries such as: Central European countries, the United States and South Korea allows to draw a conclusion that the condition of improvement of the economic situation and general well-being of the population is the innovation of enterprises. It not only leads to the improvement of the aforementioned living conditions of society, but above all maintains and activates economic development. In Poland, however, according to the CSO and PFR research [CSO 2017, PFR 2019], the scale of the phenomenon of innovative activity of enterprises is visible. The data is presented in Diagram 1:

Diagram 1. Number of innovative enterprises -% share in the total number of operating enterprises.



Source: PFR Group, *Report on the state of the small and medium-sized enterprises sector*, Warszawa 2019

In the years 2015-2017, the share of innovative enterprises amounted to 14.5% in the total number of organizations operating on the market. It was lower compared to the results recorded in previous years, i.e. 2014-2016 [CSO, 2017]. It is also possible to analyze similar data on a more detailed basis - the type of business conducted by the enterprise - the data is presented in Diagram 2.

Diagram 2. Number of innovative enterprises in Poland, broken down into service and industrial ones in the years 2006-2017.



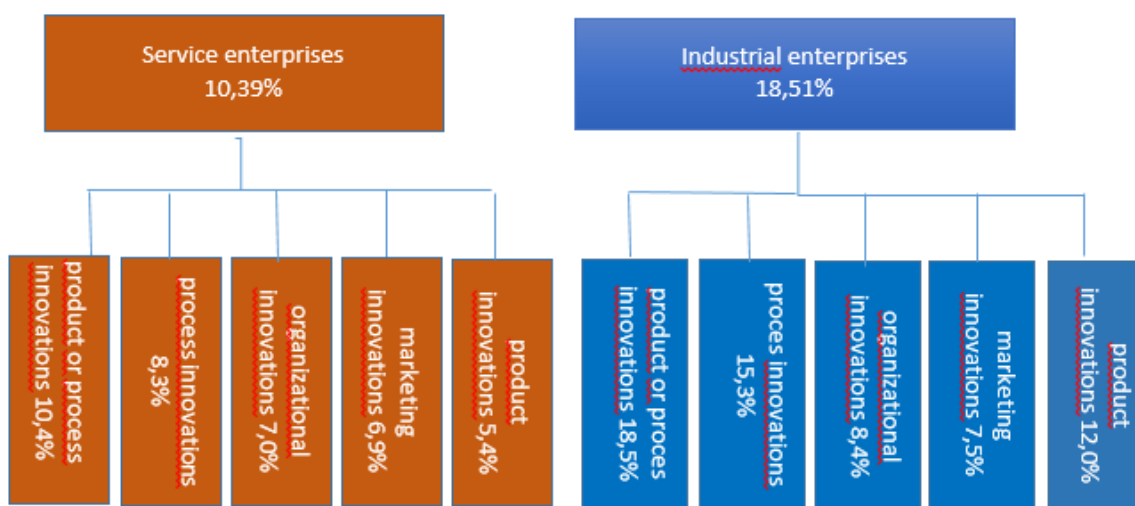
Source: CSO; PFR Group, *Report on the state of the small and medium-sized enterprises sector*, Warszawa

18.5% of all innovative enterprises are industrial companies. Service companies on the other hand - 10.4%. This percentage is lower than in the years 2014-2016. The share of innovative

enterprises in the service sector is significantly lower than in the manufacturing sector. Comparing data from recent years, taking into account knowledge of the global economic situation, one can risk the statement that the global financial and economic crisis may have had an impact on reducing the number of companies implementing innovations. The market in Poland and neighboring countries of Central and Eastern Europe are significantly linked to the markets of highly developed countries. A characteristic feature of it is therefore naturally quick response to any anomalies. Therefore, fluctuations at the global level could have significantly contributed to the inhibition of innovative activities or ones perceived as carrying significant business risk for the company.

In accordance with the OECD division of innovations [OECD 2015], presented in earlier sections, industrial enterprises most often introduce process (15.3%) or product (12%) innovations. Organizational (8.4%) or marketing (7.5%) innovations are implemented by them less often. Service enterprises are dominated by process (8.3%), organizational (7.0%) and marketing (6.9%) innovations. In contrast, product innovations are the least common, but this is due to the specifics of the activities of these organizations. The summary of data is presented in the Figure 1:

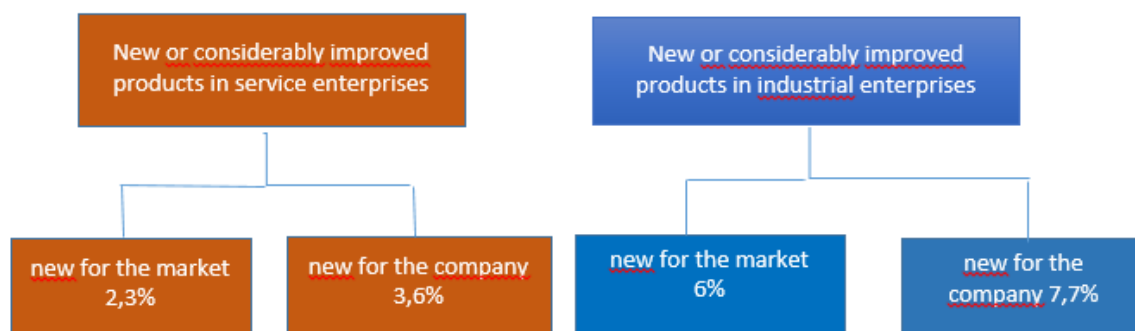
Figure 1. Types of innovations in enterprises. Years 2015-2017.



Source:CSO; *Innovative activity of enterprises in Poland in the years 2015-2017*, Warszawa 2018

The share of product innovations, one of the types of technical innovations, described in the previous section as those that are the most vivid effect of implementing R&D activities in the operations of enterprises, is presented in Figure 2:

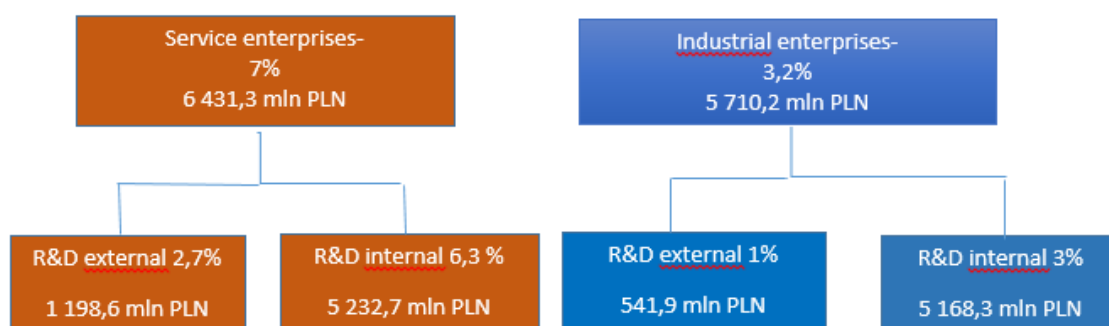
Figure 2. Share of product innovations introduced in enterprises along with the estimated scale of new products.



Source: CSO; PFR Group, *Report on the state of the small and medium-sized enterprises sector*, Warszawa 2019

R&D work is necessary to create new or improved products, as described in the previous section. They enable the development and implementation of innovations - above all product but also process ones. Their importance for organizations increases significantly when they are created based on their own development facilities or acquired from other units [PFR, 2019]. They contribute to the emergence of new knowledge in the organization, which then has the chance of commercialization, whether in the form of a product or the aforementioned innovative process. According to data presented by the Central Statistical Office, in Poland, expenditure on service companies is dominated by expenditure on R&D, and in industrial companies - on the purchase of machinery and technical equipment.

Figure 3. Typology of R&D activities in service and production enterprises in Poland.



Source: CSO; *Innovative activity of enterprises in Poland in the years 2015-2017*, Warszawa 2018

The above figure shows that it is industrial companies that are innovating more often. They usually do it based on the effects of internal R&D, which means that they operate based on the knowledge of their employees. In comparison to them, service enterprises conduct R&D activities to a much smaller extent.

Generally, in Poland, capital expenditure in 2017 amounted to PLN 257 881 billion, of which investment outlays of the enterprise sector (excluding expenditure incurred by the State) reached PLN 194.4 billion, i.e. 75% of total expenditure and were higher by 3% compared to 2016. Investment outlays in this amount accounted for approximately PLN 173 billion in 2016. The remaining value is the purchase of used fixed assets - about PLN 21.5 billion. This means that expenditure of an innovative nature - considered the most innovative - in the sector of small and medium enterprises constituted about 89% of the total value of expenditure. Table 4 presents an overview of the value of expenditure on innovation, taking into account the size of the enterprise:

Table 4. Investment outlays (in PLN million) on new (R&D) and used fixed assets of enterprises in 2017.

	General	Micro	Small	Medium	Large	SME
R&D investment outlays	172978	26694	13538	34431	98314	74664
Outlays on the purchase of used fixed assets	21462	7642	3639	4098	6082	15380
Total investment outlays	194440	34336	17177	38530	104397	90043

Source: Own elaboration on the basis of *Activities of non-financial enterprises in 2017*, CSO, 2018

Since 2017, compared to 2016, there is a visible increase in investment in almost all groups of enterprises, except for large companies. Although it should be noted that in statistical data published by the Central Statistical Office, large entities still have the largest share in total investment - 54% of total expenditure in 2017. It simply means that the value of outlays incurred by these entities is the largest, higher than for the entire sector of small and medium-sized enterprises (PLN 104 billion against PLN 90 billion). Medium-sized companies with a 20% share in companies' investment outlays are on the second place. Small and micro companies have the lowest share in the total expenditure (9% and 18% respectively). Table 5 presents a summary of the data:

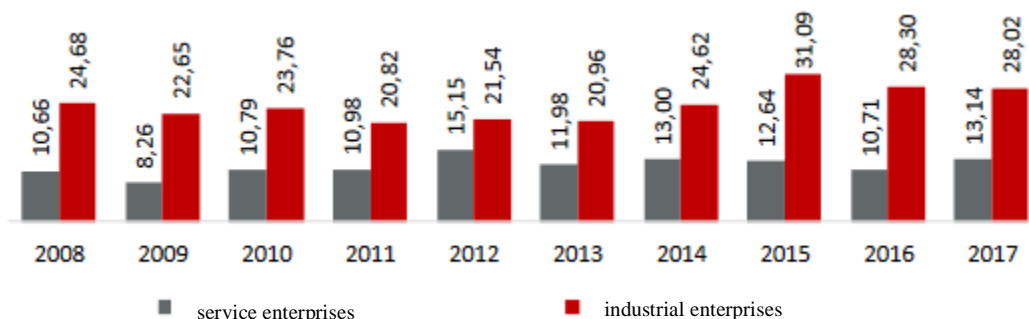
Table 5. The share of individual groups of companies in investment outlays on the scale of the year 2017.

	General	Micro	Small	Medium	Large	SME
Total investment outlays in %	100%	18%	9%	20%	54%	46%

Source: Own elaboration on the basis of *Activities of non-financial enterprises in 2017*, CSO, 2018.

In this, enterprises' outlays on innovation activities were as follows - Diagram 3:

Diagram 3. Expenditure on innovation in PLN billion.



Source: CSO; PFR Group, *Report on the state of the small and medium-sized enterprises sector*, Warszawa 2019

The time axis along with the data placed on it allows to conclude that innovation expenditure over the past 4 years has begun to increase again. Meanwhile, the impact and importance of investment in new technologies and products still seems to be marginalized by organizations - according to analysts from the research team of Deloitte, NCBiR and PKO BP [Deloitte, NCBiR, PKO BP, 2018]. In their opinion, this is proved by converting the value of expenditure on technical and technological innovations incurred in 2017 into one organization. It turns out that they were lower than a year ago (in 2016). This is mainly due to the aforementioned reduction of innovation expenditure in the group of large companies with the greatest opportunities in obtaining various sources of financing. In other cases, however, we can observe, based on statistical data, that on average, per entity, the amounts allocated to investments that are technical and technological innovations (R&D) have increased. They increased in the SME sector - they amounted to PLN 43.4 thousand, which is an increase of 6% analyzing data year on year. In the group of micro, small and medium enterprises, there were also increases to the level of PLN 17.100 thousand, PLN 319.5 thousand and PLN 2 245.3 thousand, which is an increase of 10%, 9% and 9%, respectively, per one organization in a given size category. Data summary is presented in Table 6:

Table 6. Total investment outlays per enterprise in the years 2015-2017 (in PLN thousand)

	General	Micro	Small	Medium	Large	SME
Total in 2015	104.81	16.17	349.06	2582.37	32263.99	47.04
Total in 2016	93.67	15.63	293.33	2315.16	29733.52	41.09
Total in 2017	93.61	17.13	319.49	2512.55	28672.62	43.43
Outlays on new investments/R&D in 2017	83.28	13.32	251.81	2245.27	27002.06	36.01
Outlays on the purchase of used fixed assets in 2017	10.33	3.81	67.69	267.25	1670.55	7.42

Source: Own elaboration on the basis of *Activities of non-financial enterprises in 2017*, CSO, 2018.

It seems, therefore, that the potential lack of knowledge about the possible positive effects of these activities causes the inability to implement them or search for ways to raise funds for financing innovative activities, especially from EU funds. The scope of activities related to technology transfer to enterprises from R&D facilities in Poland is still too small in relation to the needs of the modernizing economy. Sectorial cooperation understood as sharing experiences among enterprises, also due to the hyper-competition on the Polish market, is a solution rarely chosen by organizations. On the other hand, the purchase of know-how from larger, more experienced market partners [Shaner, Philipp, Schmehl, 2018] is a frequent phenomenon, also recommended as a way of optimal behavior for a growing organization. Table 7 presents a synthetic, percentage view of the structure of investment financing sources in Polish enterprises.

Table 7. Structure of sources of financing investment expenditure in 2016 %.

	Companies in general	SMEs	Small enterprises	Medium enterprises	Large enterprises
Own funds	73.05%	67.14%	67.94%	66.80%	75.91%
Budget appropriations	2.89%	1.99%	1.63%	2.14%	3.33%
Domestic credits and loans	10.91%	19.24%	17.76%	19.86%	6.88%
Funds from abroad / TOTAL	5.66%	6.37%	7.93%	5.71%	5.32%
Funds from abroad / Bank loans	1.99%	1.03%	1.01%	1.03%	2.46%
Other sources of financing	4.07%	4.41%	4.42%	4.41%	3.90%
Unfinanced outlays	3.42%	0.86%	0.32%	3.90%	4.66%

Source: Own elaboration on the basis of *Activities of non-financial enterprises in 2017*, CSO, 2018.

67% of investment outlays were financed with own funds, 19.2% came from domestic credits and loans, 6.4% were from foreign sources. The size of the organization is also important. The larger the enterprise, the greater the involvement of own funds in financing investments. Therefore, these data confirm the latest research carried out in parallel by the Central Statistical Office on the innovative activity of companies in Poland. Both current sources of research agree that their quantity has decreased. In 2015-2017, the share of innovative enterprises in total was 14.5% and was lower by 1.6 percentage points compared to the data from surveys conducted in 2014-2016 [CSO, 2018]. The highest percentage of innovative companies was recorded in the years 2006–2008. At the time, it was 21.4% in industry and 16.1% in services. Analyzing the expenditure incurred in terms of the type of organization in 2017, industrial enterprises allocated about PLN 28 billion to R&D activities, i.e. less than a year ago when the expenditure amounted to PLN 28.3 billion. On the other hand, service enterprises incurred expenditure on innovative activities at the level of PLN 13.1 billion and were higher by PLN 2.5 billion than a year earlier.

Thus, we have a confirmed by research growth of expenditure on innovation in service organizations, and a decrease is recorded in industrial organizations in 2017. On average, they allocated approximately PLN 5.7 million to innovation activities, and services to PLN 5.5 million, respectively. In 2017, compared to the previous year, expenditure on one industrial enterprise decreased by PLN 0.2 million, while for one service enterprise increased by PLN 1.8 million.

The intensity of R&D work has been steadily growing for years, but as the statistics show, it evolves and changes within not only its own specificity. It varies depending on the specifics of the sector of the company's operation and its size. Compared to Polish, domestic, GDP in 2017 amounted to 1.03%, while a year ago it was 0.97%, and in 2013, for comparison, 0.87%. Therefore, during the years 2008-2017, the involvement of the enterprise sector in R&D increased (3.5 times) and the government sector decreased (involvement decreased almost 11 times) - according to the Central Statistical Office data. This indicates a consistent implementation of the policy assumptions to encourage and stimulate the enterprise sector to R&D [Hottenrott, Lopes-Bento, Veugelers, 2017]. In addition, the basic indicators regarding the financial situation of enterprises in 2017 clearly improved. Revenues increased rapidly - by 8.2% year on year, to PLN 4.6 trillion and production by 11.2% year-on-year, to the level of PLN 3.5 trillion. The gross turnover profitability ratio of enterprises improved - 6.6% to 7.1%. This means that organizations will potentially have financial and organizational resources at their disposal to develop and implement technical and technological innovations.

In the summary of the perspectives of Polish enterprises in implementing innovative changes, it is worth quoting the conclusions arising from the results of the already mentioned study carried out by Deloitte in cooperation with the National Center for Research and Development and the PKO BP Bank regarding the situation of organizations implementing technical and technological innovations [Deloitte, NCBiR, PKO BP, 2018]:

- enterprises plan to increase their expenditure on R&D in the perspective of a year - two years (about 45% of respondents), in the period of three - five years about 57% of respondents;
- the main factors motivating entrepreneurs are: the availability of support instruments resulting from thoughtful, consistent state policy - subsidies, tax reliefs, etc., but also qualified and experienced managers and researchers from scientific units supporting research and development activities of entrepreneurs - about 71% of enterprises continue cooperation with external entities, including universities and research institutes, which is beneficial to both parties;
- the biggest concerns of enterprises are uncertainties regarding the variability of regulations, control of the use of subsidies and tax reliefs granted to them, identification of research and development activities, as well as the lack of access to qualified and experienced research staff;
- 69% of the surveyed enterprises protect the specifics of implemented technical and technological innovations through company secrets - this is the most common way of protection; patents and utility models constitute 40%, as well as trademarks 31%.

2. SUMMARY

To sum up, Polish enterprises, despite easy access to information about the support available from European organizations or the state, often do not decide to take the risk of implementing changes that result in innovation. They prefer to use the funds obtained on their own in financial institutions or to use the funds generated by the organization in the course of its activity, which is proved by the popularity of creating own R&D departments. The complicated system of support offered by the state also contributes to this. Imprecise regulations, procedures, bureaucracy, administrative burdens and costs, unclear guidelines in the scope of costs eligible for reimbursement through tax reliefs [Deloitte, NCBiR, PKO BP, 2018]; reluctantly used model of so-called open innovations (against global and European trends) pejoratively evaluated by enterprises in the conditions of prevailing market competition. Therefore, the transfer of knowledge and mutual exchange of experience between companies is still losing to its own investment effort, which is perceived as carrying less risk. Expenditure on R&D activities that are used to implement technical and technological changes do not, in principle, guarantee the development of new products or the development of new technological processes; but they significantly increase the likelihood of these changes occurring in the organization. The state strategy in the area of public support for enterprises undertaking innovative activities, implemented with the use of appropriate financing or tax system is important.

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