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DIVERSITY AND TECHNOLOGICAL DEVELOPMENT AS MANIFESTATIONS OF INNOVATION

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Abstract: Innovation is seen as a key factor contributing to the competitiveness of organizations and the economy, resulting in development. Invariably important research problem is also the diagnosis of factors hindering the conduct of innovative activities. One of the internal conditions influencing innovation are diversity and technical development. Diversity, in other words: teamwork and quality of staff, is a value increasingly desirable by modern enterprises and necessary for their development. However, when combining innovation with technology, it is worth emphasizing that the very concept of innovation can be understood not only as a process involving all activities related to the transformation of an idea or idea into a new product, but also into a new technology along with its implementation. In order to find appropriate, reliable data, it is worth reaching for the indicators that make up the European Innovation Scoreboard 2021 so as to trace the dynamics of the changes seen in the same selected indicators over the course of the last few years. The results obtained in this way give hope for their successful development in the future and the multiplication of attitudes supporting both diversity and development, supporting innovation and creativity. In the modern world, plagued by numerous crises, these are key aspects.

Keywords: innovation, diversity, technical development, indicators

Streszczenie: Innowacyjność jest postrzegana jako kluczowy czynnik przyczyniający się do wzrostu konkurencyjności organizacji i gospodarki, czego efektem jest rozwój. Niezmiennie ważnym problemem badawczym jest także diagnoza czynników utrudniających prowadzenie działalności innowacyjnej. Jednymi z warunków wewnętrznych oddziałujących na innowacje są różnorodność i rozwój technologiczny. Różnorodność, innymi słowy zespołowość, jakość kadry, jest wartością coraz bardziej pożądaną przez współczesne przedsiębiorstwa i niezbędną do ich nowoczesnego rozwoju. Natomiast łącząc innowacyjność z technologią warto podkreślić, że samo pojęcie innowacyjności można rozumieć nie tylko jako proces obejmujący wszystkie działania związane z przekształcaniem idei czy pomysłu w nowy produkt, a także w nową technologię wraz z jej wdrażaniem. Dążąc do znalezienia odpowiednich, miarodajnych danych do badań, warto sięgnąć po wskaźniki składające się na European Innovation Scoreboard 2021 i prześledzić dynamikę zmian dobranych wskaźników w ostatnich kilku latach. Wyniki otrzymane w ten sposób napawają nadzieją na ich pomyślny rozwój w przyszłości i pomnażanie się postaw wspierających zarówno różnorodność, jak i rozwój technologiczny, wspierających innowacyjność, kreatywność. We współczesnym świecie, trapionym przez liczne kryzysy, są to kluczowe aspekty.

Słowa kluczowe: innowacyjność, różnorodność, rozwój technologiczny, wskaźniki

Introduction

Among the many challenges faced by today's organizations in Poland is the need to increase innovation, perceived as a key factor contributing to an increase in the competitiveness of organizations and the economy, which results in development. What's more, the innovativeness of enterprises is the basis for gaining a competitive advantage by enterprises and influencing their success, which is reflected in their sustainable development. In recent years, many studies have been performed on innovation in such fields as economics, sociology, psychology and other social sciences, creating the basis for reflections on innovation in management sciences. In the past, the concept of innovativeness evolved not only with the development of research on innovation and innovativeness but also with the comprehensive, multifaceted development of the

world economy. In the literature, many factors determining the innovation process in enterprises have been identified. The determinants of innovation processes determine the impact and effectiveness of instruments stimulating the innovative activity of enterprises. This area is the subject of numerous studies which have identified many factors influencing innovativeness. The aspect of innovation is dealt with in economic literature by many authors (Koza, 2021, pp. 11-17), eg. T. Nawrocki (Nawrocki, 2012, pp. 10-14), L. Bialon (Bialon, 2010, pp. 5-22), or H. Salavou (Salavou, Baltas, Lioukas, 2004, pp. 1091-1112). This topic has also been diagnosed in the Oslo Handbook, developed by the European Commission and the Organisation for Economic Co-operation and Development. According to the Oslo Manual, there are two approaches to collecting data on innovativeness: entity approach, i.e. the quantitative study of innovativeness in the enterprise, which is the foundation for the comparison of companies in different areas of their innovative activity, as well as subject-related approach, i.e. collecting descriptive, quantitative and qualitative information about specific innovations carried out in individual enterprises. According to the authors of the handbook, both approaches can be used simultaneously. However, they point to the dominant subjective approach due to the more important role of individual enterprises in shaping the economic effects and the greater importance of these data for public policy. So, on the basis of the literature review, the following criteria for the division of innovations may be distinguished: the subject of innovation, place of implementation and the scope of impact, the scope and degree of novelty, results, benefits, scale of changes, measures leading to innovation, character, degree of originality, degree of complexity, method of investing, relation to the natural environment, the source of the creation and the participants of the innovation process. Invariably, an important research problem is also the diagnosis of the factors hindering the conduct of innovative activities. Due to these problems, the focus in this article will be on certain manifestations of innovation, which are diversity and technological development.

Innovation seen in diversity

The term innovation belongs to the group of concepts commonly used both in various disciplines of science and in colloquial speech. However, this concept does not have a clear definition. In the literature on the subject there are many different definitions for this term, depending on the context of the research. The genesis of the term innovation derives from the Latin *innovatio* or *innovare* and means novelty or newly introduced things. innovation – after the Dictionary of the Polish Language – means an action introducing something new, usually some improvements, novelty, reform (*Slownik*…, 1996, p. 323). The concept of innovation was introduced into economic sciences at the beginning of the twentieth century by the Austrian economist Joseph Schumpeter. The definition formulated by him is the foundation on which the other terms are based, and at the same time, it is extremely universal and current in the present economic reality (Brozek, 2019, pp. 11-30).

The internal conditions affecting innovation include, among others, creativity, entrepreneurship, teamwork, diversity of staff or detailed technological changes. Diversity, also referred to as teamwork or quality of staff, is a value increasingly desirable by modern enterprises. In many of them, diversity is no longer just one of the elements of personnel policy, but a long-term vision of development. At the same time, there is a strong conviction among a large part of the management staff, not only in Poland, that it is much easier and safer to manage homogeneous teams of people, and any emphasis on civic attitudes in business is only a temporary fad. Diversity is therefore consciously overlooked in traditionally run companies, as it interferes with the use of well-known, unified human resource management instruments. However, the interest in and management of diversity is becoming more and more widespread. Increasingly, the benefits of this are noticed, exposed and appreciated. One of them is certainly to see the strength of employee teams in diversity, unite their inclusion in a common organizational culture and build commitment. As a result, diversity management can bring many different types of benefits and functions to a company. One of them may be support for employee innovation. It is of great importance and ever-increasing importance to use human resources wisely in the development of innovation; in particular, it is important to prevent the waste of talent (Borkowska, 2010, pp. 5-15).

Diversity management has great potential for creating all kinds of innovation activities – from small improvements to important inventions. Knowledge of the motivations that create pro-innovation attitudes allows us to design appropriate financial and non-financial solutions

that, on the one hand, will ensure the employer's interest in innovation, and on the other hand, will give satisfaction to employees. However, it would be difficult to address some of the instruments of motivation to selected recipients. The success of the process of creating innovations in the company using diversity management requires the gaining of knowledge about how to harness pro-innovative attitudes amongst employees using non-financial methods. It turns out to be necessary to provide employees with expressions of appreciation from the management, but also to shape the organizational culture in such a way that innovators are appreciated by colleagues. Creating employee innovation can be supported by managing diversity in the company. Employees of different companies, however, constitute separate populations, which each organization should get to know on its own, and adapt the instruments used to its specific situation. The employer's awareness of the existing differences allows for the selection of appropriate management tools, working towards ensuring mutual benefits, both for the entrepreneur and for the employees. An effect conducive to building commitment and implementation of the basic assumptions of diversity management is created. When a company accurately addresses the motivational measures and management instruments used, diversity can bring measurable financial and social benefits, i.e. employee satisfaction from the fact that their needs have been taken care of. Diversity is worth noting, getting to know and using in the design of management instruments, which also perform their function better if they are diverse, but complementary (Warwas, 2019, pp. 129-139).

Nowadays, we are immersed in diversity. Our environment is usually dynamic and complex. New discoveries and technologies are modifying and even completely changing industries. The free movement of people between countries and continents has intensified both mobility and migration, and the competition of companies in global and international markets has led to increased cultural diversity. The world's leading organizations rely mainly on the intellect, knowledge, competence, and more broadly on the human capital of their employees. In the competitive struggle, they increase the efficiency of management by making labour relations more flexible, relying on transformational leadership and designing and implementing flat organizational structures and new human resource management systems. Focusing on a wider range of stakeholders, organizations base their development strategies on values and consider ethical conduct, corporate social responsibility or co-management as important pillars of their activities. At the same time, employees are dependent on the uncertainty of employment in conditions of competition and stress, the need for constant learning, creating innovations and competing in the process of career development, they make an effort to build a work-life balance (Warwas, 2019, pp. 9-10).

Taking advantage of opportunities arising from socio-economic trends is a huge challenge for employees and employers. Diversity management comes to the rescue of this challenge (Bal--Wozniak, 2020, pp. 13-29; Bohdanowicz, 2020, pp. 71-85).

Diversity management as a comprehensive approach is strongly linked to culture and organizational structure as well as development strategy (Warwas, Rogozinska-Pawelczyk, 2016, pp. 112).

Diversity management, in addition to human resource management, is included in the broadest of categories: management. Diversity management is linked to management, which is the most general category, and is an essential part of it. Diversity management is an important trend for business and for society as a whole. It is one of the answers to the challenges associated with its variability and uncertainty: technological development, working in extremely diverse, often dispersed teams and constant search for innovation. Diversity management is responsible for liquidity exacerbated by demographic challenges, ageing populations and migration, as well as the economic problems that arise against this background. Turning differences, and therefore potential conflicts, into diversity: wealth and abundance – that's what diversity management is, simply put. This is a time-consuming and difficult process. Diversity management fosters better financial performance and innovation and supports brand image building, as confirmed by numerous studies. Diversity is a feature of the modern world, it is impossible and not worth turning away from it (Warwas, 2019, pp. 13-15).

When it comes to measuring the innovativeness of an enterprise, many difficulties are encountered in the selection of measures. The authors take different approaches and different solutions in this regard. Scientific achievements in the field of innovation of the economy as a whole are useful for measuring innovation in enterprises.

Some researchers adopt methods used by various international and national institutions, e.g. EuroStat, GUS (Central Statistical Office of Poland). These methods focus on individual dimensions of the activity and do not have a synthetic dimension.

Innovation seen in technological development

Technology is a fundamental element of the culture of society, as well as being a factor in the development of the economy and entities functioning in it. The importance of its development in the modern world economy results from the fact that changes in this area are widely recognized as one of the strongest impact on economic processes, and the technology itself is increasingly treated as the main factor of changes and increase in the level of innovation, which determines the pace and directions of development of individual entities or entire countries, creating new opportunities and fields for action and formulating different conditions of competition (Wisniewska, 2010, p. 117).

Responsible innovation is reflected in the creation of responsible technologies. And since entrepreneurship is an economic and social value, an important effect of the entrepreneurship of employees of organizations is their tendency to generate and implement new technological solutions. Technological development is one of the manifestations of entrepreneurship. The entrepreneurial concept of the competitiveness of enterprises is based on the generation of innovations, in particular of a technological, product or process nature. The technology strategy refers to the use of technology to achieve and maintain technological advantage, referring to the possession of the necessary competences. The innovativeness of the company is therefore associated with its ability and motivation to implement the results of scientific research, research and development, as well as new ideas, ideas and inventions into practice, is associated with constant search. In its research and development strategy, the company uses both its own research and development potential, as well as external sources. The literature stresses the importance of legitimising new technologies in order to enable their dissemination. Social changes caused by the impact of new technologies are inevitable. Three possible behaviours of enterprises towards the emergence of innovative technologies are also considered, i.e. joining a new technology, exiting the market, or accelerating the improvement of existing technology., although this is a rare phenomenon (Fatula, 2018, pp. 9-26).

Development strategies include: innovation strategy, technological strategy and research and development strategy (Janasz, 2016, pp. 29-35).

Technology is a combination of knowledge and skills, as well as the tools and equipment used (Machaczka, 1998, pp. 30-34). The usefulness of knowledge for the enterprise has its reference to basic research, research and development and the application of this knowledge (Rokita, 2005, p. 219). Technology affects the organizational structure. In turn, the types of technologies are determined, among others, based on the standardization of input and output factors, and the standardization of intra-organizational processes (Hatch, Kostera, Kozminski, 2010, pp. 9-18). Technology includes theoretical knowledge flowing from basic sciences, coupled with an ability to apply this knowledge in industrial practice. Theoretical knowledge comes from basic research, but also from applied research and research and development. Some technical and natural sciences equate technology with a recipe or method of manufacturing specific products or materials. The technology consists of: documented and undocumented knowledge, practical skills and know-how, machines, devices, organization, as well as methods of manufacturing and implementation of processes. The sources of technology acquisition are both endogenous, including own research and development, and exogenous including strategic partnership in the field of research and development, joint ventures, purchase, and licensing; and we may also consider here the acquisition of a company with its technology and the mixed nature, including technology transfer or contracted research and development or clandestine acquisitions. Technology in market terms should be considered as a whole, combining capital, materials, know-how and a qualified and specialised workforce (Chyba, 2016, pp. 96-107).

The development of technology uses exploration in general, including the exploitation of opportunity. An opportunity is an idea or aspiration that is discovered or created by entrepreneurial individuals. This is followed by development over time, leading to its transformation into profitable ventures. The concept of opportunity includes the process of discovering an opportunity, the dynamics of the process of its development and the process of evolution of ideas and aspirations into opportunity. A technological opportunity is associated with the use of an opportunity related

to the occurrence of technological innovation, new technologies, but also with the development of science. Technological development refers primarily to technical aspects, but may also concern previously unknown ways of production, provision of services or creation of new products, services and systems. It may include innovative process organisation and other activities. The importance of using knowledge and cooperation with scientific and research centres is emphasized. It is also pointed out that an innovative idea or technological solution that is the basis of technological entrepreneurship allows for the creation of a new or improved product. The effective course of technological entrepreneurship culminating in technological innovation can be considered in the context of dynamic abilities (Stanieć, 2016, pp. 216-227).

Technological development focuses on the impact of technical innovation on the entrepreneurial process. It is characterized by combining social dynamics with dynamics related to the development of new technologies. A technology entrepreneur should be able to predict technological changes. In the case of technological entrepreneurship, technical factors shall be taken into account. They are: the role of technology, technical systems and the institutional environment. When considering the dynamic abilities of an individual in the process of technological entrepreneurship, it is noted that they have both a cognitive dimension, related to mental models, and a behavioural dimension. The mental model is described as the repetitive models of giving meaning that relate to both the processes of perception and the interpretation and internalization of change. Behavioural scripts, in the context of searching for change, are repetitive patterns of social behaviour in given situations. In turn, the interactive reactions of individuals with a changing environment causes changes in both cognitive mental models and behavioural patterns of conduct (Kordel, 2014, pp. 20-28).

Combining innovation with technology, it is worth emphasizing that the very concept of innovation can be understood not only as a process involving all activities related to the transformation of an idea or idea into a new product, but also into a new technology along with its implementation. It includes activities related to the improvement and development of existing products, as well as technological processes (Bąk, Kulawczuk, 2009, p. 9).

Technological development should take into account sustainable development goals, i.e. not only economic, but also social and ecological ones. Modern technologies using knowledge base their development on entrepreneurial and innovative activities. Technologies are integrated into the created value chain, which is important in creating a competitive advantage of an economic entity. However, in the value chain, social aspects, including ecological ones, are increasingly emphasized. Such issues should, therefore, be taken into account already at the research and development stage and should, thus, be responsible. It is important that the aspects of responsibility, in relation to entrepreneurship, innovation, as well as the knowledge used, are reflected among the organizational values. Responsible entrepreneurship and innovation are reflected in the creation of responsible technologies. Hence, tools to assess the interplay of innovation and accountability are crucial. Responsible technology should take advantage of the opportunities resulting from the assumptions of sustainable development and the role of corporate social responsibility (Chyba, 2016, pp. 96-107).

Methodology

Both diversity and technological development can be analysed with the help of many indicators. The European Innovation Scoreboard (https://ec.europa.eu/growth/sites/growth/files/ris2019.pdf) published by the European Commission organises selected indicators in four areas, i.e. framework conditions, investment, innovation activity and impact.

In the area of framework conditions, the category of human resources includes indicators such as: the number of new doctorates, the population aged 25-34 with a higher education, as well as lifelong learning; in the category of attractive research systems there are such indicators as international scientific publications, 10% of the most cited publications, as well as foreign doctoral students; in the category of innovation-friendly environment there are two indicators, i.e. broadband networks and opportunities-based entrepreneurship.

In the area of investing, two categories are included, i.e. finance and support, as well as the investments of companies. Two indicators are placed in the finance and support category, i.e. R&D expenditure in the public sector, as well as expenditure on venture capital. And in the category of company investment, there are three indicators, i.e. R&D expenditure in the enterprise sector, expenditure on innovation that does not

count as R&D, as well as enterprises providing training to develop or improve the ICT[1] skills of their employees.

In the area of innovative activity, three categories are to be found. In the innovators category, there are three indicators relating to small and medium-sized enterprises – SMEs for short, i.e. SMEs with product or process innovations, SMEs with marketing or organisational innovations, as well as SMEs innovating in-house. Three indicators were placed in the linkage category, i.e. innovative SMEs cooperating with others, joint public-private publications, as well as private co-financing of public R&D expenditure. The intellectual property category includes three indicators, i.e. international PCT[2] patent applications, trademark applications and application design.

There are two categories in the impact area. Two indicators are placed in the employment impact category, i.e. employment in knowledge-based activities and employment in fast-growing enterprises in innovative sectors. In the category of impact on sales, three indicators were included, i.e. the export of intermediate and highly advanced products, the export of knowledge-based services, and the sales of market novelties and new innovative products.

In order to find relevant, reliable data, this article has just reached for the European Innovation Scoreboard 2021 (https://ec.europa.eu/docsroom/documents/46934).

Among the indicators available in the EIS measurement, indicators relating to human resources were used as those relating to diversity, in particular the indicator of new doctoral graduates. Among attractive research systems, an interesting indicator is the one referring to international scientific co-publications. Among finance and support, R&D expenditure in the public sector is an interesting indicator.

However, when it comes to indicators relating to both diversity and technological development, in the area of firm investments, R&D expenditure in the business sector deserves attention. In the field of information technologies, the indicator referring to companies providing ICT training deserves attention. It is also worth referring to the indicators talking about the number of innovators, both product innovators and business process innovators.

In addition, several indicators relate to the issue of technological development. These are indicators from the intellectual property category, where three indicators have taken place, i.e. PCT international patent applications, trademark applications and design applications.

All these indicators prove the level of diversity in the countries studied. Therefore, as already specified above, the indicators that will be taken into account are:

- newly defended doctorates,
- international scientific publications,
- expenditure on research and development in the public sector,
- expenditure on research and development in the enterprise sector,
- enterprises providing training in the field of information and communication technologies,
- product innovators,
- business innovators,
- international PCT patent applications,
- trademark applications,
- application design.

The indicator of newly defended doctorates indicates the degree to which scientific knowledge in the studied country is deepening. This particular indicator is a measure of the supply of new third-cycle university graduates in all fields of education. Doctoral graduates do well as employees in companies, and many of them occupy managerial positions. Deepening this knowledge may be followed by innovative attitudes, diversifying the status quo. The situation is confirmed by the indicator relating to international scientific publications. International scientific publications are an indicator of the quality of scientific research, as cooperation increases scientific productivity. Public sector R&D spending casts a light on the extent to which a country's authorities use state spending to support the proliferation of diversity. Research and development (R&D) spending is one of the main drivers of economic growth in the knowledge economy. Therefore, trends in the R&D expenditure ratio provide key clues to the EU's future competitiveness and prosperity. R&D spending is essential for the transition to a knowledge-based economy, as well as for improving production technology and stimulating growth. R&D spending in the corporate sector shows the extent to which private investment supports diversity. The indicator records the formal creation of new knowledge in companies. This is particularly important in the science-based

[1] ICT means Information And Communication Technologies.
[2] PCT means Patent Cooperation Treaty.

sectors (pharmaceuticals, chemicals and some fields of electronics), where most of the new knowledge is generated in or near R&D laboratories. This is confirmed by both the indicator referring to companies conducting training in the field of information and communication technologies, as well as the indicator indicating the number of innovators, both product and business. ICT skills are particularly important for innovation in an increasingly digital economy. The participation of enterprises providing training in this area is an indicator of the overall development of employees' skills. Product innovation, on the other hand, is a key component of innovation, as it can create new markers and improve competitiveness. The higher participation of product innovators reflects a higher level of innovation activities. Many companies innovate not by improving new products, but by improving business processes. Innovations in business processes include process, marketing and organizational innovations.

And finally, three indicators relating to technological development. The first of these, international PCT patent applications. The ability of companies to develop new products determines their competitive advantage. One measure of the innovation rate of new products is the number of patents. This indicator measures the number of PCT patent applications. Another indicator talks about patent applications. Trademarks are an important indicator of innovation, especially in the service sector. A Community trade mark gives its proprietor a uniform right applicable in all Member States of the European Union through a uniform procedure that simplifies trademark policy at European level. It fulfils the three basic functions of a trademark: it identifies the origin of goods and services, guarantees consistent quality through evidence of the company's commitment to the consumer, and is a form of communication, the basis for advertising. The last indicator talks about the design of the application. Design is the external appearance of a product or its parts resulting from lines, contours, colours, shape, texture, materials, or its ornamentation. The product can be any industrial or craft object, including packaging, graphic symbols and typographic typefaces, but excluding computer programs. It also includes products consisting of multiple components that can be disassembled and reassembled.

Research

The most interesting, and at the same time reliable, research approach seems to be to trace the dynamics of changes in these indicators over the course of the last several years, i.e. in the period 2014-2021. It is also worth following this aspect for several countries. The conversions will be made on the basis of the underlying data published in the EIS 2021 (https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis).

Each year, the European Innovation Scoreboard (EIS) provides a comparative assessment of the research and innovation performance of EU Member States and selected third countries, as well as the strengths and weaknesses of national research and innovation systems. It helps to identify the areas on which these countries need to focus their efforts to improve their innovation performance. All results for the EU concern the current 27 Member States. Innovation performance continues to improve, both for the EU as a whole and for individual Member States. Since 2014, the EU's innovation performance has improved by an average of 12.5 percentage points, in particular due to significant performance improvements for the following indicators: broadband networks, venture capital expenditure and joint international scientific publications. Since 2014, innovation performance has improved in all Member States of EU. Cyprus, the Czech Republic, Greece, Italy, Lithuania, Malta, Portugal, Slovenia and Spain are below the EU average. These countries were therefore included in the group of Moderate Innovators. Bulgaria, Croatia, Hungary, Latvia, Poland, Romania and Slovakia are Emerging Innovators, whose performance is significantly lower than the EU average (https://ec.europa.eu/docsroom/documents/46411?locale=en).

In connection with the above classification, in order to trace the situation based on the adopted indicators, the situation of Poland was traced, and in addition, the Polish results were compared with the results referring to other countries, especially Hungary, which, like Poland, is in the group of emerging innovators, Spain – a moderate innovator, Germany – a strong innovator and Belgium – an innovation leader.

Both Poland and Hungary are emerging but at the same time fast-growing economies. Spain has been one of the fastest economically developing countries in Europe for half a century. Germany and Belgium are among the strongest economies in Europe.

The indicators selected in this article so as to characterize both diversity and technological development will be discussed below. The first of the indicators – talking about newly defended doctorates – the annual results in European countries, including Poland, remained at a similar level, although in some countries it adopted a downward trend. In Spain, the indicator increased its value year after year. As for international scientific publications, the indicator referring to them increased its value year on year. Spending on research and development, both in the public sector and in the corporate sector, every year in most countries, including Poland, tended to decline. However, in Belgium, Germany and Spain, and in the case of the second indicator also in Hungary, the value of the indicator increased year after year. The indicator referring to enterprises conducting training in the field of information and communication technologies year after year in a large number of countries, including Poland, had an upward trend. The same was true for two more indicators relating to the number of innovators, both product and business. The indicator of international PCT patent applications in Spain decreased in value every year, and the other countries remained at a similar level year after year. The indicator relating to trademark applications has gradually increased its value. Finally, the indicator on application design had a decreasing trend in the countries surveyed, with the exception of Hungary and Poland, where its value slightly increased.

The conducted research has yielded optimistic findings. In most cases, the indicators remained at a similar level every year, or increased their value, which gives an optimistic signal for European countries. Every year, their scientific knowledge and the number of international scientific publications increased. There was also more and more spending to support diversity in the area.

The obtained results give hope for their successful development in the future and the multiplication of attitudes supporting both diversity and technological development, and thus supporting innovation.

Conclusions

Diversity and teamwork based on creativity are the values increasingly demanded by modern enterprises. In the modern world, plagued by numerous crises, creativity is a key aspect. An entrepreneur who is not creative is not a good entrepreneur.

Defining the directions of technological development is essential for the proper formulation of economic policy, which should be conducive to long-term economic growth. This is hindered by the high dynamics of changes in the environment and the accompanying uncertainty and risk. In addition, the complexity of social and economic phenomena occurring in development processes and the variability of conditions undoubtedly make it difficult to forecast the future.

Today, we need both diversity and technological development in order to be able to emerge from the crisis caused by the coronavirus pandemic and more recent traumatic events, and to be able to look to the future with courage.

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