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Editorial Office: Rzeszow University of Technology, The Faculty of Management,
10 Powstańców Warszawy Ave., 35-959 Rzeszów, phone: +48 17 8651383, e-mail: kwart_wz@prz.edu.pl
<http://mmr.prz.edu.pl/>

Additional information and an imprint – p. 71

CONTENTS

| | |
|--|----|
| From the Editorial Committee | 5 |
| Dagmara FLOREK-KLEŃSK: Electric scooters and the safety of road users – selected legal aspects..... | 7 |
| Nataliia GERASYMCHUK: Formation of resource-saving strategy for the development of the agro-industrial complex | 17 |
| Pavlna HEJDUKOVÁ, Lucie KUREKOVÁ: Selective migration analysis: a case study of the migration of Polish healthcare staff | 25 |
| Michał KOŚCIÓŁEK, Tomasz TOMCZYK: Development of private health insurance in Poland and the public health care system | 37 |
| Ewa PONDEL: Secret invention as a form of securing state interests in the field of defense and state security | 49 |
| Iwona WOJCIECHOWSKA: Market approach to educational services in Polish higher education | 59 |
| The list of reviewers cooperating with Scientific Papers entitled „Modern Management Review” in 2019 | 67 |
| The list of articles published in the Journal of „Modern Management Review” in 2019 | 69 |
| Additional information | 71 |

From the Editorial Committee

We are giving you the next 26th (4/2019) issue of the Quarterly of the Faculty of Management of the Rzeszow University of Technology entitled “Modern Management Review”.

The primary objective of the Quarterly is to promote publishing of the results of scientific research within economic and social issues in economics, law, finance, management, marketing, logistics, as well as politics, corporate history and social sciences.

Our aim is also to raise the merits and the international position of the Quarterly published by our Faculty. That is why we provided foreign Scientific Council, as well as an international team of Reviewers to increase the value of the scientific publications.

The works placed in this issue include many assumptions and decisions, theoretical solutions as well as research results, analyses, comparisons and reflections of the Authors.

We would like to thank all those who contributed to the issue of the Quarterly and we hope that you will enjoy reading this issue.

With compliments
Editorial Committee

Dagmara FLOREK-KLEŃSK¹

ELECTRIC SCOOTERS AND THE SAFETY OF ROAD USERS – SELECTED LEGAL ASPECTS

In recent years, there has been a real boom in electric scooters in European cities. Unfortunately, delight in scooters is also accompanied by negative emotions - they pose a real threat to road users. Media from many European countries reports about dangerous events involving electric scooters. Only in France alone, during the years 2013-2017, there were 1,378 accidents involving electric scooters, of which 5 were fatal injuries in 2017. At present, there is a lack of statistical data illustrating these events in Poland, but the number of media reports over the last 7 months indicates that this is a serious problem. The more serious is that at the moment the changes announced by the legislator have not come into force to this day and until then the scooter will be considered a pedestrian. This article discusses the legislative changes proposed by the legislator regulating electric scooters, as well as analyzes the regulations in force in other European countries regulating this issue.

Keywords: road traffic safety, safety of road users, pedestrian safety, analysis of safety status, safety of electric users on scooters.

In the era of struggle for the environment electric means of transport are becoming more and more popular. In recent years, in European cities one can see a real boom on electric skateboards, segways and electric scooters. In particular, the latter have gained popularity. Unfortunately, the enthusiasm over scooters is also accompanied by negative emotions. Pedestrians, cyclist and at last drivers do not want them – they afraid of their health and safety. The electric scooters arouse more and more emotions. The issue of safety in common communication, especially in road traffic in the era of technological, legal or infrastructural changes, is the subject of constant deliberations and research. The analysis of the Police statistics, published annually on the websites of this institution, as well as the analysis of research carried out by the National Road Safety Council (National Road Safety Council, <http://www.krbrd.gov.pl/pl/monitoring-zachowan.html>, 2019), indicates that the safety of road users, in particular pedestrians, is one of the main problems in the modern world. Media reports from many European countries about occurrences involving electric scooters users are alarmingly high. Only in France alone, in the years 2013-2017, there were 1 378 accidents involving people directing electric scooters, of which 5 people died in 2017 (<http://www.leparisien.fr/societe/les-accidents-de-trottinettes-en-forte-hausse-10-10-2018-7916037.php>, 2019). At the moment, there are no statistical data illustrating these events in

¹ Dagmara Florek-Kleńsk, Master's degree, Department of Law and Administration, Rzeszow University of Technology Ignacy Łukasiewicz, Akademicka 2, 35-084 Rzeszów, e-mail: dfk@prz.edu.pl. ORCID: 0000-0002-5069-2936.

Poland, nevertheless, the number of media reports in the last four months indicates that this is a serious problem. The upward trend clearly indicates that the problem of road users' safety in the context of electric scooters should be a priority for the competent state authorities, including the executive, as well as for the services responsible for security in communication.

1. INTRODUCTION

It all started with city bikes, later carsharing developed at a staggering pace, and now the streets of large cities conquer micro-mobility in the form of electric scooters. The idea of vehicle sharing is becoming more and more popular, regardless of the number of wheels. Although the scooter is a convenient and, above all, a compact means of transport, city authorities cause considerable problems. All because it is difficult to classify a person driving a scooter. Is it still a pedestrian, or maybe a driver? Or how to treat them: as a cyclist or a rollerblader? Nobody knows that, especially the Police, and unfortunately road events (or rather "pavements") are not lacking. And the Police are spreading their hands since they do not know who and what to punish. The collisions on the pavements are on the agenda, and the Police record them as collisions, not specifying who entered whom and who had the right to be where the incident occurred. The law does not clearly state what status electric scooters have. The lack of a statutory definition results in even such absurd situations that took place in Warsaw when pedestrians were punished with a fine for causing a collision with the driver of an electric scooter. The Police reaction to the incident resulted from the fact that the electric scooter is a device and cannot be classified into any type of defined vehicles that must meet certain technical conditions. Therefore, it is difficult for the user of such a device to be the driver of a vehicle in the light of statutory regulations (Traffic Law, i.e. *JoLof* 2018, item 1990 with later amendments). Therefore, the Police interpret traffic law in a certain way, equating electric scooters with pedestrians. This way of interpreting the law seems to be wrong. A different but equally controversial classification of the electric scooter was taken by the Lublin-West District Court in Lublin, III Criminal Division of December 20, 2016, Ref. act III K 302/15 (Court Judgment Analysis System, 2019).

The case, on the basis of which the court issued this precedential ruling, concerned the mortal deduction of a 10-year-old boy moving on an electric scooter on the sidewalk, at a speed of about 22 km/h. At the pedestrian crossing the boy hit the side of the bus, for which – just like in the case of the victim – the green light was on. As a result of the accident, the boy died. In the present case, the key was to determine whether the boy had the right to move on the sidewalk and drive the vehicle onto the pedestrian crossing – i.e. whether the person moving on an eclectic scooter is a pedestrian. The District Court in Lublin showed that despite the lack of specific provisions regarding electric scooters, the following conclusions can be drawn from the other provisions of the Road Traffic Law Act – an electric scooter cannot be treated as a pedestrian. Driving a scooter, he is also not driving a bicycle. The grounds of the judgment show that an electric scooter, such as an aggrieved one, can only be treated as a moped, "i.e. a two- or three-wheeled vehicle equipped with a combustion engine of a cylinder capacity not exceeding 50 cm³ or an electric motor with a power not exceeding 4 kW, whose design limits the speed of travel to 45 km/h" (Court Judgment Analysis System, 2019). The court found the bus driver not guilty, he did not slow down enough before the pedestrian crossing, and he did not take into account that the child was approaching the crossing.

There is no precedent law in Poland, so the judgment of the court and the opinion in this case refers only to one specific case. If the current situation remains unchanged, each individual case may end up in court, and the judgments may be different depending on the interpretation used. Nevertheless, as of now, as long as the gap in Polish law is not “patched” by people moving on electric scooters, or other electric vehicles have the status of pedestrians. Therefore, such persons should remember that in accordance with art. 11 paragraph 1 of the Road Traffic Act, pedestrians walk on the sidewalk or pedestrian road. In another case, pedestrians using electric vehicles on the road for bicycles or on public roads, in residential areas and in traffic zones may receive a penalty mandate – the tariff predicts a mandate from 20 to 500 PLN.

2. AN ATTEMPT TO DEFINE “AN ELECTRIC SCOOTER”

The road traffic law does not expressly speak about the movement of the electric scooter. Nevertheless, the fact that the Road Traffic Act does not explicitly refer to the electric scooter does not mean that it is impossible to draw any conclusions from other norms of this law as to the nature of the item and the manner in which it should move on public roads. Certainly, an electric scooter cannot be treated as a pedestrian, i.e.

“a person who is outside the vehicle on the road and does not carry out works or activities provided for by separate regulations; including a person driving, pulling or pushing a bicycle, moped, motorcycle, stroller, handicap or wheelchair, a person in a wheelchair, as well as a person under 10 years of age driving a bicycle under the care of an adult” (Article 2 point 18 of the Road Traffic Act).

When riding a scooter, it is also not driving a bicycle, because

“a bicycle is a vehicle with a width not exceeding 0.9 m, moved by the strength of the person riding this vehicle; which can also be equipped with an electrically-operated auxiliary electric drive supplied with a voltage of no more than 48 V with a nominal continuous power not exceeding 250 W, whose output power decreases gradually and falls to zero after exceeding the speed of 25 km/h” (Article 2, point 47 of the Road Traffic Act), as the electric scooter motors have a power output of up to 1,600 W.

An eclectic scooter cannot be classified as a vehicle. Paragraph 2 (31) of the Road Traffic Act defines the term 'vehicle' as 'a means of transport intended to travel on the road and a machine or a device adapted to it'. There are many different divisions and vehicle classifications, including due to the load capacity, total weight, own weight, capacity and engine power, the number of people being transported or due to the nature of their work (Stefański, 2000).

Road traffic law divides the vehicles into:

- motor vehicle – i.e. a vehicle equipped with an engine, except for a moped and rail vehicle (Article 2, point 32);
- motor vehicle – i.e. a motor vehicle whose design allows driving at speeds exceeding 25 km/h; this term does not include an agricultural tractor (Article 2, point 33);
- low-speed vehicle – i.e. a motor vehicle, the design of which limits the speed of travel to 25 km/h, excluding the agricultural tractor (Article 2, point 34);

- a unit vehicle – i.e. a combination of vehicles consisting of a motor vehicle joined to the trailer (Article 2, point 35);
- special vehicle – i.e. a motor vehicle or a trailer intended to perform a special function, which makes it necessary to adapt the body or to have special equipment; the vehicle may carry persons and things related to the performance of this function (Article 2, point 36);
- vehicle used for special purposes – i.e. a motor vehicle adapted in a special way to carry persons or loads, used by the Armed Forces of the Republic of Poland, the Police, the Internal Security Agency, the Intelligence Agency, Military Counterintelligence Service, Military Intelligence Service, Central Anticorruption Bureau, Guard Border, fiscal control, Customs Service, fire protection units, Road Transport Inspection and Prison Service (Article 2, point 37);
- privileged vehicle – i.e. a vehicle that sends light signals in the form of blue flashing lights and at the same time sound signals of variable tone, driving with switched on low beam or road lights; this term also includes vehicles in a column at the beginning and at the end of which there are privileged vehicles sending additional light signals in the form of red flashing light (Article 2 (38));
- historic vehicle – i.e. a vehicle which on the basis of separate regulations has been entered in the register of monuments or is located in the voivodeship register of monuments (Article 2, point 39).

Regardless of which vehicle we are dealing with, it is not possible to qualify the electric scooter to any of the above-mentioned groups.

In the current legal state, an electric scooter could be treated only as a moped, because in the light of art. 2 par. 46 of the Road Traffic Act it is a two- or three-wheeled vehicle equipped with a combustion engine with a cylinder capacity not exceeding 50 cm³ or an electric motor with a power not exceeding 4 kW, whose design limits the speed of travel to 45 km/h. Unfortunately, there is a problem here – you can drive a motorbike on the street, but electric scooters are legally impossible to navigate for a few important reasons. First of all, they cannot be moved by persons under the age of 18 who are not entitled to AM driving license. Secondly – even people with such rights, or adults, cannot move a moped that does not have adequate equipment. And electric scooters do not have it. In accordance with the Regulation of the Minister of Infrastructure of 31 December 2002 on the technical conditions of vehicles and the scope of their necessary equipment, the moped should be equipped, among others, with a front low beam and driving lights, a rear position light, a rear reflector, turn signals at the rear and at the front, a brake light “stop”. In addition, the moped must be registered, have a current review, and the owner must also purchase civil liability insurance. The absence of mandatory approval and policy equipment excludes the recognition of electric scooters as mopeds.

Despite the fact that the provisions of the Road Traffic Act do not specify the status of electric scooters, it is necessary to emphasize that such persons are obliged to participate in traffic and are therefore obliged to observe the basic principles of safety in traffic defined for example in Art. 3 and 4 of the Road Traffic Act. It is clear from the aforementioned articles that the participant and other person on the road are obliged to exercise caution, avoid any action that could endanger the safety or order of road traffic, make this move difficult or disturb the peace or public order in connection with the movement and expose anyone to the detriment. Traffic participants have the right to count on others complying

with the rules. As you can see, the current situation is uninteresting and you really need to urgently refine the issue of electric scooters. It is hard to imagine treating them as pedestrians. On the other hand, recognizing them as a moped (with the need to do all the actions described above) also makes no sense. What remains – it seems that the legislator should classify scooters as bicycles by adding them to the definition contained in the Road Traffic Act.

3. THE DRAFT OF LEGAL REGULATIONS REGARDING A PERSONAL MOBILITY DEVICE (PMD)

The rapid popularization of electric scooters as an attractive, alternative means of transport enabling efficient and fast moving around the increasingly crowded streets of big cities, in fact created a situation in which the law could not keep pace with technical progress. The first attempts to change the law have already been made three years ago – the definition of a personal mobility device (hereinafter PMD) was to be introduced to the Road Traffic Law, as well as provisions defining the way of its movement. However, they were excluded from the works due to the fact that they went beyond the scope of implementation into the national legal order of the provisions of Directive 2014/45 / EU (Directive of the European Parliament and of the Council, 2014) of the European Parliament and of the Council on periodic roadworthiness tests of motor vehicles and their trailers. An increasing number of incidents involving electric scooters and their effects have prompted the government to work on legislation on personal transport equipment.

Ministry of Infrastructure beginning of June this year presented a package of proposals on regulating the rules of personal mobility device traffic (Service of the Republic of Poland, 2019), in which this concept was covered. The package of proposed changes is to address the following issues:

- 1) in the Act – Road Traffic Law, a new definition will appear in § 2: “Personal mobility device (PMD)”: a device designed to move only by the driver located on this device, with a width not exceeding 0,9 m, length not exceeding 1.25 m, unladen weight not exceeding 20 g, equipped with electric drive, whose design limits the speed of travel to 25 km/h;
- 2) in §2 in paragraph 47 of the Road Traffic Law, the definition of the bicycle contained therein is to be supplemented: “...this term also includes a personal transport device”. Thanks to this clarification of the definition of a bike, PMD users and cyclists will be covered by the same rules. Therefore, cyclists – as before – but also moving PMDs will be obliged to move: roads for bicycles, passes for cyclists, lanes for bicycles or a road carriage, where the permissible speed is not more than 30 km/h;
- 3) the project also provides for exceptional situations – when the PMD user will be able to navigate the sidewalk or pedestrian route, when the width of the sidewalk along the road, where traffic is allowed at a speed greater than 30 km/h is at least 2 m and lacks a separate roads for bicycles and lane for bicycles. In this situation, the driver of the personal transport equipment, using a pavement or a pedestrian road, is obliged to drive slowly, take special care and give way to pedestrians;
- 4) the Ministry has also prepared a list of behaviors prohibited to the head of the PMD. Such as: leaving on the road, stop or other place intended for traffic, bicycle and personal transport equipment, if it impedes traffic or threatens its safety; pulling a personal transport vehicle of another vehicle; using a public device equipped with

- an electric drive other than a personal transport device on a public road; use of a footpath or pedestrian road except in the cases of specific exceptions; directing the personal transport device to a person under the age of 10;
- 5) in addition, the drivers, for example, a scooter in the age range of 10–18 years will have to have a bicycle card;
 - 6) as in the case of cyclists, riding in helmets will not be obligatory, but recommended;
 - 7) PMD vehicles will not require registration, but must be equipped with an efficient brake and lighting;
 - 8) owners of vehicles not meeting the technical requirements specified in the Act will face penalties in the amount of PLN 500 to PLN 10,000 for each infringement (Szymaniak, 2019).

The Ministry of Infrastructure also pointed out that people moving on scooters that are powered by muscle power will still be treated as pedestrians.

The changes proposed by the Ministry of Infrastructure are not without drawbacks. Still, even after the planned changes in life, in certain situations the PMD will remain on them (e.g. if the bicycle route ends, and the parallel road will predict higher speeds than the 30 km/h limit). The lower age limit of PMD users also raises doubts. It seems that, as in the form of European decisions – it should be determined not at the level of 10 years, and 14-15 years. In view of the fact that users between 10 and 18 years of age will have to have a bicycle card, the question of the scope of the exam for this card is asked. The project has not yet found its way to the parliament, which allows us to hope that it will be subject to opinions and consultations, including regulations based on the European solutions.

4. COMPARISON OF REGULATIONS REGARDING ELECTRIC SCOOTERS IN SELECTED EUROPEAN COUNTRIES

The countries that have regulated the issues of moving electric scooters are, among others: Norway, Belgium and Denmark, Germany, Austria. The states that have recently made legislative changes in the discussed issue are Germany, Austria and France, and these changes will be a reference to the proposal of the Ministry of Infrastructure.

4.1. German regulations

Until recently, it was not possible to legally move around an electric scooter in cities in Germany, because there were no provision for a specific place on the road foresaw such a vehicle. In May this year The Bundesrat adopted rules on driving on electric scooters – Regulation on the share of electric vehicles in road traffic of 4 April 2019 (Verordnung über die Teilnahme, 2019). According to new regulations, which came into force in June this year, scooters can ride at a speed of not more than 20 km/h, and scooters cannot have a power of more than 500 W. They should move on a cycling route, and if not ma – on the road. They have no right to enter the pavement.

Scooter drivers must be over 14 years old. No document or license is required to drive a scooter, but third party liability insurance is required. Electric scooters must have a sticker confirming the insurance of a small motor vehicle, such as that used in Germany mopeds or scooters. It costs several dozen euros a year (about 60–90 euro).

The mandatory equipment of the electric scooters also includes: two independent brakes, a horn, as well as lighting (white) and rear (red), and a license plate with dimensions of 6.5 cm x 5.3 cm. For riding on an electric scooter, as in the case of cyclists, a helmet is not

required. The helmet is required in Germany only when you get on a moped or a scooter. After the entry into force of these provisions, the last EU country that has not legally regulated electric scooters and makes it impossible to use them, will be Great Britain (Transport Publiczny, 2019).

4.2. Austrian regulations

In Austria, this issue was regulated by the 31st Amendment to the Road Law (Straßenverkehrs-Ordnung Verordnung vom 06.03.2013, 2019), which came into force on 1 June 2019 – it regulates, among other things, the proper use and fitting of electric road scooters admitted to traffic in Austria. Amendments to the law apply in all Länder in Austria. According to the new regulations, which have been in force since June this year, scooters can drive at a speed of not more than 25 km/h.

The electric scooter can only be used on bicycle roads, if there is no bicycle route, one needs to use the roadway. It is forbidden to move electric scooters on pavements. In pedestrian zones and residential areas it is allowed to move around with the electric scooter, provided that the speed is adjusted to pedestrian traffic, which in practice means that the scooter will move using the strength of the leg muscles. It is allowed to park electric scooters on pavements, provided that its width is not less than 2.5 meters.

It is forbidden to use the phone while driving with the electric scooter, except for the hands-free car kit. It is not allowed to drive a scooter when the blood alcohol concentration is higher than 0.8 per thousand.

The age limit for electric scooters users has been set at 12 years old. Younger children can use electric scooters provided they are looked after by a person aged min. 16 years. Children under 12 must drive in helmets.

Mandatory equipment for electric scooters includes a brake, as well as white light (front) and red (rear). Electric scooters, whose maximum speed does not exceed 25 km/h, and the power is not greater than 600 W, do not need to have license plates or insurance. Vehicles with higher parameters are treated as motorcycles and then the regulations impose an obligation to register such a vehicle and also to purchase compulsory insurance. In addition, the person driving such a vehicle must be at least 15 years old and hold a driving license of category AM or B.

4.3. French regulations

Electric scooters, whose number in Paris is estimated at 20,000, have become – as the agency AFP (French Press Agency) writes – a real nuisance for the mayor, because there is a lack of appropriate legal provisions for this increasingly popular means of transport.

In France, from the beginning of the year, a total of six deaths and almost three hundred injured in accidents caused by users of popular two-wheelers were added (Januszewska, 2019). France, to prevent more accidents from September this year, will introduce new legislation prohibiting driving electric scooters on pavements (tvn24, 2019).

The French Ministry of Transport has prepared a decree that regulates the electric movement of such vehicles. The details of the document are revealed by one of the Paris dailies – “Le Parisien”. According to the journal, the document forbids driving electric scooters on pavements and limits their maximum speed to 25 km/h. Models accelerating to higher speeds will have a total ban on moving around public areas.

On electric scooters, one will not be able to travel on roads outside built-up areas – only on roads for bicycles running alongside them. In cities, such vehicles will be able to drive

on roads for bicycles and on roads where the permissible speed does not exceed 50 km/h. In places of particularly pedestrian traffic, the speed limit has been introduced – 8 km/h. They can be deposited only in specially designated places. It was also announced that they would be completely prohibited from moving along the sidewalks, and that a penalty of € 135 would be punished for breaking this provision.

However, this is not the end of the restrictions found in the decree. The legislator also introduced the obligation to equip scooters driven by electric motors with front and rear lighting as well as a horn. Additionally, at night or during the day when the visibility is limited, one will have to ride in a reflective vest. The regulations also specify that electric scooters may be used by children over 8 years of age, and for minor drivers (up to 12 years of age) they prescribe driving in a protective helmet. It was also forbidden to carry scooters of other people and use headphones while driving.

The new rules will come into force as early as September. A similar restriction is already in force in Paris (Kaczmarczyk, 2019).

Table 1. Comparison of selected aspects of the regulation of electric scooters in Germany, Austria and France

| | GERMANY | AUSTRIA | FRANCE | POLAND |
|------------------------------|---|---|---|--|
| age | 14 years old | 12 years old, children under 12 years old under the care of a person aged min. 16 years old | 8 years old | 10 years old |
| max speed | 20 km/h | 25 km/h | 25 km/h, and in the pedestrian zone, 8 km/h | 25 km/h |
| permissible road zone | bicycle lanes, if there are no such lanes, then roads, | bicycle lanes, if there are no such lanes, then roads, | bicycle lanes, if there are no such lanes, then roads, | bicycle lanes, if there are no such lanes, then a road, a speed limit of 30 km/h, and if there is not, then a sidewalk |
| helmet | no obligation | compulsory for children under 12 | compulsory for children under 12 | no obligation |
| compulsory equipment | <ul style="list-style-type: none"> – 2 independent brakes – a bell/a horn – front and rear lighting – a plate – liability insurance policy sticker | <ul style="list-style-type: none"> – 2 independent brakes – a bell/a horn – front and rear lighting | <ul style="list-style-type: none"> – 2 independent brakes – a bell/a horn – front and rear lighting – a reflective vest | <ul style="list-style-type: none"> – a brake – front and rear lighting |
| insurance | compulsory | no obligation | no obligation | no obligation |
| driving license | no obligation | no obligation | no obligation | children aged 10-18 years bicycle card |

Source: author's own research.

5. SUMMARY

The proposals of changes in the law proposed by the Ministry of Infrastructure will undoubtedly improve the safety of road users, however, as it was already worth mentioning, we would like to introduce some additional solutions, such as increasing the age limit for children who could independently move electric scooters up to the age of 12, introduce the obligation to ride in a helmet, as well as additional scooter equipment with a bell/a horn. It is also very important to determine the speed limit when driving on the sidewalk or in places of special pedestrian traffic. This is due to the fact that if there is no bicycle path, a scooter will be able to move on the roadway, but only if it has a 30 km/h limit. In practice, this will mean that the electric scooter will not be able to drive on most roads in cities, where, as a rule, the speed limit is 50 km/h. The roadway will allow one to drive, for example, in a residential area with a limit of 20 km/h. However, if there is neither a bicycle infrastructure nor a road with a speed limit of 30 km/h, then the electric scooter will only be able to move along the sidewalk. So the situation will not change much. There are very few bicycle paths in Polish cities, as well as roads with a limit of 30 km/h. And what in the proposed project is to be an exception, i.e. driving on pavements, will become a rule in fact. Of course, in this case, the driver will be obliged to slow driving and be especially careful, but in the absence of speed limits when driving on the sidewalk, we are on common sense. However, it is worth remembering that no regulations will guarantee the participants of the security movement if they do not apply to them themselves, and the state apparatus will not enforce penalties against the defiant.

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Nataliia GERASYMCHUK¹

FORMATION OF RESOURCE-SAVING STRATEGY FOR THE DEVELOPMENT OF THE AGRO-INDUSTRIAL COMPLEX

The article is dedicated to the development and justification of the theoretical and conceptual grounds and methodological toolkit for the resource-saving strategy for agro-industrial complex development under the set priorities of national economy development and the preconditions for establishing favorable entrepreneurial climate in the agrarian sector of national economy.

Key trends and development factors are outlined for the process of economic regulation of agriculture intensification, the structure and the dynamics of resource provision indicators in agriculture; the author also outlines the contradictions, directions and factors in increasing the efficiency of agriculture functioning within the agro-industrial complex of Ukraine.

Conceptual grounds are formulated for the integration system mechanisms for agro-industry development, also presented comprehensive long-term development strategy on agricultural resource-saving, which already gave its results on selected enterprises of Poltava region.

Keywords: agro-industrial complex; resource saving; resource-saving mode in agro-industrial complex; strategy of resource-efficiency of the agro-industrial complex.

1. INTRODUCTION

The effectiveness of resource-saving in agrarian and processing production is inextricably related to the use of innovative methods, technologies, means of labor. The need to solve theoretical and practical problems aimed at identifying and using the reserves of efficiency growth of agro-industrial enterprises by reducing the resource intensity of production determined the relevance of the problem under study. The development of a holistic scientific concept for the formation of a system for regulating the resource-saving development of the agro-industrial complex is an urgent scientific problem, the solution of which will allow to differentiate the emphasis in the use of regulatory mechanisms for effective use of resources and means of labor, and determine the objectives and nature of innovative resource-saving development of the agro-industrial complex.

¹ Nataliia Gerasymchuk, PhD, Department of Economics, Faculty of Management, Rzeszow University of Technology, al. Powstańców Warszawy 12, 35-959 Rzeszów; e-mail: n.gerasymchu@prz.edu.pl. ORCID: 0000-0002-3931-5320.

2. THE OBJECT OF RESEARCH

The author investigates the solution of the scientific problem of the formation of a resource-saving strategy in the agro-industrial complex to ensure the systemic action of the components of an active resource-saving policy aimed at overcoming the inertia of perception by national agricultural producers of the influence of driving forces on the part of the continental and world agrarian and processing spaces, which, unlike existing approaches, to find out the readiness of domestic agro-industrial complex to use the best experience of application an innovative chain of effective resource conservation and resource use.

3. THE AIM AND OBJECTIVES OF RESEARCH

The aim of research is substantiation of the features of development and presentation of examples of the implementation of the resource-saving strategy in the agro-industrial complex by the example of agricultural enterprises in Semenivka, Globyno and Novosanzhary districts of the Poltava region.

According to a specific aim, the following problems are consistently solved in the research:

1. A steady growth of the final results of the functioning of the country's agro-industrial complex.
2. An implementation of the main directions of ensuring the country's food security on the basis of strengthening the positions of domestic agricultural enterprises in international, national and regional food markets.
3. The use of the provisions of integrative mechanisms of the resource saving strategy in the agro-industrial complex as an attractor of the intensification of agro-industrial production by optimizing the processes of resource use and resource efficiency in the form of interactive use of new progressive forms of organization of agricultural production and processing of agricultural products.
4. Research of existing solutions of the problem Various aspects of the resource-saving strategy were studied by leading domestic and foreign scientists.

The first and most significant author, opened the topic of resource saving, was the former president of Kazakhstan N. Nazarbayev, who in his work (Nazarbaev, 1992), which was merely the first in the field, outlined the strategy of resource-saving as a fundamental direction of the country's development. The following significant author, Vovk Yurii, in his work (I. Vovk, Y. Vovk, 2017) investigated the specific features of implementing resource-saving measures at machine-building enterprises, the fundamental work on resource-saving belongs to the authors of the book (Andrushkiv, I. Vovk, Y. Vovk, Palyanitsa, Pogaydak, Stoyko, 2012), in which resource savings are investigated as a kind of economic relations. A number of authors (Andrushkiv, Yermoshenko, Yerokhin, Liashenko, Sotnik) investigated resource conservation in the global or national dimension, or as a component of national policy. A separate interesting study is the work of Kondratenko (Kondratenko, 2010), in which the author explores resource conservation in the context of regional economic systems. The most involved in the study of the issue covered in this article are the works of the authors Starytska and Shcherbak in which resource saving is considered at the level of the agricultural enterprise and the author's monograph, in which the initial data of this study are provided.

4. METHODS OF RESEARCH

The problem can be solved on the basis of the use of the dialectical method, which studies the most general connections of the system «nature – society» and the contradictions of these links, as well as the application of the evolutionary approach – gradual development, which is based on continuous, gradual quantitative change as one of the forms of movement in nature and society. Economic-mathematical modeling, that is, the construction of interrelated models, formalizes the resource-saving development of the entire agro-industrial complex, is an effective tool for the rationale of resource-saving innovative projects. The complex of such resource-saving models is an interrelated system of models describing various aspects of the resource-saving functioning of the agrarian economy and is aimed at solving a set of organizational, economic, technical-technological and socio-environmental problems. The methodological essence of the proposed approach is finding the optimal balance between the resources spent for the implementation of the project (land, water, labor, material, energy, financial, etc.), quality characteristics of products or services (gluten and protein content in the grain, sugar content of beets, fatness of livestock, grade of meat etc.), ecological safety of this project and its ability to reproduce the resource potential. The result of this search is often at the design stage provides significant resource savings.

5. RESEARCH RESULTS

According to the author's concept of the approach, the implementation of the resource-saving strategy with the stimulating role of the state must be implemented in all the main areas at the same time:

- a radical improvement of tax, credit, monetary, customs and tariff policies, investment policy with the aim of creating and maintaining mutually beneficial cooperation between the state and agribusiness, forming prerequisites for sustainable growth of the agrarian economy, protecting domestic agricultural producers and the domestic market of agricultural products;
- changing the role and forms of direct economic regulation with a view to more closely linking the interests of different levels and business entities;
- improvement of the legislative policy aimed at creating a single and more or less stable legal space;
- development of state entrepreneurship in the agrarian sphere with the aim of directly influencing the state to manage agricultural enterprises, first of all they form the scientific and technological potential of the agrarian sector.

By its very nature, the agrarian economy is a socially-oriented market economy and, consequently, is the best conductor of the state policy of social and economic policy. The degree of development and the level of agricultural efficiency largely depend on the balance of the economy as a whole, the state budget and the budget of households. At the same time, agriculture is one of the most resource-intensive industries. The limited volume of natural features of resources (including land and biological potential) to meet the ever growing needs of society in agricultural production through increased production should be considered primarily in the choice of the direction of intensification of agricultural production. Another important feature of agriculture that can't be ignored in the formation of a resource-saving strategy, due to the specific nature of its transition to a resource-saving type of reproduction, is the fact that under the influence of the scientific and technological revolution

and the deepening of the social division of labor in agriculture integrated with the supply of industries and spheres. The development of this progressive process of increasing the integration of agricultural production has led to the emergence of a qualitatively new subsystem of the economy – agriculture, covering all stages of the production of food products from the means of production for agricultural enterprises, the production of agricultural raw materials, processing and processing and bringing it to the consumer. Single attempts to reform the agro-industrial sector led to the destruction of the agro-industrial complex as an integrated system. Without restoration of its integrity, sustainable economic growth is impossible, therefore part of the resource-saving strategy should be focused on its restoration. Summarizing the results of management and economic science based on specific features of agricultural enterprises, let's propose the following effective resource-saving strategy for agricultural enterprises in the Poltava region (Fig. 1), which was adapted from previous author's work in this journal (Gerasymchuk, 2013).

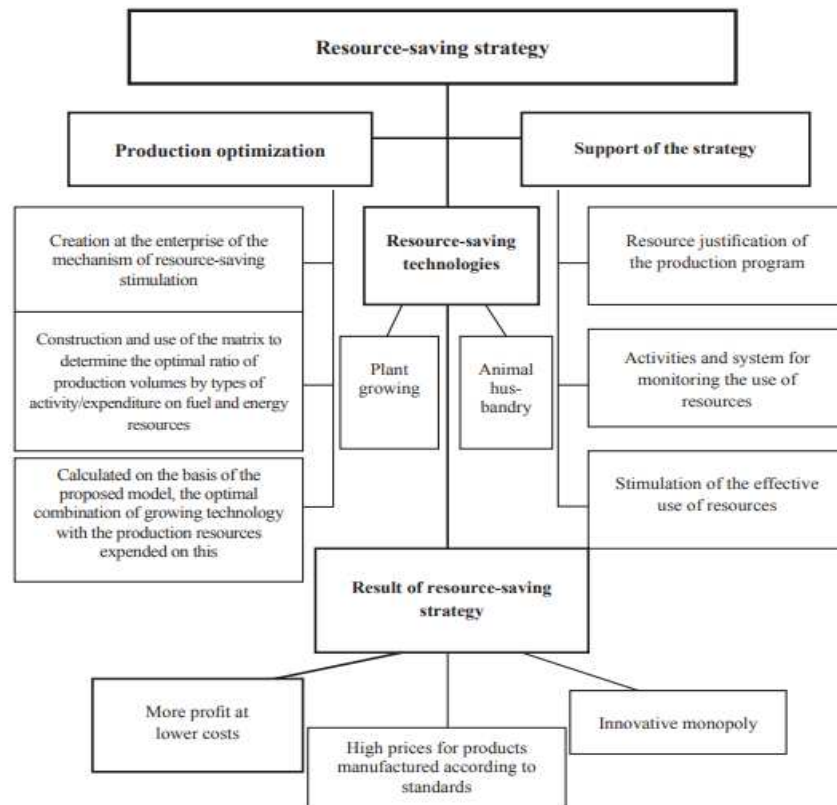


Figure 1. The concept of a resource-saving strategy in the economic activities of agricultural enterprises

Source: own work.

The main idea of most of the individual measures proposed in our strategy is stimulation of the necessary behavior, leaving the details of individual events open and not making

them mandatory. Thus, existing market mechanisms are unlikely to be violated. Under the laws of the open market there should be no restrictions on entrepreneurial freedom, therefore the issue of the effectiveness of resource use should be spread by raising the awareness level and be integrated into the competencies and skills profiles of entrepreneurs (Urban, 2010). In addition, environmental and/or resource-saving technologies are a derivative of the development of innovative and research processes of the enterprise that arise as part of a global movement towards sustainable agriculture (Garcia-Torres, 2003). The strategy considers three synergetic components of the agro-industrial complex development (Gerasymchuk, 2015):

- Production efficiency: optimization of the productive use of natural resources (materials, energy and water).
- Environmental management: minimizing the impact on the environment and nature by reducing waste and emissions.
- Human development: minimizing risks for people and communities, and supporting their development.

Achieving the goal of the resource-saving strategy is carried out in the production process through the use of innovative activity, the latest technologies, better process control and entrepreneurial incentives. The environmental part of the resource-saving strategy includes the following activities: monitoring of the consumption of water and wastewater generation by taking into account all sources of use and discharge points; development of key performance indicators and level of monitoring performance; improvement of agricultural activities; manure processing with the study of the possibility of methane capture for heating, control of efficiency and establishment of a preventive maintenance program to control leaks, straits and overflows. In the process of public discussion of the Poltava Development Strategy for the period until 2020, we proposed a resource-saving strategy in the form of its specific implementation areas, in accordance with operational objective 2.3. «Ensuring energy security, forming energy-efficient public, agrarian and industrial sectors» and 2.2. «Strengthening small and medium-sized enterprises (SMEs)», depicted in Fig. 2.

The studies conducted in one of the enterprises prove the possibility of obtaining an equivalent substitute for mineral fertilizers from manure using biotechnology. The introduction of resource-saving technology of direct sowing of spring wheat with the introduction of biofertilizers provides a reduction in the cost per 1 hectare for the amount of 999.6 UAH compared with intensive, and the specific costs of work are reduced by 2.3 times, fuel – 1.7 times, mineral fertilizers – 3.7 and protective equipment – 3 times (approved in Semenovska district of the Poltava region). In general, due to the transition to resource-saving technologies, the cost of 1 ton of grain is reduced by 35% and with an average annual sowing area of spring cereals in the region of about 832.7 thousand ha, the resource-saving effect will be 832 million UAH. In addition, there is a reduction in soil erosion and an increase in its fertility

In animal husbandry, the priority direction of resource conservation is the transition to efficient feed production technologies and new optimized feeding rations that allow to increase productivity while reducing the unit cost of resources. The transition to energy saving technologies, the creation of an optimal microclimate in the cultivation of animals, can reduce energy costs by 35%, and the use of bioenergy plants for the utilization of manure in biogas – to provide its own autonomous power supply of both livestock complex and other divisions of the economy.

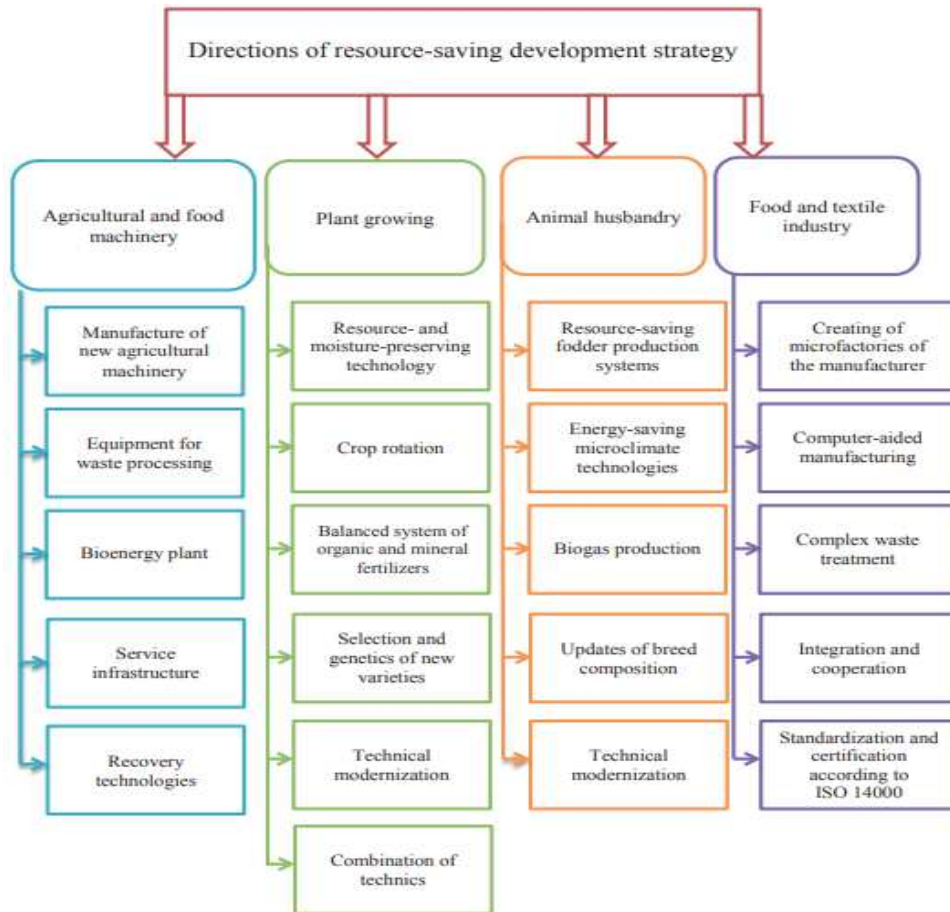


Figure 2. Proposed directions of resource-saving development

Source: own work.

The bioenergy plant allows to receive energy by 70% cheaper than that of external suppliers. As a result, due to a complex of resource-saving measures, the cost of pork is reduced by 29%. The solution of the problem of effective processing of manure in biogas or biofertilizer has a special economic significance.

In the meat industry, the priority of resource-saving development remains complex processing of waste and optimization of the recipes for meat and sausage products. The organization of specialized meat-processing production provides an opportunity for deep processing of food and non-food waste. Resource-saving technology is the development of fodder flour and fat from non-food waste from slaughtering cattle, but even more potential for resourcesaving is laid in the use of secondary raw materials for therapeutic and preventive purposes. The introduction of an optimized multi-component recipe for sausages makes it possible to reduce the cost of products by 18% while maintaining their quality characteristics (according to the Globin Meat-Processing Plant). In the dairy industry, it is possible

to achieve a high level of resource saving through reasonable concentration and modernization of the material and technical base.

Thus, in the production of butter, the least energy-intensive and capital-intensive technology product by 12% and improve its quality characteristics. It is effective to use the dairy products (primarily buttermilk and whey) for the production of sour milk drinks, it allows storing whole milk and using the secondary raw materials with maximum efficiency. The cost price of a sour-milk drink in this case is 30% lower than in traditional technology. Great prospects also have new energy-saving technologies for pasteurizing milk, reducing energy costs by 79%. In the milling industry, the resource saving resource is primarily the technology of flour production and the level of waste-free production. Optimization of technological regimes and minimization of losses makes it possible to reduce the resource intensity of flour-milling production by 10–12% (tested in «Yana» LLC, Svitlovodsk District, Kyrovograd Region). An indispensable condition for *кучшгксы* saving is also based on the concentration of the industry and the uniform loading of technological equipment. Domestic bakery production is characterized by very high energy intensity and due to the modernization of furnaces, as well as optimization of the multicomponent baking bread recipe, it is possible to reduce its cost by 12%.

6. CONCLUSIONS

1. Development of resource-saving processes in the agro-industrial complex will be facilitated by the creation, at various levels of government, of bodies coordinating issues of resource provision and resource saving. It includes an information-analytical group (employees of the economic service of the enterprise) and a sector of resource-saving projects. With the efforts of this service, effective measures are taken to switch to non-waste technologies for production of high-quality rye flour and to justify the resource-saving indicators of installed equipment, and innovative business projects are developed for the further development of the material and technical base of the processing industry created on the basis of this enterprise for further processing of products.
2. The proposals on resource-saving projects and improvement of the state structure of resource-saving management have already been reflected in the regional program for the development of the agro-industrial complex in the Poltava region.
3. Summarizing the above, it should be noted that due to a complex of organizational, economic and technical technological projects, it is possible to dynamically develop the resource-saving potential of the regional agro-industrial complex. Further activities in this direction will lead to formation and effective functioning of a resource-saving mechanism for development of the agro-industrial complex.

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Pavína HEJDUKOVÁ¹, Lucie KUREKOVÁ²

SELECTIVE MIGRATION ANALYSIS: A CASE STUDY OF THE MIGRATION OF POLISH HEALTHCARE STAFF³

This paper focuses on the issue of the migration of Polish healthcare staff. The goal of the paper is to analyze selective migration flows of Polish citizens using the example of healthcare staff and compare the results of the completed analysis with aggregated emigration flows. The completed analysis draws from data from the OECD database (2019) – Health Workforce Migration and International Migration Outlook from 2007 to 2017. There was created a unique data set, which made it possible to specify in greater detail the differences in preference when selecting a destination between common emigrants from Poland and healthcare staff. It was also possible to observe whether preferences differed among doctors and nurses and how their preferences differed over time. This paper uses statistical descriptions in order to record the development of emigration flows and correlation analyses for expressing changes in the preferences of Polish healthcare staff.

Keywords: migration, healthcare staff, nurses, doctors, shortage, preferences, analysis.

1. INTRODUCTION

The migration of healthcare staff is a highly significant topic dealt with on both the level of practice and scientific debates. However, the problem is that many professionals do not realize that healthcare staff is crucial for a high-quality and sustainable healthcare system and it is thus necessary to devote a larger amount of space to the given topic, as the situation with the shortage of high-quality healthcare staff is now alarming in many countries.

Aluttis et al. (2014) point out that healthcare is a quickly growing branch of the global economy. This fact is primarily influenced by globalization processes and the worldwide growth of demand for healthcare, the support of the healthcare technologies industry, and

¹ Ing. Pavína Hejduková, Ph.D., University of West Bohemia, Faculty of Economics, Department of Finance and Accounting; e-mail: pahejdu@kfu.zcu.cz; Univerzitní 8, 301 00 Pilsen. ORCID: 0000-0003-3387-1198.

² Ing. Lucie Kureková, University of Economics, Prague, Faculty of Economics, Department of Economics; e-mail: xkurl06@vse.cz; W. Churchill Sq. 1938/4, 130 67 Prague. ORCID: 0000-0002-7611-0463.

³ This paper was created within the project SGS-2017-004 'Finance and Sustainable Development from the Perspective of Theory and Practice' at the University of West Bohemia, Faculty of Economics.

the opening of borders for the opportunity to work abroad on an EU level; all the aforementioned factors lead to cross-border migration of healthcare staff in the EU. An OECD study (2007) has shown that almost all EU member states depend increasingly on healthcare staff from abroad. Wismar et al. (2011) point to trends similar to this OECD study (2007), and state that countries such as Estonia, Slovakia and Poland rely very little on the use of foreign doctors (the demand ranges roughly from 0.02 to 0.7% of the overall workforce) and, on the contrary, countries like Switzerland, Slovenia, Ireland and the United Kingdom are among countries with a high dependence on foreign doctors (demand ranges roughly from 22.5% to as much as 36.8% of the overall labor force). As will be presented in the article using concrete data, Polish healthcare staff is typical for migration to countries with a high dependency on healthcare staff, which corresponds to the data given by Wismar et al. (2011).

As Afzal et al. (2012) state, despite the fact that the choice to migrate is a personal matter, the decision to migrate is influenced by many overall economic and social aspects. We can name “push and pull” factors for migration such as disparity in working conditions, financial rewards, the lack of promotion opportunities, unsuitable living conditions, the desire to gain new experiences, working on one’s professional development, increasing household income, and so forth. There are many reasons why healthcare staff migrates and decides to work in a country different than its home country (for more see e.g. Mesquita & Gordon, 2005; Bonner & O’Brien, 2013; Oosthuizen, 2005).

However, the problem that is linked to migration of qualified staff – which is typical for healthcare – is the so-called brain drain, which has very serious impacts on the healthcare system of the home country, as qualified intellectuals (i.e. in this case doctors and nurses) leave their home country, causing a shortage of qualified healthcare staff in the given country (WHO, 2006; Gibson & McKenzie, 2011).

This paper focuses on the issue of migration of Polish healthcare staff. The goal of the paper is to analyze the flows of the selective migration of Polish citizens using the example of healthcare staff and compare the results of the completed analysis with aggregated emigration flows.

This paper has been divided into several sections. In the first section of the paper, a literature review has been carried out. In the second, the goal of the paper is defined in more detail, the methodological approach is explained, and used data including a list of research limitations are described. The third section presents the results of the analysis and the completed statistical survey. The conclusion of the paper presents a summary of the primary research findings and additional potential directions of future research in the given area are outlined.

2. LITERATURE REVIEW

As was mentioned in the introductory section of this paper, migration of healthcare staff has been a phenomenon of the era of globalization for several years now (for more see e.g. Hejduková & Kureková, 2016; Hejduková & Kureková, 2017).

In light of the fact that this paper is focused on the issue of the migration of Polish healthcare staff, the studies mentioned below have been selected based on the specific focus of the paper.

One of the countries that has one of the most fundamental problems with healthcare staff, specifically in terms of the shortage of nurses, is the United Kingdom. As Abs.net

claims (2019), the United Kingdom is no longer capable of maintaining present standards of healthcare, as around 40,000 more nurses are needed. At the same time, thanks to the referendum on Brexit, the number of nurse registrations from EU countries including Poland has significantly decreased since 2016; this fact will also be evident in the results of this paper. The United Kingdom is attempting to deal with the problem by hiring nurses from the Philippines; however, there are significant language barriers and the potential staff from these countries often cannot manage the complicated English-language tests.

Another country that faces serious problems due to a shortage of healthcare staff is Ireland. According to healthcare professionals' representatives, the Irish health system is "sleepwalking into another winter crisis" due to the HSE's inability to address the shortage of consultants, GPs and nurses in the public service. Peadar Gilligan, president of The Irish Nurses and Midwives Organisation said that "the recruitment and retention problem in Ireland is now at crisis point" (Irish Examiner, 2018).

As can be observed from available data, a more fundamental problem is beginning to appear among nurses, primarily in the context of general nursing and the ageing of the population. If we summarize the data published by Simoens et al. (2005), the majority of OECD countries seem to be suffering from nurse shortages. Some countries have published estimates of how many headcounts or full-time equivalent nurses per year over the next decade would be needed to match demand for and supply of nurses. Australia reports a shortage of around 6 000 registered nurses (around 3% of practicing registered nurses) (Access Economics, 2004, O'Hagan, 2002). Conservative estimates of Canada's shortage of registered nurses put the number in the range of 16 000 (Canadian Nursing Advisory Committee, 2002) or 6.9% of the present workforce. The Netherlands has reported a shortage of 7 000 nurses (1% of the practicing registered nurse workforce). The shortage of nurses in Norway has been estimated at 3 300 full-time equivalents or about 5.4% of practicing nurses (Askildsen et al., 2003). There are 3 000 (4.6%) fewer generalist nurses in Switzerland than required (Irwin, 2001). The United States government reported a shortage of 110 700 registered nurses (5% of the practicing registered nurse workforce) in 2000 (National Centre for Health Workforce Analysis, 2002).

Scheffler & Arnold (2019) develop in their research study a projection model for the demand of doctors and nurses by OECD countries in the year 2030. Their model is based on a country's demand for health services, which includes the following factors: per capita income, out-of-pocket health expenditures and the ageing of its population. The supply of doctors and nurses is projected using country-specific autoregressive integrated moving average models. Results of this research study show that it is possible to expect a shortage of nearly 400,000 doctors across 32 OECD countries and a shortage of nearly 2.5 million nurses across 23 OECD countries in 2030.

According Kaminska & Kahancova (2011), the healthcare sector in the EU is strongly affected by migration in Slovakia, Poland and Hungary. This fact is one of the reasons for the selection of this paper's focus on migration of Polish healthcare staff.

Articles focused on Polish healthcare staff have been published by e.g. Szapakowski et al. (2017), in which the authors have analyzed the migrations of nurses and doctors from Poland: data for the years 2014–2020 based on the sample of the capital city of Warsaw. Their studies have pointed out the differences in motivation and the barriers and reasons for the migration of Polish doctors and nurses. Their statistical analysis shows that the decision to migrate among the doctors in the study was influenced by their previous work abroad and participation in recruitment company meetings. In the case of the nurses in the study,

the situation was different; recruitment companies and subsequently previous practice abroad played a significant role.

Haczyński et al. (2017) decided to analyze changes in the size of the population of nurses in Poland from 2004 to 2014 with regard to changes in their employment and the phenomenon of ageing. The reason for the selection of this topic was primarily the fact that nurses are the largest professional group in the field of healthcare. The analysis draws on data published by the Central Register of Nurses and Midwives of the Central Statistical Office (GUS) and the OECD. The authors point out that the profession of nurse has no substitute generation in Poland and claim that there is a fundamental shortage of professionally active nurses in the country. At the same time, the authors cite the problem of incomplete information from the Register of Nurses and thus also to limitations of the study.

Wolk (2016) claims that, in regard to limiting the departure of healthcare staff, reforms of the healthcare system in Poland have been highly ineffective and have not supported return migration. The author emphasizes the fact that reforms of the healthcare system have to be implemented in the whole healthcare sector and must focus on drastic financial restructuring.

Hongyan et al. (2014) also point to the dramatic shortage of nurses on a worldwide scale. In their paper, they claim that migration has a significant impact on the individual and national level and summarize the factors that contribute to the migration of nurses from the perspective of the source and receiving country. A specific element of the paper is also the discussion on the ethical questions surrounding the migration of nurses. They introduce the question of whether nurses should be accepted abroad, especially if they are from developing countries or countries already experiencing a nursing shortage (Sparacio, 2005; Omeri, 2006). They also discuss the question of how source countries have invested in the education of nurses, who later leave to other countries (for more see e.g. McElmurry, 2006).

As is clear from the aforementioned list of literature, the migration of healthcare staff is a heated topic not only on the level of doctors, but also of nurses (which is perhaps even more common). At the same time, we can assume an increase in the shortage of healthcare staff not only for reasons of migration from one country to another, but also due to the heightened need to increase the numbers of staff in the context of the ageing of the population.

3. METHODOLOGY AND DATA

The goal of the paper is to analyze the flows of the selective migration of Polish citizens using the example of healthcare staff and compare the results of the completed analysis with aggregated emigration flows. The analyzed period is from 2007 to 2017 (the last available data is from 2017). The data was taken from the OECD database (2019) – Health Workforce Migration and International Migration Outlook. The database keeps data on the migration of citizens from Poland and Polish doctors and nurses. Data are collected for the member states of the OECD. Unfortunately, the timelines are not always complete and very often information on OECD member states is missing; for example, the Czech Republic does not provide information on the number of nurses from abroad. Such discrepancies can naturally have an impact on the results of our analysis; nonetheless, we believe that despite this fact our results will bring new findings and that this paper will point to the urgency of the necessity for better statistical reporting in the field of Health Workforce Migration in OECD countries.

In order to carry out the analysis of selective migration from Poland, we observed OECD member states in which an influx of Polish citizens with the profession of doctor or nurse was recorded. This created a unique data set, which made it possible to observe the selection of destinations made by Polish healthcare staff from 2007 to 2017. Thanks to this data set, we were able to look in more detail at the differences in preferences in the selection of destinations among common emigrants from Poland and healthcare staff. It was also possible to observe how preferences differ among doctors and nurses and how their preferences changed over time.

The analysis has been divided into several steps. The first step identifies countries to which Polish citizens most often emigrated. In terms of its statistical research on international migration, the OECD publishes basic summaries on each member state. A part of the OECD – International Migration Outlook summary is a list of 10 states (the so-called Top 10) to which Polish citizens most often migrated. The data contains information for 2017 and for the years 2007–2016. The list of the Top 10 states according to the OECD (2019) is shown in Fig. 1.

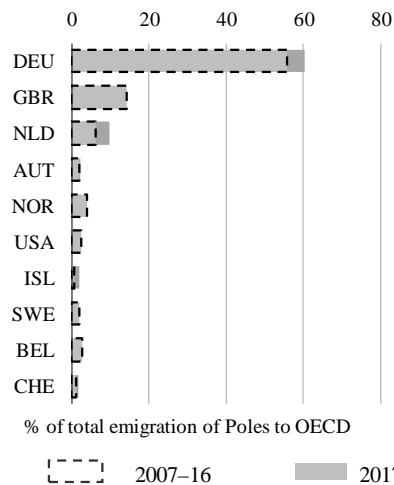


Figure 1. Emigration of Poles to OECD countries – TOP 10 countries

Source: OECD (2019) – International Migration Outlook, authors' own depiction

The second step identified countries to which Polish healthcare staff most often emigrated. Data from the OECD – Health Workforce Migration was used, in which 10 states (or the Top 10) to which Polish healthcare staff most commonly emigrated were identified. The data contain information divided into doctors and nurses. In light of the fact that annual flows can be influenced by the volume of current Polish healthcare staff in the host country, two statistical indicators for recording preferences were observed: Foreign-trained staff – annual flows and stock (doctors and nurses). Statistical indicators were first expressed cumulatively for the years 2007-2016; according to this cumulative sum, states were ordered from the largest volume of migration flows or the stock of foreign trained doctors and nurses. Subsequently the proportion of individual host states in overall emigration in 2017

and for the 10-year reference period from 2017 to 2016 was calculated. The summary of the Top 10 states is shown in Fig. 2.

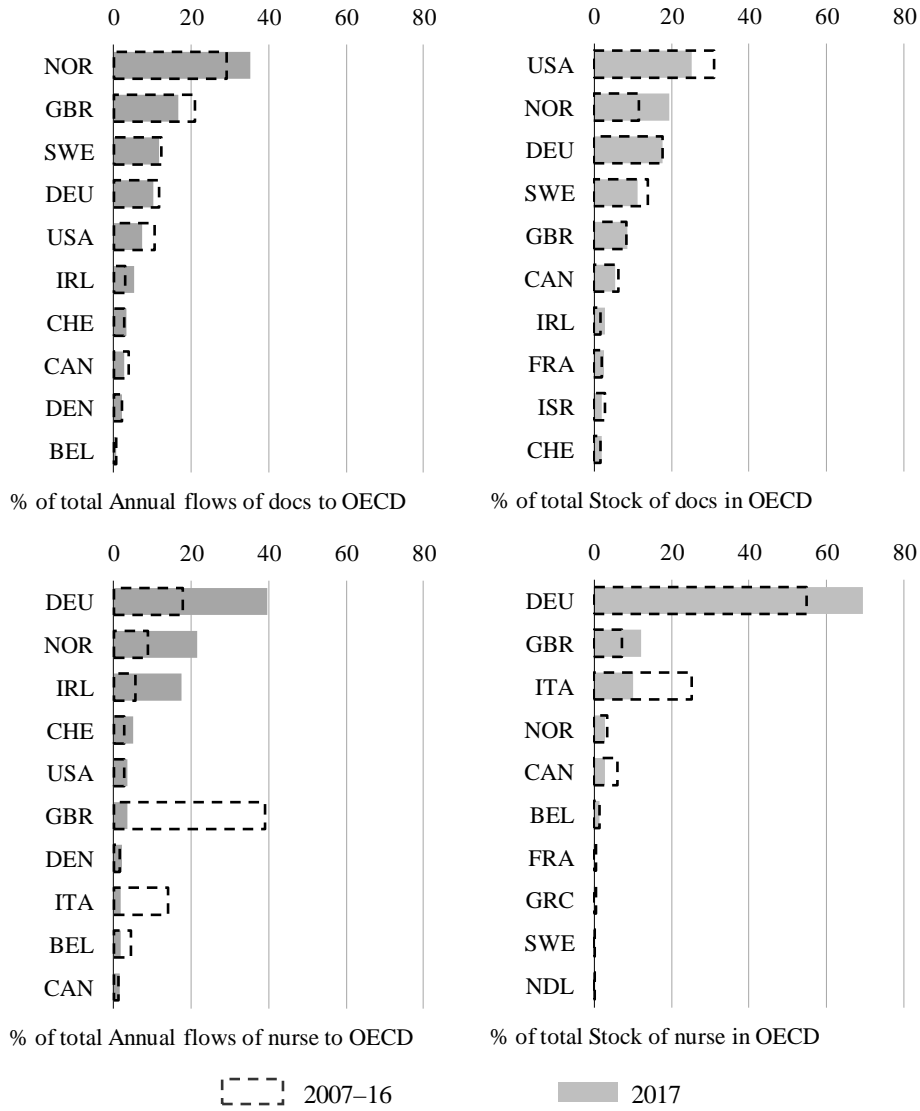


Figure 2. Emigration of Polish medical staff to OECD countries – TOP 10 countries
 Source: OECD (2019) – Health Workforce Migration, authors' own depiction; *data for 2017 were not available; with the help of OLS, values for 2017 were estimated, **only the reference period is listed, as data for 2016 and 2017 were not available.

The third step identified the differences in the preferences of migrating citizens and healthcare staff. Based on the Top 10 analysis of states presented in Figures 1 and 2,

a comparison of the order of states can be carried out. Thus it is possible to find out which host states were most preferred by citizens of Poland and by healthcare staff. Furthermore, it is possible to compare more closely the volume of annual flows and the overall number of doctors and nurses. In conclusion, the closeness of the dependency of preferences between the reference period of 2007-2016 and the year 2017 was measured in order to find out whether a change took place in 2017 in the selection of the host state compared to the average development in the past 10 years. Dependence was measured via the Pearson correlation coefficient (pworth). If the pworth value takes on values close to 1, it is possible to assume that no change in preferences took place compared to the referential period between 2007 and 2016. On the contrary, if pworth values are close to zero or even negative, it can be assumed that a change in preferences took place.

For a more detailed picture of the acquired data set on the emigration of healthcare staff from Poland, basic descriptive statistics such as mean, standard deviation, minimum and maximum were calculated. In Table 1, these statistics for the TOP 10 states are listed, i.e. host states are listed to which migration flows most often travel and in which there is the largest proportion of Polish healthcare staff abroad. According to the "time period" column, we can see that complete timelines are unfortunately not always available. Incomplete data most often appear among statistics following the migration of nurses.

4. RESULTS

If we compare the mean annual values of the Stock of Polish doctors and nurses in total (i.e. the sum for all OECD states), it is evident that there are more nurses (12,522) than doctors (8,334) abroad in the studied period. The value for nurses may be undervalued due to incomplete statistics; there are likely even more of them abroad than the calculated value from available statistics. If we look at the overall dynamics of emigration flows of Polish healthcare staff and thus indicators of annual flows of Polish doctors and Nurses, the annual flows were higher for doctors (845) than nurses (665).

Fig. 1 shows that during the observed period, Polish citizens primarily preferred Germany as the host country. Almost 60% of emigration flows from Poland went to Germany; then at some distance followed Great Britain and Holland. In addition, interest in Germany and Holland increased in 2017 compared to the reference period. It is possible to expect that, thanks to the situation stemming from Brexit, Polish citizens will prefer the German labor market.

The preferences of doctors in selecting a target country is significantly different from aggregated emigration flows from Poland. Figure 2 clearly shows that in the studied period doctors primarily preferred Norway, then Sweden and Great Britain. A historically large proportion of doctors are in the USA, Norway and Germany. We can thus claim that doctors do not copy the scheme of decision making that is typical for aggregated emigration flows in the selection of a host country (Fig. 1).

On the contrary, the preferences of nurses in the selection of a target country copy aggregated emigration flows; nurses preferred the German labor market. In 2017, growth of emigration to German, Norway and Ireland is evident. Furthermore, it is possible to observe a weakening interest in the Italian labor market. The heightened interest in Ireland in 2017 may be explained to a certain degree by the situation in Great Britain, which culminated in the vote to exit the EU (i.e. Brexit).

Table 1. Summary of basic statistics – Migration of healthcare staff from Poland

| Annual flows of Polish docs to OECD countries | | | | | | Stock of Polish docs in OECD countries | | | | | |
|---|-------------|------|----------|-----|--------------|--|-------------|--------|----------|--------|---------------|
| Country | Time period | Mean | Std. Dv. | MIN | MAX | Country | Time period | Mean | Std. Dv. | MIN | MAX |
| TOTAL | | 845 | 189 | 663 | (2009) 1 346 | TOTAL | | 8334 | 1702 | 5074 | (2007) 10 648 |
| NOR | 2007–17 | 249 | 152 | 117 | (2007) 669 | USA | 2007–16 | 2559 | 270 | 2160 | (2007) 2979 |
| GBR | 2007–17 | 174 | 59 | 115 | (2011) 339 | DEU | 2007–17 | 1454 | 201 | 1138 | (2007) 1756 |
| SWE | 2007–16 | 104 | 37 | 57 | (2010) 161 | SWE | 2007–16 | 1126 | 239 | 769 | (2016) 1571 |
| DEU | 2007–17 | 97 | 14 | 72 | (2009) 127 | NOR | 2007–17 | 1253 | 432 | 612 | (2009) 1938 |
| USA | 2007–17 | 86 | 10 | 65 | (2017) 97 | GBR | 2007–17 | 768 | 59 | 668 | (2008) 875 |
| CAN | 2007–17 | 32 | 8 | 23 | (2017) 50 | CAN | 2007–17 | 523 | 40 | 458 | (2007) 571 |
| IRL | 2010–17 | 37 | 6 | 28 | (2016) 47 | ISR | 2007–17 | 231 | 23 | 200 | (2007) 270 |
| CHE | 2007–17 | 24 | 6 | 16 | (2008) 32 | FRA | 2011–17 | 254 | 6 | 243 | (2011) 259 |
| DNK | 2007–16 | 19 | 9 | 8 | (2012) 36 | IRL | 2011–17 | 233 | 26 | 184 | (2012) 288 |
| BEL | 2007–17 | 6 | 2 | 2 | (2010) 9 | CHE | 2008–17 | 143 | 16 | 120 | (2008) 181 |
| Annual flows of Polish nurses to OECD countries | | | | | | Stock of Polish nurses in OECD countries | | | | | |
| Country | Time period | Mean | Std. Dv. | MIN | MAX | Country | Time period | Mean | Std. Dv. | MIN | MAX |
| TOTAL | | 665 | 159 | 457 | (2017) 889 | TOTAL | | 12 522 | 7807 | 3901 | (2007) 23 001 |
| GBR | 2007–17 | 261 | 103 | 22 | (2017) 374 | DEU | 2012–17 | 13 167 | 1572 | 11 000 | (2012) 16 000 |
| DEU | 2012–17 | 255 | 74 | 114 | (2012) 342 | ITA | 2007–17 | 2836 | 249 | 2351 | (2017) 3136 |
| ITA | 2007–17 | 94 | 87 | 28 | (2017) 322 | GBR | 2014–17 | 2784 | 224 | 2495 | (2014) 3044 |
| NOR | 2007–17 | 71 | 23 | 42 | (2011) 131 | CAN | 2007–17 | 691 | 28 | 649 | (2011) 735 |
| BEL | 2007–17 | 30 | 25 | 4 | (2008) 90 | NOR | 2009–17 | 524 | 98 | 350 | (2009) 663 |
| USA | 2007–15 | 23 | 15 | 5 | (2015) 50 | BEL | 2007–17 | 175 | 126 | 9 | (2007) 333 |
| CHE | 2007–17 | 19 | 9 | 7 | (2010) 33 | FRA | 2007–15 | 47 | 21 | 6 | (2007) 75 |
| DNK | 2007–16 | 11 | 13 | 0 | (2012) 49 | GRC | 2007–16 | 45 | 2 | 40 | (2007) 47 |
| CAN | 2007–17 | 8 | 6 | 0 | (2017) 23 | SWE | 2007–16 | 34 | 18 | 10 | (2007) 67 |
| SWE | 2007–16 | 6 | 3 | 2 | (2008) 12 | NDL | 2007–16 | 29 | 14 | 8 | (2012) 46 |

Source: OECD (2019) – Health Workforce Migration

The dependence of decision making between the reference period and 2017 was measured using the Pearson correlation coefficient (pworth). Results in Table 2 show that the indicator of overall emigration (EMIGRATION) and almost all indicators of selective migration with the exception of NURSE ANNUAL FLOW are pworth values close to 1. Pworth was very low (pworth=0.28) for the Nurse annual flow indicator. Thus in the case of aggregated emigration flows, results show that in 2017 a significant change took place in the preferences – this conclusion is identical to migration flows of doctors. On the contrary, in the case of migration flows of nurses the low pworth (NURSE ANNUAL FLOW) implies that in 2017 a change occurred in the preferences in the selection of host countries compared to the reference period. This change was caused by a lower degree of interest in Great Britain in 2017 and heightened preferences for the labor market in Germany and Norway.

Table 2. Results of the closeness of dependence between the reference period 2007–2016 and 2017

| | EMIGRATION | DOCTOR ANNUAL FLOW | DOCTOR STOCK | NURSE ANNUAL FLOW | NURSE STOCK |
|---------|------------|--------------------|--------------|-------------------|-------------|
| pworth | 0.99 | 0.95 | 0.96 | 0.28 | 0.95 |
| t-test | 23.83 | 8.84 | 9.80 | 0.81 | 8.58 |
| p-value | 0.000 | 0.000 | 0.000 | 0.624 | 0.000 |

Source: OECD (2019) – International Migration Outlook and Health Workforce Migration, authors' own depiction

5. CONCLUSION

This paper has dealt with the issue of the migration of Polish healthcare staff. The goal of the paper was to analyze the flows of selective migration of Polish citizens using the example of healthcare staff and to compare results of the completed analysis with aggregated emigration flows.

As was discovered from the completed research, not only Poland but other developed countries face problems in their healthcare systems, and issues with securing high-quality staff are at the forefront of all problems in the field of healthcare.

OECD countries of course deal with the shortage of staff by acquiring foreign employees with healthcare education, which is a significant characteristic of globalization. This fact is of course accompanied by various pluses and minuses and the phenomenon of migration flows of healthcare staff should be viewed from both the perspective of the country from which this staff flows and the perspective of the country to which this staff has come to work.

Based on studied scientific sources, we can claim that the migration of nurses is becoming a more significant problem in terms of the migration of healthcare staff, although the migration of doctors is also crucial in observing healthcare systems. Different motivation to migrate and different preferred countries have been found among nurses and doctors.

In the completed analysis, Polish citizens primarily preferred Germany as the host country during the studied period. Almost 60% of emigration flows from Poland went to Germany; then at some distance followed Great Britain and Holland. Nurses in the selection of a target country copy copied aggregated migration flows and doctors on the contrary had

different preferences, primarily preferring Norway, then Sweden and Great Britain. A large proportion of Polish doctors have historically worked in the USA, Norway and Germany.

Furthermore, the results of the analysis have shown that a change of preferences did not take place in 2017 in terms of aggregated migration flows and the selective migration of doctors. In terms of nurse migration flows, a change in the preferences of host country selection took place in comparison to the reference period. This change was caused by lower interest in Great Britain, and also in Italy in 2017, and heightened preferences in the labor market in Germany, Norway and Ireland. The heightened interest in Ireland in 2017 may to a certain degree be caused by the situation in Great Britain, which culminated in the vote to exit the EU (i.e. Brexit).

This paper also mentions the issue of incomplete data in the field of selective migration of healthcare staff; specifically, a lack of incomplete data most often appears in statistics on the migration of nurses. The paper thus points to the urgency of the necessity for better statistical reporting in the field of Health Workforce Migration in OECD countries, as these discrepancies can naturally have an influence on the results of further analyses and the ability to replicate the research in general.

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Michał KOŚCIÓŁEK¹
Tomasz TOMCZYK²

DEVELOPMENT OF PRIVATE HEALTH INSURANCE IN POLAND AND THE PUBLIC HEALTH CARE SYSTEM

In the light of OECD reports and Watch Health Care Foundation research, Poland is on one of the last places in Europe in terms of organization and financing of healthcare services. Due to the inefficiency of the public health care system related to the lack of doctors and the length of waiting for visits to specialists, additional health insurance is a method of improving the health protection standard of Poles. The study presents the condition of the Polish healthcare system and the most important factors influencing the development of private health insurance. As a result of the analysis with use of the zero unitarisation method, it was found that the places where private medical insurance will develop the fastest are Mazowieckie, Śląskie and Dolnośląskie, and it will be more difficult at the so-called eastern wall.

Keywords: private health insurance, health care system, private health care market, public health care, zeroed unitarisation method.

1. INTRODUCTION

Access to a properly functioning health care system is the constitutional right of every citizen. From art. 68 of the Constitution arises that the authorities are obliged to provide citizens, regardless of their material status, with access to healthcare, which is financed from public funds. Moreover, this access should be equal regardless of what model of the healthcare system would be introduced in the future (PIU, 2016). Therefore, it should be in the interest of the authorities to provide citizens with access to the highest quality medical services and to create an effective health care system. However, according to the data presented in 2018 in the OECD (OECD, 2018) report and in the Watch Health Care Foundation (WHC, 2019) research in 2019, Poland ranks one of the last places in Europe in terms of organization and financing of the healthcare system. In view of the inefficiency and increasing restrictions of the public health care system in Poland, private health insurance is not only an addition, but also a method for improving of health care. In the

¹ Master's degree, Michał Kościółek, Department of Economics Faculty of Management, Rzeszow University of Technology Ignacy Łukasiewicz, Aleja Powstańców Warszawy 12, 35-959 Rzeszów; e-mail: mkos@prz.edu.pl. ORCID: 0000-0002-4059-9244 (corresponding author).

² Master's degree, Tomasz Tomczyk, Faculty of Management, Department of Finance, Banking and Accounting, Rzeszow University of Technology Ignacy Łukasiewicz, Aleja Powstańców Warszawy 12, 35-959 Rzeszów; e-mail: tomczyk@interia.pl. ORCID: 0000-0003-4134-7628.

light of the “Risks That Matter” study conducted in 21 OECD countries in 2018, fear of falling ill has a large impact on the popularity of this type of insurance. 54% of respondents declared that they are most afraid of illness or disability.

The aim of the study is to analyze the current situation in the entire Polish health care system and identify voivodships where the development of private medical insurance will be the fastest according to the zero unitarisation method.

2. LITERATURE REVIEW

The literature indicates that health care systems bear extremely important and continuous responsibility for human health throughout their lives. They are therefore necessary for the proper functioning and development of individuals, families and even entire societies. According to the World Health Organization (WHO), national healthcare systems should be oriented towards achieving three general goals. This should be the pursuit of good health as well as responding to population expectations and equity in financial contributions. Achievement of these goals depends primarily on the extent to which national health systems cope with the performance of four basic functions, which include the provision of services, resource generation, financing and management. Furthermore, the minimum requirements that the healthcare system should meet are set out. These include, above all, access to high-quality services, effective health promotion and disease prevention, as well as appropriate response to emerging new threats (Donev et al., 2013).

Public health systems in different countries vary in many ways. One of the factors enabling the introduction of certain models of healthcare systems is the financing method, which determines the nature of individual systems. Health care models distinguished on the basis of financing method and their most important features are presented in Table 1 (Borkowska, 2018).

The financing of the Polish healthcare system is based on similar principles to those resulting from the Bismarck model and is based on both compulsory and voluntary health insurance. However, the literature indicates that in the currently prevailing socio-economic realities, financing of the public health care system from one source only is insufficient, and the direct result is the inability to properly perform public tasks in the field of health care (Lenio, 2018). Economically effective and clinically effective funding for health services should be based on all possible sources of funding. In the case of Poland, it seems necessary to include a private source of financing (Nojszewska, 2015).

According to data from international institutions, the organization and financing of public healthcare in Poland ranks one of the last places. Although the influence of the National Health Fund is constantly growing, the Polish healthcare system still seems underfunded and inefficient. An aging society and the related growing need for access to medical services means that the current method of financing public health care may prove even more inefficient in the future. Therefore, private health insurance seems to be a method of improving the current situation and an opportunity to retrofit the financial care system without having to change tax rates (Płonka, 2017).

A similar opinion is expressed by I. Laskowska, claiming that the unfavorable tendency of the aging of the society will increase the demographic load indicators, which in turn will translate into a significant change in the relationship between persons paying premiums for universal health insurance and persons reporting the need for medical services. Commercial health insurance thus creates the opportunity to co-finance the public system, especially

considering the dynamic development of the private insurance market in Poland. The author points out, however, that a low level of society's wealth is a significant barrier to market development, and their dissemination will not be possible without legislative changes (Laskowska, 2017).

Table 1. Models of health care systems by financing method

| Specification | Model character | Financing method | Main features |
|----------------------------|-------------------------------|---|--|
| Model of Beveridge | budgetary | financing using fiscal tools, from general taxes | universal access to health care, bureaucracy, underfunding |
| Model of Siemaszko | centralized health protection | financing from the state budget, general taxes | similarly to the Beveridge model, however, there is more state control in management and financing |
| Model of Bismarck | insurance | financing from collections from compulsory social security, deducted from the payroll | both public and private service providers, but with dominant social ownership, the indirect role of the state in system regulation, difficult to control, high costs |
| Market model (USA, Israel) | residual | financed by voluntary private health insurance | healthcare is treated as a commodity where suppliers are private enterprises, poor state control |

Source: Own study based on: (Donev et al., 2013; Jaworzyńska, 2016; Borkowska, 2018; Ostrowska-Dankiewicz, 2017).

M. Jeziorska, in turn, points out that, despite a significant increase in expenditure on the health care system over the last decade, this system remains ineffective, as evidenced by, for example, negative opinions of citizens. Co-financing of the healthcare system from public funds would certainly have an impact on the deterioration of the public finance sector balance or increase in the tax burden. However, the prospect of a significant increase in budget spending on healthcare in the coming years does not seem realistic. Therefore, it is necessary to search for solutions that would allow for co-financing of the health care system by means of private funds from the established instrument, and this may undoubtedly be commercial health insurance, which may be of a complementary, supplementary or substitution nature (Jeziorska, 2016).

As T. Schneider points out, private health insurance in Poland has excellent market and development opportunities and has grown over the public segment in recent years due to three main factors (Schneider, 2018):

- the speed of the service – which in the case of the public system is very slow, what is a huge opportunity, because it is one of the most important factors of customer satisfaction,

- quality of treatment – the low number of doctors per one patient in Poland compared to European standards may be a reason to believe that the quality of treatment in the public system is low,
- hospital treatment – a strong focus on hospital treatment results in a lack of ambulatory care and unmet needs of clients.

Increasing the use of private health insurance can have a positive impact on the entire healthcare system. Research conducted by P. Szybkiewicz has shown that countries, to a large extent, use health insurance to finance healthcare, in relative terms allocate more funds to healthcare than countries where the use of private insurance is marginal. Although the introduction of private insurance into the health care system is unlikely to significantly increase the state of health of the society, it can contribute to changes in the perception of the entire health care system (Prędkiewicz, 2014).

3. CURRENT HEALTH CARE SYSTEM IN POLAND FROM THE PUBLIC AND PRIVATE SIDE

3.1. Participation and importance of private health insurance in the Polish system

In the first half of 2019, Poles spent over PLN 430 million on private health insurance, which means an increase of 12% y/y. According to data from the Polish Insurance Association (PIU), private health insurance at the end of June this year was used by over 2.7 million people, i.e. 20% more than a year ago. Research indicates that Poles consider health care as a priority, hence their increased interest in this type of insurance. The number of people covered by this type of group insurance is also increasing. Employers want to provide their employees with wider access to medical services, which is caused on the one hand by their concern for their colleagues, and on the other by struggle for retaining an employee in the company – i.e. concern for the functioning of the business. More and more employers recognize the value of a healthy and satisfied employee. According to the Sedlak & Sedlak report “Additional benefits in the eyes of employees in 2019”, an additional medical care package is also the most common additional benefit desired by employees. This is also confirmed by research conducted by PIU (PIU, 2019), which shows that private health packages are of great interest not only to employees but also employers. About 80% of respondents believe that the employer should provide employees with cyclical visits to the doctor, during which the general state of their health is examined and lifestyle recommendations are presented.

The most important reason for the development of private health insurance is the problem of access to public services. Therefore, patients are ready to pay for private treatment and thus shorten queues to doctors. Long waiting times for visits, crowds and queues in facilities are the main problems of the public health system. According to PIU, currently an average time of waiting for a visit to a specialist is 3.8 of month, what is caused by the amount of public spending on health care below the minimum level of safety.

Another problem that also seriously affects the development of private medical insurance is the lack of doctors. According to OECD and EC (OECD, 2018) data, Poland has the least in Europe. The European average is 3.8 per thousand inhabitants, in Poland it is 2.4. The advantage of private medical care is the fact that companies selling this type of service sign contracts with many facilities and can direct activity there where is the free space. An important argument in favor of private health insurance is also that they provide medical care throughout the country, without referrals and limits.

The private health insurance market is therefore becoming a kind of “safety cushion” for the overloaded public system and is assuming some responsibility for the health of an increasing number of Poles.

3.2. Situation in public health care

The public health care system in Poland is still not appropriate and does not actually provide 100% of patients' needs. Eurostat data show that European Union countries spend on a health care average one-tenth of the Gross Domestic Product. Poland against this background is performing poorly and is definitely below average. In terms of health care expenditure, France is the leader, which in 2016 allocated as much as 11.5% of GDP to this goal (European Union, 2016). Germany are second – 11.1% GDP, and Sweden on the third place – 11%. Austria, the Netherlands, Denmark and Belgium were also above the average of 9.9% average. Poland does not look good in this ranking, because only 6.5% of GDP was allocated to health care. Only Romania, Luxembourg, Latvia and Estonia spend less. Considering the absolute values, Germany was the country which spent the most on healthcare in 2016 – nearly EUR 352 billion. The French was second – around 257 billion euros, and third was the Great Britain – 233 billion euros. Poland was thirteenth with expenses of around EUR 28 billion. For comparison, Spain, which is the fifth in the EU in this respect, spent almost EUR 100 billion in 2016. This shows how much we still miss to European mediums.

According to the data of the Central Statistical Office published in the National Health Account for 2016, total expenditure on health care in 2016 amounted to PLN 121.1 billion and was higher than in 2015 by about PLN 6.6 billion. Current public expenditure on healthcare amounted to PLN 84.6 billion in 2016, that was 4.55% of GDP (compared to 4.46% in 2015). Therein 59.8% came from compulsory health insurance, and 10% was expenditure of local governments and the government of country. According to the same data, private expenditure amounted to PLN 36.5 billion, that was 1.96% of GDP (against 1.90% in 2015). Taking all expenses into account, private were 30.2% of the total. The largest stream of current expenditure on health care (both public and private) concerned health services – 57.3%, including mainly hospital treatment – 31.5% of total expenditure, and ambulatory treatment – 22.3%.

According to the report “Health at a Glance 2018” prepared by OECD and the European Commission, there is lack of at least 30,000 doctors in Poland. What is worse, their number is constantly decreasing, and the reason for this is: the elderly age of doctors, too little number of students admitted to Medical Universities, a huge problem with obtaining specialization - too little places for residents. In terms of the number of doctors, Poland ranks last in the European Union. The report “Health at a Glance 2018” also shows that the primary health care is in the most difficult situation, where the percentage of family doctors, compared to other EU countries, is very low and amounts to only 9% of all specialists. For comparison, less is only in Greece – 5%. Deficiency of doctors is not only a matter of patients who have problems with access to cabinets, but also the problem of the doctors themselves. According to the information contained in the report, the average number of patients for one doctor in the European Union per year is 2147, while in Poland the average is 3104 patients. In terms of workload, Poland ranks third place, after Hungary – 3457 and Slovakia – 3311. It looks even worse in the situation of primary care physicians, who give in Poland over 4,700 advices a year. The situation with access to specialists looks bad in Poland and is not improving. According to the Watch Health Care Foundation Barometer

survey, the average waiting time for an appointment with a specialist over the past 9 years has almost doubled, if you compare the situation between June 2012, when the average waiting time was 2.2 months, and January 2019, when time of waiting 3.8 months. This situation is exactly illustrated in Figures 1 and 2.

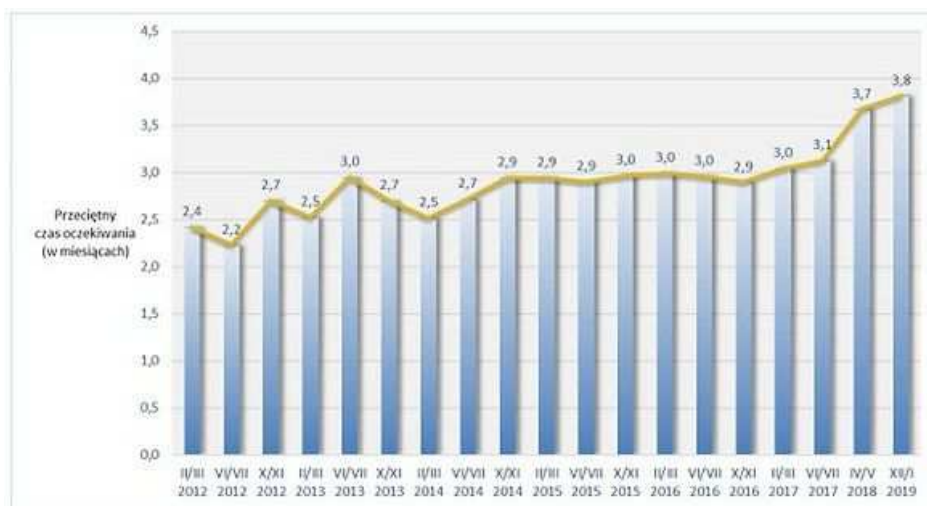


Figure 1. Change in the average waiting time for guaranteed health services in Poland (value in months) over a long-term horizon

Source: (WHC, 2019).

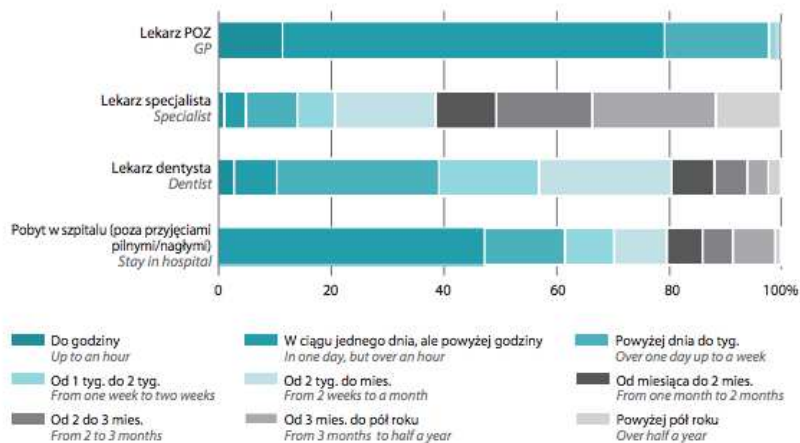


Figure 2. Waiting time for medical services in Poland in 2016

Source: (Central Statistical Office).

The presented situation in the Polish public healthcare system is not optimistic and indicates weaknesses that are determinants of the development of private health insurance.

3.3. Analysis of factors influencing the development of the Polish private health sector in terms of voivodeships

In this part of the discussion, the analysis will be carried out using the zero unitarisation method, which will allow to determine the potential for the development of private health insurance in individual voivodeships of Poland. From many factors influencing the development of the private health sector, 5 features were selected and used for the analysis. Those are:

1. indicator – health care expenditure,
2. indicator – Gross domestic product per inhabitant,
3. average monthly gross salary,
4. beds in general hospitals for 10,000 of the population,
5. doctors with the right to practice a medical profession per 10,000 population.

Table 2. Expenses for healthcare by voivodeships in 2010–2018

| Województwo | gminy łącznie z miastami na prawach powiatu | | | | | | | | |
|---------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] |
| DOLNOŚLĄSKIE | 124 472 585,92 | 100 121 327,73 | 94 116 722,94 | 109 393 238,93 | 110 289 075,31 | 112 556 247,63 | 107 130 130,18 | 118 306 300,35 | 134 062 021,34 |
| KUJAWSKO-POMORSKIE | 90 143 581,28 | 88 588 295,37 | 82 467 271,26 | 85 948 484,03 | 95 175 028,46 | 90 919 478,85 | 105 426 976,32 | 85 098 313,53 | 85 848 279,60 |
| LUBELSKIE | 53 282 468,54 | 51 610 105,43 | 52 567 508,28 | 51 976 263,80 | 55 128 611,62 | 52 384 777,32 | 52 643 308,06 | 50 265 276,51 | 49 545 951,87 |
| LUBUSKIE | 30 954 745,54 | 26 242 254,52 | 26 813 045,17 | 27 150 037,60 | 27 411 953,79 | 27 902 075,93 | 29 161 367,16 | 37 147 579,26 | 39 698 080,67 |
| ŁÓDZKIE | 84 854 483,28 | 164 826 097,20 | 87 449 648,57 | 97 087 931,44 | 103 805 443,05 | 94 944 769,28 | 106 478 682,82 | 101 490 288,76 | 95 147 996,14 |
| MAŁOPOLSKIE | 115 204 458,58 | 109 855 309,68 | 97 796 463,57 | 115 090 227,42 | 125 246 270,19 | 125 411 835,39 | 133 370 444,35 | 146 863 734,43 | 164 246 202,07 |
| MAZOWIECKIE | 403 097 976,71 | 356 965 657,29 | 293 329 080,44 | 383 525 552,62 | 381 501 856,25 | 371 484 894,67 | 310 656 140,13 | 418 893 108,02 | 457 304 170,62 |
| OPOLSKIE | 27 605 898,66 | 24 554 243,76 | 26 396 410,02 | 25 054 343,36 | 25 721 107,13 | 26 103 088,40 | 27 253 684,28 | 24 554 179,64 | 27 168 344,20 |
| PODKARPACKIE | 47 567 650,73 | 45 631 760,15 | 45 524 934,42 | 47 087 955,64 | 49 685 089,69 | 46 674 702,82 | 48 581 893,95 | 56 738 402,97 | 62 141 680,62 |
| PODLASKIE | 25 702 179,65 | 28 532 788,01 | 29 734 811,35 | 27 810 019,49 | 29 488 957,98 | 31 843 679,14 | 32 775 731,33 | 35 095 940,95 | 41 343 962,25 |
| POMORSKIE | 69 577 445,12 | 80 402 449,80 | 77 789 101,11 | 78 647 144,44 | 77 716 301,01 | 74 613 098,04 | 74 672 329,65 | 77 540 654,09 | 85 421 287,85 |
| ŚLĄSKIE | 280 557 865,86 | 256 356 305,11 | 261 444 785,79 | 316 289 153,33 | 295 941 728,52 | 311 117 470,92 | 268 482 981,48 | 285 857 260,60 | 296 759 629,31 |
| ŚWIĘTOKRZYSKIE | 36 880 955,53 | 33 435 705,39 | 34 809 460,33 | 35 117 043,80 | 36 507 753,24 | 34 050 968,84 | 32 875 236,91 | 33 605 098,65 | 42 941 264,61 |
| WARMIŃSKO-MAZURSKIE | 48 362 885,10 | 44 288 884,81 | 48 155 286,98 | 44 209 296,01 | 44 671 529,47 | 45 019 244,77 | 41 195 759,72 | 43 639 394,27 | 45 429 944,66 |
| WIELKOPOLSKIE | 126 021 666,72 | 105 181 387,23 | 81 129 804,13 | 86 467 720,27 | 93 876 911,65 | 107 871 886,04 | 118 501 763,45 | 105 014 804,05 | 116 727 294,02 |
| ZACHODNIOPOMORSKIE | 60 236 325,32 | 72 134 038,05 | 75 006 573,67 | 68 890 353,72 | 74 324 783,69 | 63 312 360,12 | 62 650 837,46 | 63 988 840,03 | 73 566 167,46 |

Source: (Local Data Bank, Central Statistical Office).

According to the conducted analysis, the greatest development opportunities for private health insurance in 2016 were in the Mazowieckie, Śląskie and Dolnośląskie voivodeships. These are areas belonging to the most economically developed places in Poland. It was also influenced by many factors, including well-developed medical facilities, large expenses for health care and an adequate number of working doctors, which allows the functioning of the public health service and dynamic development of private health insurance. The situation on the “eastern wall” of the country looks worse, where residents have a big problem with access to specialists and specialist tests. This is a big impetus for the development of private insurance in these areas, but the problem is the small number of doctors there, and thus private medical facilities. Lower incomes of society also do not help this situation.

Table 3. Gross domestic product per inhabitant by voivodeships in 2010–2016³

| Województwo | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------------|--------|--------|--------|--------|--------|--------|--------|
| | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] |
| DOLNOŚLĄSKIE | 42 295 | 46 296 | 47 986 | 48 179 | 50 061 | 52 237 | 53 659 |
| KUJAWSKO-POMORSKIE | 31 127 | 33 231 | 34 365 | 35 280 | 36 387 | 38 202 | 39 503 |
| LUBELSKIE | 25 875 | 28 282 | 29 648 | 30 449 | 31 192 | 32 077 | 33 371 |
| LUBUSKIE | 31 723 | 33 738 | 35 078 | 35 786 | 37 637 | 39 053 | 40 639 |
| ŁÓDZKIE | 34 747 | 37 620 | 39 403 | 40 145 | 41 869 | 43 790 | 45 199 |
| MAŁOPOLSKIE | 32 909 | 36 119 | 37 334 | 38 167 | 39 834 | 42 172 | 43 865 |
| MAZOWIECKIE | 59 666 | 64 473 | 67 389 | 69 028 | 71 715 | 74 738 | 77 359 |
| OPOLSKIE | 30 818 | 33 237 | 34 152 | 34 640 | 36 299 | 37 816 | 38 551 |
| PODKARPACKIE | 26 122 | 28 545 | 29 554 | 30 585 | 31 644 | 33 177 | 34 120 |
| PODLASKIE | 27 381 | 29 672 | 30 288 | 31 374 | 32 352 | 33 275 | 34 299 |
| POMORSKIE | 36 017 | 39 054 | 41 341 | 41 457 | 42 570 | 45 001 | 46 913 |
| ŚLĄSKIE | 40 201 | 43 693 | 44 863 | 44 796 | 46 511 | 48 686 | 50 184 |
| ŚWIĘTOKRZYSKIE | 28 968 | 30 957 | 31 642 | 31 392 | 32 643 | 33 844 | 34 633 |
| WARMIŃSKO-MAZURSKIE | 27 197 | 29 257 | 30 232 | 30 776 | 31 957 | 33 180 | 34 514 |
| WIELKOPOLSKIE | 39 454 | 42 753 | 44 774 | 46 150 | 48 015 | 50 821 | 52 844 |
| ZACHODNIOPOMORSKIE | 32 061 | 34 116 | 35 453 | 35 851 | 37 477 | 39 584 | 40 592 |

Source: (Local Data Bank, Central Statistical Office).

Table 4. Average gross monthly salaries by voivodeships for the years 2010–2018

| Województwo | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] | [zł] |
| DOLNOŚLĄSKIE | 3 412,37 | 3 587,25 | 3 709,32 | 3 868,86 | 4 042,86 | 4 204,24 | 4 385,84 | 4 654,51 | 4 942,39 |
| KUJAWSKO-POMORSKIE | 2 910,82 | 3 062,32 | 3 182,31 | 3 322,09 | 3 439,06 | 3 540,25 | 3 672,98 | 3 886,20 | 4 139,21 |
| LUBELSKIE | 3 099,60 | 3 257,14 | 3 382,66 | 3 488,61 | 3 605,03 | 3 699,48 | 3 815,95 | 4 020,25 | 4 260,71 |
| LUBUSKIE | 2 920,43 | 3 073,95 | 3 203,18 | 3 282,07 | 3 425,38 | 3 567,60 | 3 734,90 | 3 950,95 | 4 239,92 |
| ŁÓDZKIE | 3 066,02 | 3 245,97 | 3 383,30 | 3 510,20 | 3 618,63 | 3 790,76 | 3 925,10 | 4 141,94 | 4 441,29 |
| MAŁOPOLSKIE | 3 169,90 | 3 332,98 | 3 456,16 | 3 574,22 | 3 700,06 | 3 906,96 | 4 077,91 | 4 347,10 | 4 678,95 |
| MAZOWIECKIE | 4 279,55 | 4 504,66 | 4 637,58 | 4 773,41 | 4 927,34 | 5 098,55 | 5 240,86 | 5 523,65 | 5 888,90 |
| OPOLSKIE | 3 137,29 | 3 249,58 | 3 358,42 | 3 473,40 | 3 632,84 | 3 793,28 | 3 927,04 | 4 144,91 | 4 379,25 |
| PODKARPACKIE | 2 877,43 | 3 023,21 | 3 152,36 | 3 282,69 | 3 412,30 | 3 527,62 | 3 653,67 | 3 837,17 | 4 089,81 |
| PODLASKIE | 3 019,83 | 3 178,15 | 3 310,71 | 3 432,71 | 3 530,17 | 3 647,08 | 3 767,20 | 4 005,94 | 4 264,04 |
| POMORSKIE | 3 383,58 | 3 567,49 | 3 696,89 | 3 847,12 | 4 011,59 | 4 132,13 | 4 274,73 | 4 496,64 | 4 794,74 |
| ŚLĄSKIE | 3 528,19 | 3 794,62 | 3 855,26 | 4 022,80 | 4 100,51 | 4 221,45 | 4 295,29 | 4 481,57 | 4 825,28 |
| ŚWIĘTOKRZYSKIE | 2 971,58 | 3 137,91 | 3 250,94 | 3 349,81 | 3 435,93 | 3 580,62 | 3 669,57 | 3 911,49 | 4 171,17 |
| WARMIŃSKO-MAZURSKIE | 2 879,97 | 3 019,37 | 3 150,27 | 3 264,63 | 3 386,96 | 3 495,02 | 3 619,16 | 3 802,98 | 4 028,33 |
| WIELKOPOLSKIE | 3 126,36 | 3 284,41 | 3 397,25 | 3 515,31 | 3 597,69 | 3 723,69 | 3 894,10 | 4 124,13 | 4 382,96 |
| ZACHODNIOPOMORSKIE | 3 120,15 | 3 289,56 | 3 417,76 | 3 539,12 | 3 649,27 | 3 793,68 | 3 946,28 | 4 154,25 | 4 431,95 |

Source: (Local Data Bank, Central Statistical Office).

³ Data for 2017–2018 are not yet available on the website of the Central Statistical Office.

Table 5. Beds in general hospitals per 10,000 population by voivodeships for 2010–2017⁴.

| Województwo | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | [-] | [-] | [-] | [-] | [-] | [-] | [-] | [-] |
| DOLNOŚLĄSKIE | 48,42 | 48,38 | 50,84 | 51,80 | 51,25 | 51,10 | 51,31 | 50,43 |
| KUJAWSKO-POMORSKIE | 42,97 | 43,00 | 45,35 | 46,08 | 47,33 | 47,20 | 47,31 | 47,02 |
| LUBELSKIE | 51,82 | 52,00 | 54,65 | 53,35 | 52,93 | 52,84 | 52,76 | 52,63 |
| LUBUSKIE | 40,96 | 41,24 | 44,34 | 43,75 | 43,55 | 43,24 | 42,73 | 43,28 |
| ŁÓDZKIE | 53,23 | 52,92 | 52,02 | 53,43 | 53,08 | 52,07 | 51,41 | 51,59 |
| MAŁOPOLSKIE | 42,78 | 42,91 | 44,58 | 44,24 | 44,46 | 44,06 | 44,11 | 44,19 |
| MAZOWIECKIE | 45,92 | 46,07 | 49,53 | 49,89 | 49,01 | 48,47 | 48,90 | 48,38 |
| OPOLSKIE | 43,13 | 43,21 | 49,23 | 49,08 | 48,53 | 46,22 | 47,74 | 46,15 |
| PODKARPACKIE | 44,91 | 44,89 | 47,42 | 47,81 | 48,32 | 48,17 | 48,61 | 48,00 |
| PODLASKIE | 49,61 | 47,45 | 48,81 | 48,96 | 49,44 | 49,91 | 50,77 | 50,35 |
| POMORSKIE | 38,27 | 37,41 | 39,60 | 41,20 | 40,54 | 41,19 | 39,38 | 39,82 |
| ŚLĄSKIE | 56,07 | 55,27 | 56,33 | 56,31 | 56,17 | 55,85 | 55,75 | 55,17 |
| ŚWIĘTOKRZYSKIE | 50,25 | 50,44 | 51,66 | 48,90 | 49,95 | 50,22 | 50,38 | 49,09 |
| WARMIŃSKO-MAZURSKIE | 41,17 | 43,25 | 46,18 | 46,13 | 45,98 | 46,32 | 47,04 | 46,79 |
| WIELKOPOLSKIE | 45,36 | 45,19 | 46,55 | 42,28 | 45,11 | 45,34 | 44,30 | 44,71 |
| ZACHODNIOPOMORSKIE | 45,17 | 44,96 | 48,72 | 48,89 | 48,69 | 48,34 | 47,85 | 46,29 |

Source: (Local Data Bank, Central Statistical Office).

Table 6. Doctors with the right to practice a medical profession per 10,000 population by voivodeships for 2010–2017⁵.

| Województwo | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| | [osoba] | [osoba] | [osoba] | [osoba] | [osoba] | [osoba] | [osoba] | [osoba] |
| DOLNOŚLĄSKIE | 37 | 38 | 38 | 39 | 40 | 40 | 41 | 42 |
| KUJAWSKO-POMORSKIE | 28 | 29 | 29 | 30 | 30 | 30 | 31 | 32 |
| LUBELSKIE | 36 | 37 | 37 | 38 | 38 | 39 | 40 | 41 |
| LUBUSKIE | 24 | 24 | 24 | 24 | 26 | 24 | 25 | 25 |
| ŁÓDZKIE | 41 | 42 | 43 | 44 | 44 | 45 | 46 | 46 |
| MAŁOPOLSKIE | 35 | 36 | 35 | 37 | 38 | 37 | 38 | 39 |
| MAZOWIECKIE | 46 | 46 | 47 | 47 | 48 | 48 | 49 | 50 |
| OPOLSKIE | 24 | 24 | 24 | 25 | 25 | 26 | 26 | 26 |
| PODKARPACKIE | 24 | 24 | 25 | 25 | 25 | 26 | 27 | 27 |
| PODLASKIE | 40 | 41 | 41 | 42 | 43 | 43 | 44 | 44 |
| POMORSKIE | 37 | 37 | 37 | 37 | 38 | 39 | 39 | 39 |
| ŚLĄSKIE | 36 | 36 | 36 | 37 | 37 | 38 | 38 | 39 |
| ŚWIĘTOKRZYSKIE | 27 | 28 | 28 | 29 | 29 | 30 | 30 | 31 |
| WARMIŃSKO-MAZURSKIE | 24 | 24 | 25 | 25 | 26 | 26 | 26 | 27 |
| WIELKOPOLSKIE | 31 | 31 | 31 | 32 | 31 | 32 | 32 | 29 |
| ZACHODNIOPOMORSKIE | 34 | 35 | 35 | 36 | 36 | 37 | 37 | 37 |

Source: (Local Data Bank, Central Statistical Office).

⁴ Data for 2018 are not yet available on the website of the Central Statistical Office.

⁵ Data for 2018 are not yet available on the website of the Central Statistical Office.

Table 7. Zero unitarisation method

| kryterium | | Wskaźnik 1 | Wskaźnik 2 | Wskaźnik 3 | Wskaźnik 4 | Wskaźnik 5 |
|---------------------------------|---------------------|-------------|------------|------------|------------|------------|
| Rodzaj zmiennej diagnostycznej | | S | S | S | S | S |
| Rok 2016 | | | | | | |
| Obszary i wielkości określające | DOLNOŚLĄSKIE | 107130130,2 | 53659,00 | 4385,84 | 51,31 | 41 |
| | KUJAWSKO-POMORSKIE | 105426976,3 | 39503,00 | 3672,98 | 47,31 | 31 |
| | LUBELSKIE | 52643308,06 | 33371,00 | 3815,95 | 52,76 | 40 |
| | LUBUSKIE | 29161367,16 | 40639,00 | 3734,90 | 42,73 | 25 |
| | ŁÓDZKIE | 106478682,8 | 45199,00 | 3925,10 | 51,41 | 46 |
| | MAŁOPOLSKIE | 133370444,4 | 43865,00 | 4077,91 | 44,11 | 38 |
| | MAZOWIECKIE | 310656140,1 | 77359,00 | 5240,86 | 48,90 | 49 |
| | OPOLSKIE | 27253684,28 | 38551,00 | 3927,04 | 47,74 | 26 |
| | PODKARPACKIE | 48581893,95 | 34120,00 | 3653,67 | 48,61 | 27 |
| | PODLASKIE | 32775731,33 | 34299,00 | 3767,20 | 50,77 | 44 |
| | POMORSKIE | 74672329,65 | 46913,00 | 4274,73 | 39,38 | 39 |
| | ŚLĄSKIE | 268482981,5 | 50184,00 | 4295,29 | 55,75 | 38 |
| | ŚWIĘTOKRZYSKIE | 32875236,91 | 34633,00 | 3669,57 | 50,38 | 30 |
| | WARMIŃSKO-MAZURSKIE | 41195759,72 | 34514,00 | 3619,16 | 47,04 | 26 |
| | WIELKOPOLSKIE | 118501763,5 | 52844,00 | 3894,10 | 44,30 | 32 |
| ZACHODNIOPOMORSKIE | 62650837,46 | 40592,00 | 3946,28 | 47,85 | 37 | |

| Macierz | x1 | x2 | x3 | x4 | x5 | Q |
|---------------------|--------|--------|--------|--------|--------|--------|
| MAZOWIECKIE | 1,0000 | 1,0000 | 1,0000 | 0,5816 | 1,0000 | 0,9163 |
| ŚLĄSKIE | 0,8512 | 0,3822 | 0,4169 | 1,0000 | 0,5417 | 0,6384 |
| DOLNOŚLĄSKIE | 0,2818 | 0,4612 | 0,4728 | 0,7288 | 0,6667 | 0,5223 |
| ŁÓDZKIE | 0,2795 | 0,2689 | 0,1887 | 0,7349 | 0,8750 | 0,4694 |
| MAŁOPOLSKIE | 0,3744 | 0,2386 | 0,2829 | 0,2889 | 0,5417 | 0,3453 |
| LUBELSKIE | 0,0896 | 0,0000 | 0,1213 | 0,8173 | 0,6250 | 0,3307 |
| PODLASKIE | 0,0195 | 0,0211 | 0,0913 | 0,6958 | 0,7917 | 0,3239 |
| WIELKOPOLSKIE | 0,3220 | 0,4427 | 0,1695 | 0,3005 | 0,2917 | 0,3053 |
| ZACHODNIOPOMORSKIE | 0,1249 | 0,1642 | 0,2017 | 0,5174 | 0,5000 | 0,3016 |
| POMORSKIE | 0,1673 | 0,3079 | 0,4042 | 0,0000 | 0,5833 | 0,2926 |
| KUJAWSKO-POMORSKIE | 0,2758 | 0,1394 | 0,0332 | 0,4844 | 0,2500 | 0,2366 |
| ŚWIĘTOKRZYSKIE | 0,0198 | 0,0287 | 0,0311 | 0,6720 | 0,2083 | 0,1920 |
| OPOLSKIE | 0,0000 | 0,1178 | 0,1899 | 0,5107 | 0,0417 | 0,1720 |
| PODKARPACKIE | 0,0753 | 0,0170 | 0,0213 | 0,5638 | 0,0833 | 0,1521 |
| WARMIŃSKO-MAZURSKIE | 0,0492 | 0,0260 | 0,0000 | 0,4679 | 0,0417 | 0,1170 |
| LUBUSKIE | 0,0067 | 0,1652 | 0,0714 | 0,2046 | 0,0000 | 0,0896 |

Source: Own study.

4. SUMMARY

As it can be seen from the analysis, the private health insurance sector in Poland is constantly evolving, and their high increase y / y indicates a change in the approach to health protection of both society and employers. The situation in the public health care system has a huge impact on this, problem of which is among others bureaucracy, taking the doctor time that he could devote to the patient. The situation is also complicated by the decreasing

number of doctors, what hinders access to private healthcare. Long queues to get to specialists are forming, and benefits bought outside insurance – “out of pocket” - are becoming more and more expensive. According to CSO data, medical services in July 2019 were more expensive by 5.6% than the year before. Therefore, the fastest and easiest way to take advantage of private health services in large agglomerations, where at the turn of the last years a lot of non-public medical facilities have developed, providing access to most specialists without the long waiting to which the use of public health care forces.

To summarise, private health insurance is becoming increasingly important for the proper functioning of the public health care system in Poland. However, without appropriate legislative solutions, private health insurance will not be able to play a proper role in improving the functioning of public health care in Poland. The changing approach of employers should be used for this and the awareness of such change in the young generation should be shaped all the time.

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Ewa PONDEL¹

SECRET INVENTION AS A FORM OF SECURING STATE INTERESTS IN THE FIELD OF DEFENSE AND STATE SECURITY

The purpose of this paper is to characterize a secret invention and to evaluate and analyze this legal institution in the context of security protection. A secret invention is an exception to the principle of disclosure of inventions, commonly used in both Polish and international patent law. This special solution is of great importance in the field of national defense and security, enabling control over the effects of research and development in the area of broadly understood security. The main research methods that were used in this work are the method of analysis, the legal-empirical method and the method of synthesis. System analysis allowed establishing patent protection principles and distinguishing the principle of public transparency in this area. A critical analysis based on the analysis of the texts of legal acts from the studied area allowed determining the essence of a secret invention, understand and interpret legal procedures related to the classification of the invention. On the other hand, legal and empirical studies were used to clarify doubts in the practical application of provisions of statutory law. In order to make the necessary generalizations and present the final conclusions, the synthesis method was applied.

Keywords: security management, state security, secret invention, special services.

1. PRINCIPLES OF PATENT PROTECTION

In the Polish Industrial Property Law of June 30, 2000 (OJ of 2017, item 776 (as amended) (hereinafter referred to as Industrial Property (I.P.) modeled on international patent conventions, the definition of the invention was abandoned. The current provisions do not contain a definition of the invention “as such”, however, they refer to inventions which patents are granted for, taking them from the positive side – by listing the constitutive features of the invention, and from the negative side – by indicating solutions that cannot be qualified as inventions or cannot be patented (Skubisz, 2012). In accordance with art. 24 I.P. “Patents are granted – regardless of the field of technology – for inventions that are new, have an inventive level and are suitable for industrial use”.

The invention in the subjective sense refers to the creation of the human mind. However, they are not inventions of “the discovery of phenomena and processes occurring in nature or society or the laws governing these fields, as well as the results of purely manual work,

¹ Ewa Pondel, M.A., assistant, Department of Law and Administration, Faculty of Management, Rzeszow University of Technology Ignacy Łukasiewicz, al. Powstańców Warszawy 12, 35-959 Rzeszów; e-mail: epondel@prz.edu.pl. ORCID: 0000-0001-8096-5897.

it is a requirement of mental creativity” (Szewc, Jyż, 2003). In contrast, the invention with the subject matter refers to a mode of action indicating “all means necessary to achieve a practical goal and through an application it allows to achieve this goal (completeness of the solution)”. General ideas are not considered inventions: only the formulation of the problem, the initial concept of its solution which do not contain full and detailed instructions for effective conduct” (Szewc, Jyż, 2003).

An extremely interesting definition of the invention should be attributed to the English historian L. Bender, according to whom the invention is something that was invented and constructed, in contrast to the discovery of something that already existed but was not known (Bender, 1995). The invention is usually associated with something new, revealing, presented never before. This is a special solution to the problem, considered by the creator to be completely new and innovative. The essence of the invention is often identified with a technical solution to any problem (Szewc, Jyż, 2003).

The literature on the subject pointed out that the greatest development of inventiveness always occurred during the war. Aggression or defense against aggression increases creative effort and accelerates the development of technology. The living needs of man were also an equally important driving force of progress, and the first inventions in this field were farm tools used and gradually improved for almost 2 million years (Orłowski, 1999).

In accordance with art. 24 of the I.P., an invention needs to meet certain requirements to be patentable. Patents are granted only for technical solutions regardless of the field of technology which are new, have an inventive level and are suitable for industrial use. An invention is new if it does not form part of the state of the art. The term “prior art” refers to technical knowledge and means, in accordance with Article 25 of the Public Procurement Law, everything that before the date on which priority is given to obtain a patent has been made available to the public in the form of a written or oral description, by use, issuing or disclosing otherwise (Decision KO EUP T 144/83, Official Journal of the EUP of 1986 No. 301). In the event of independent applications for the same solution, priority is given to the earlier one (Vall, 2008).

An invention is considered to have an inventive level (Article 26 of the Public Procurement Law) if it is not obvious to a person skilled in the art and it does not result directly from the state of the art. On the other hand, the expert is a person who, in the field covered by the invention, has at least knowledge and skills that can be described as common and generally recognized achievements in this field of technology (Sieńczyło-Chlabicz, 2011). The requirement to have an appropriate inventive level is to ensure that patents are granted only for creative and ingenious solutions and not for those that are already publicly known.

The industrial applicability of the invention (Article 27 of the Public Procurement Law) occurs when, according to the invention, a product or a method can be obtained, in a technical sense, in any industrial activity without excluding agriculture. The invention needs to be able to be implemented, be able to be used with identical effect in a repetitive manner, and must also achieve the specific practical purpose indicated in the application.

A patent may be granted for an invention that meets the above requirements. The word patent is derived from the Latin language, being the commonly accepted abbreviation for the term *litterae patentes*, meaning (open letters)², in other words: confirming with an official document the giving of the entities listed therein certain rights, privileges or titles (Vall,

² In French, the Latin abbreviation has also been used, but neither the meaning nor the wording corresponds to the phrase *litterae patentes*. From the phrase *litterae breves* (i.e. short letter) only the

2008). The provision of art. 63 par. 1 of the Public Procurement Law, provides that by obtaining a patent, one may acquire the exclusive right to use the invention in a profitable or professional manner throughout the entire territory of the Republic of Poland. This regulation undoubtedly contains the most important provision of patent law (Szajkowski, 2003). The patent gives the right holder the exclusive right to manufacture use, offer for sale or import a product or process based on the invention, thus prohibiting such activities to other entities without the prior consent of the patent owner. The doctrine claims that the exclusive right to use the invention specified in the cited provision is a positively defined sphere of the possibilities of using it, consisting in the possibility of using the invention and reaping the benefits of “owning” and “disposing” (Szajkowski, 1990).

A patent is an important tool used by enterprises in business activities, including raising the company's reputation as well as obtaining additional income, e.g. from licenses granted for the use of a given invention.

Patents are granted by national offices, in Poland by the Patent Office of the Republic of Poland or regional offices – the European Patent Office and other regional and international offices (the patent is granted in the countries designated by the applicant).

It is advisable to submit a notification immediately after the development of a technical solution, the earlier the notification is filed, the lower the risk of losing the patentability of the invention due to the fact that another entity will sooner apply the same technical solution in any country. In most countries around the world, patents are granted on a first-come, first-served basis (Source: www.uprp.pl). An application called a patent application can be filed by both a natural and legal person. In practice, patents are the result of investments made by enterprises in the field of innovation. The fact of having a patent entitles its holder to prevent others from producing, selling or using the invention without the permission of its creator, as well as making commercial use of the patent. The exclusive right to use the invention in a profitable manner is granted to the patent owner, for a maximum of 20 years from the date of filing.

One of the key principles relating to the protection of inventions is the principle of openness of the invention. It means that the applicant is obliged to publicly disclose the essence of the invention in its description, which is part of the application documentation. The essence of the patent system is to grant the monopoly (exclusive rights) to the creator more precisely – the patent holder, to use the invention in a specific territory and at a specified time. These monopolies are granted in exchange for full disclosure to virtually the entire world of the solution that has been made. Information about the patent application and about the granted patent is published by Patent Offices around the world in official publications, in Poland in the Patent Office Bulletin (an application) and Patent Office News (obtaining the patent), respectively. In accordance with legal regulations in most countries, including Poland, disclosure should be made in such a way that both the essence of the invention and the solution itself are understood to the extent necessary to implement it. Published patent applications are a valuable source of knowledge about the results of scientific research in a given field, ahead of the arrival of a specific product on the market. Considering the procedure for granting patents, it should be noted that it is time consuming, usually it takes several years, the earlier the application is filed, the earlier the holder of the invention will be able to pursue his claims against infringers who would like to unlawfully obtain his hand

word *breves* (the French word *brevet* derived from it) is left, and then the word “Invention”, resulting in the term *brevet d'invention* (Machlup, 1958).

and obtain undue benefit from someone else's idea. However, the creator may not always enjoy his invention. It may turn out that the invention regarding some special solutions will be kept secret by the state.

2. THE CONCEPT OF SECRET INVENTION

A secret invention is an exception to the principle of disclosure of inventions. It serves to protect against public access to solutions that can be used for specific purposes, especially in fields related to defense and security.

According to art. 56 of the I.P. an invention made by a Polish citizen may be considered secret if it relates to national defense or security. An invention may be classified as secret if it was made by a Polish citizen, regardless of where they reside or who has the right to a patent (Miklasiński, 2001). The invention is not secret by itself, but only after a specific procedure (Vall, 2008). Inventions regarding state defense include, in particular, types of weapons, explosives, listening and eavesdropping systems, command methods and procedures, as well as technical means legally used by the services of the Polish state (Article 56 (2) I.P.). Inventions regarding state security are technical measures used by special services authorized to perform operational and reconnaissance activities, as well as modern types of equipment and fittings, and methods of use by these services (Article 56 (3) of the I.P.).

The detailed types of solutions that may be subject to confidentiality have been specified in § 2 of the Regulation of the Council of Ministers of July 23, 2002 on inventions and utility models regarding state defense or security (OJ of 2002 No. 134, item 1338). Such solutions may include, in particular, solutions in the field of weapons, ammunition, explosives or direct coercion measures, sights, observation and range devices used in combat equipment, combat motor vehicles, airplanes, helicopters and warships means of detecting and destroying sea and land mines, means and methods of masking combat equipment and detecting masked equipment, crossing and landing means, fortifications and combat shelters of transport infrastructure facilities, anti-aircraft and missile defense systems, means and means of command of troops, special IT measures, special means of information, communication, land, air or water applicable in combat operations, or using operational reconnaissance activities, methods of counteracting radio-electronic diversion, means of detecting and measuring radioactive contamination chemical, microbiological, special wired and wireless means of communication, special technical means, equipment and devices suitable for carrying out operational reconnaissance activities, as well as protection of classified information (Czarnocka, 2018).

The submission of a secret invention to the Patent Office is only intended to claim priority to the patent obtained. While the patent application has a security classification, the Patent Office does not consider this application (Article 58 of the Civil Code). The Patent Office also decides not to recognize the invention as secret. The decision on the secrecy of the invention regarding the defense and security of the State is made by the Minister of National Defense, minister competent for internal affairs or the Head of the Internal Security Agency, respectively (Article 57 (2) of the I.P.). In most cases, even before filing the patent application with the Patent Office, the person entitled to obtain a patent for the invention applies to an authorized state body with a request to obtain the status of the secret. Very often it is an entity covered by the Act on the Protection of Classified Information, and the studies under which the invention was created were previously also classified. You can also apply for a status of secrecy after filing with the Patent Office. In such a situation,

the decision to recognize the invention as secret should be attached to the previously filed application, and only from that moment will the invention be treated as secret. However, it seems that the submission of a decision on the secrecy of an invention should be provided at an early stage of the patent procedure, and in particular prior to the announcement of the invention application (Article 43 of the Public Procurement Law). Upon application, the invention is disclosed and becomes part of the state of the art (Demendecki, Niewęglowski, Sitko, Szczotka, Tylec, 2015).

In accordance with art. 57 section 1 I.P. secret invention is classified information within the meaning of the Act on the Protection of Classified Information of August 5, 2010 (OJ of 2019, item 742). After the invention is recognized as secret, the competent authority gives it one of the following clauses: “top secret”, “secret”, “confidential” or “proprietary”. In practice, the procedure for obtaining this clause depends on the type of invention and the holder. The degree of protection of classified information depends mainly on its classification. Its consequence is to provide classified information with an appropriate confidentiality clause. If the entire document has a specific security classification, all its elements are equally protected (Wyrok Naczelnego Sądu Administracyjnego w Warszawie z dnia 26 marca 2013 r.).

The highest confidentiality clause is the “top secret” clause, which is given to classified information if their unauthorized disclosure could cause exceptional serious damage to the Republic of Poland in that it could: threaten the independence of the sovereignty or territorial integrity of the Republic of Poland; threaten the internal security or constitutional order of the Republic of Poland; threaten alliances or the international position of the Republic of Poland; weaken the defense readiness of the Republic of Poland; identify officers, soldiers or employees of services responsible for the implementation of intelligence or counterintelligence tasks who perform operational intelligence activities, if this would threaten the security of the activities performed or could identify the persons assisting them in this regard; threaten the life or health of officers, soldiers or employees performing operational intelligence, or persons providing assistance to them in this respect; threaten the life or health of crown witnesses or their relatives or the so-called anonymous witnesses or persons close to them, i.e. in a situation where there is a justified fear of danger to life, health, freedom or property in significant intentions of the witness or a person closest to them (Sakowicz, 2017).

Another type of “secret” clause is classified information, if its unauthorized disclosure could cause serious damage to the Republic of Poland by preventing the implementation of tasks related to the protection of the sovereignty or constitutional order of the Republic of Poland; would deteriorate the relations of the Republic of Poland with other countries or international organizations; would disrupt the state's defense preparations or the functioning of the Armed Forces of the Republic of Poland; would impede the performance of operational and reconnaissance activities conducted to ensure state security or prosecute perpetrators of crimes by services or institutions authorized to do so; would significantly disrupt the functioning of law enforcement and judicial authorities would result in a loss of considerable size in the economic interests of the Republic of Poland (Hałas, 2017).

In turn, classified information is given the “confidential” clause if its unauthorized disclosure causes damage to the Republic of Poland by: that it impedes the current foreign policy of the Republic of Poland; impedes the implementation of defense projects or negatively affects the combat capability of the Armed Forces of the Republic of Poland; disturbs

public order or threaten the security of citizens; impedes the performance of tasks by services or institutions responsible for protecting security or the basic interests of the Republic of Poland; impedes the performance of tasks by services or institutions responsible for protecting public order, the security of citizens or prosecution of perpetrators of fiscal offenses and criminal offenses, and judicial authorities would threaten the stability of the financial system of the Republic of Poland; adversely affects the functioning of the national economy (Leciak, 2011).

The lowest type of clause given to classified information is the “restricted” clause, which is granted when classified information has not been given a higher classification and their unauthorized disclosure may have a detrimental effect on the performance of national defense tasks by public authorities or other organizational units, foreign policy, public security, compliance with the rights and freedoms of citizens, the judiciary or the economic interests of the Republic of Poland (Hoc, 2017).

The consequence of the decision on the secrecy of the invention is the inability to take up and pursue proceedings leading to obtaining a patent, the Patent Office also does not publish an announcement about the submitted invention. As a result, the holder cannot be granted a patent for such an invention. A secret invention may be filed at the Patent Office only to reserve priority to a patent (Article 58 (1) of the I.P.). This will prevent any possible grant of a patent in another country due to the earlier priority date of filing a secret invention in Poland.

The right to obtain a patent for a secret invention submitted to the Patent Office in order to claim priority passes for compensation to the State Treasury, represented by the authorized body, which decided to recognize it as a secret invention (Article 59 (1) of the I.P.). A natural or legal person who filed an application for an invention loses the exclusive rights to the patent to the Treasury. The amount of compensation is determined according to the market value of the invention. Payment of compensation is paid out of the state budget one time or in parts every year, but not longer than for 5 years. If the entitled party does not agree with the amount of compensation determined, in accordance with art. 284 point 5 of the p.p. he has the right to bring a claim for damages before a common court, which in civil proceedings will determine both the amount and the rules for payment of damages (Doliński, [https](https://)). The classification of the solution as a secret invention and the deprivation of the right to a patent should be considered a case of expropriation (Nowińska, 1982). It should be noted that secret inventions apply only to a given country.

The recognition that an invention has ceased to be secret is decided by the same authority that decided on its secrecy, and accordingly the Minister of National Defense, the minister competent for internal affairs or the Head of the Internal Security Agency. In this case, at the request of the relevant entity, the Patent Office may initiate or resume the procedure for granting a patent, especially if the period of 20 years has not expired since the date of filing the invention (Doliński, [https](https://)). The entity entitled to obtain a patent for a declassified invention is the State Treasury, it may transfer the right to the patent to another entity (e.g. a State Treasury company). Completion of the proceeding with a positive decision will allow the use of the invention, e.g. the sale of the device containing the invention, while maintaining the monopoly arising from the patent. It should be noted, however, that all forms of prior disclosure of the invention harm its novelty and patentability. Such disclosure of the invention should be considered its use in covert operations carried out by security services, or to clarify the principles of its operation in specialist literature (Demendecki, Niewęłowski, Sitko, Szczotka, Tylec, 2015).

Similar patent procedures apply in most European countries, the USA and Great Britain. In the United States in 1951, the American Secrecy Invention Act was created, which imposed a government “secrecy order” on patent applications that contain confidential information, thus restricting access to the invention and withholding the grant of a patent. Very similar to Poland, there are several types of secret orders that differ in secrecy. At the end of the fiscal year 2016, the number of patents covered by the security classification was around 6,000 and was the highest since 1993 (<https://zmianywnaziemi.pl/wiadomosci/rzad-amerykanski...>).

3. CRIMINAL ASPECTS OF THE INVENTION WITH THE “SECRET” CLAUSE

When analyzing the problem of a secret invention in the light of the applicable provisions of criminal law, it seems that the simplest form of protection of intangible assets is to keep secret the fact of the creation of the good. However, it is difficult to reconcile with the fact that the inventor creates their work in order to be used by a fairly broadly understood social environment. However, there is a need to create various forms of protection so as to disseminate these intangible goods while not exposing the artist to moral and material damage. A group of intangible goods subject to exceptional protection is a secret invention.

As previously mentioned, a secret invention is classified information. This concept was formulated in the provisions of the Act of August 5, 2010 on the protection of classified information (OJ of 2019, item 742) and replaced the concept of state secrets, commonly used in earlier regulations. Referring to the Act on the protection of classified information, it should be assumed that classified information is one whose unauthorized disclosure may cause serious damage to the security and defense of the Polish state, or would be unfavorable from the point of view of its interests, also during its development and regardless of the form and the way they are expressed (Article 1 (1) of the Act on the protection of classified information).

A secret invention is a special type of solution that is of strategic importance for national security, it cannot be made public, it is subject to special legal protection, and the creator cannot disclose it. It should be borne in mind that in the case of unlawful disclosure of information about a secret invention and disclosure of the technical solution itself, which is a secret invention, you may be guilty of the offense of disclosing or using classified information under Art. 265 of the Penal Code. This provision regulates the inadvertent disclosure of such information that has been acquainted in connection with the performance of a public function or the authorization received, as well as a qualified type covering the situation when such information was disclosed to a person acting on behalf or on behalf of a foreign entity.

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The offense specified in art. 265 § 1 of the Criminal Code (basic type) is intentional, the perpetrator of this crime must be aware of the information he discloses or uses. They carry the features of classified information regarded as “secret” or “top secret”. Committing this crime is also possible with the possible intention, when the perpetrator, taking certain actions and is aware that they can with high probability lead to getting acquainted with classified information by an unauthorized person. The offense specified in art. 265 § 2 of the Criminal Code (qualified type) is intentional, it is possible to commit with both direct and eventual intention. The offense specified in Art. 265 § 3 of the Criminal Code as an unintentional crime, it may be committed if the perpetrator, without intent to commit it, commits it as a result of failure to observe the caution required in the given circumstances, although the possibility of committing this act was foreseen or could have foreseen.

For committing the offense specified in art. 265 § 1 of the Criminal Code (basic type) a penalty of imprisonment from 3 months to 5 years is foreseen. The statutory penalty for this act entitles the court to order a fine or a penalty of restriction of liberty instead of a penalty of imprisonment. The qualified type of the offense of disclosure of classified information classified as “secret” or top secret (art. 265 § 2 of the Criminal Code) is punishable by imprisonment from 6 months to 8 years. For the offense provided for in art. 265 § 3 of the Criminal Code a fine, restriction of liberty or imprisonment of up to one year has been imposed. As regards criminal measures, the court may order a ban on holding a specific position or exercising a specific profession. The offense specified in art. 265 of the Criminal Code are prosecuted for public prosecution (Kamuda, 2018).

4. CONCLUSIONS

The classification of the secret invention is of great importance in the field of defense and security of the state. It enables the state to maintain control over the effects of research and development in the sphere of state security and defense. This applies to both research carried out by entities operating on the basis of the Act on the protection of classified information, as well as any other entities outside this system. It can be assumed that these regulations, contained in the Industrial Property Law, are consistent with other regulations that are the basis for conducting business activity in the field of state security and defense (Dana, 2016). By classifying the invention, the state has the ability to quickly take direct control over all technical solutions that will be used by state services to protect internal and external security. The effectiveness of actions in the sphere of security protection depends largely on the use of modern equipment, current procedures and methods of operation, and the use of new strategies.

The justification for classifying and depriving one of the right to protect an invention is to protect the security of the state and to obtain an adequate response in the face of danger. State security is one of the basic existential values whose goal is to ensure the integrity of the state, the smooth functioning of its own citizens and other entities, and to enable them all to develop effectively. The existence of the state security of the state is inseparably connected with the internal sense of security of individual people who make up the state, a necessary condition for maintaining state security is the creation of an organizational system capable of maintaining and protecting these values in all conditions (Pomykała, 2011). State security is here an example of the public interest that should be put before the protection of the individual interest.

It should also be emphasized that the design of the secrecy of inventions does not definitively prevent a patent from being obtained. It provides for the situation of further processing of the notification, when it turns out that the security classification is no longer needed. The rightholder may, therefore, acquire exclusive rights to the invention, which in turn gives him the right to make commercial use of the invention (by selling products or granting a license). The inventor of the invention, which as a result of secrecy has lost the right to a patent, has been provided compensation for claims arising from the loss of the invention and consequential damages. The provisions of the Act also guarantee the possibility of any disputes arising from this in court.

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Iwona WOJCIECHOWSKA¹

MARKET APPROACH TO EDUCATIONAL SERVICES IN POLISH HIGHER EDUCATION

The political changes that took place in Poland at the turn of the eighties and nineties of the twentieth century influenced not only the transformation of the political and economic systems, but also the majority of areas of social life. In higher education, the changes were the most dynamic. The purpose of this article is to look at the circumstances of the emergence of the higher education market in Poland and to consider the consequences of the market approach to the educational activity of universities.

The introduction of market mechanisms in Polish higher education and changes in the socio-economic environment mean that universities that are not able to cope with competition and growing market requirements often face serious problems. Therefore, long-term strategic thinking and the use of tools to strengthen or at least maintain the current position of universities on the market is necessary.

Keywords: university market, Polish universities, educational service, higher education, market mechanism, communication with the environment.

1. INTRODUCTION

The political changes that took place in Poland at the turn of the 1980s and 1990s influenced not only the transformation of the political and economic systems, but also the majority of areas of social life. Higher education was one of the areas in which transformations, both institutional and quantitative ones, were the most dynamic. The legal basis for all transformations in this area was provided by the Act of September 12, 1990 on Higher Education (Journal of Laws No. 65 of 1990, Item 385 as amended), which contained regulations regarding the construction of a new model of higher education. The most important provision of this Act spoke of the abolition of the existing state monopoly in the creation and running of universities², thus offering the possibility of establishing non-state universities³ and the introduction of paid forms of education in state institutions (evening, extramural and post-graduate studies). The aim of this article is to take a closer look at the circumstances of the

¹ Iwona Wojciechowska MA, The Faculty of Management, Department of Marketing, Rzeszów University of Technology, al. Powstańców Warszawy 12, 35-959 Rzeszów; e-mail: iwojciechowska@prz.edu.pl, 17 7432522. ORCID: 0000-0003-0678-1066.

² In Poland before 1990, only state universities existed, the only exception was the John Paul II Catholic University of Lublin (KUL).

³ The first non-state university in Poland was the Private School of Business and Administration in Warsaw (currently: the Private College of Business, Administration and Computer Techniques in Warsaw), founded by Tadeusz Koźluk by the decision of the Minister of Education of 29 June 1991.

emergence of higher education market in Poland and to consider the consequences of a market-based approach to the educational activity of universities. To achieve the set goal, literature on the subject, legal acts and statistical data were analysed.

2. BEGINNINGS OF THE HIGHER EDUCATION MARKET IN POLAND

Before 1990 in Poland, we had a small number of universities, transparency of structures, unified curriculum content, as well as competition-free centrally funded higher education (See: Dybaś, Dziemianowicz-Bąk et al., 2012; Kaczmarczyk, 2013). As noted by M. Kaczmarczyk (2013), the Act introduced in 1990 and the formal and legal changes resulting from it, became the basis for building a completely different from the previous one model of higher education, based on reformed state and emerging non-state universities. The development of non-state universities introduced market competition mechanisms to the field of social life, which until now had entirely been subordinated to state central planning and management (Waltoś, Rozmus [ed.], 2016). A. Buchner-Jeziorska (2005) writes directly about the more or less conscious (intentional) transformation of the higher education system into the market of educational services.

According to the general definition, the market is a place where demand and supply meet, at which the price is set. Otherwise, it is also the overall relationship between entities (sellers and buyers) participating in exchange processes (Wrzosek, 2012). By adapting this definition to the sphere of services, it can be specified that the services market is formed by relationships between entities providing services (service providers) and entities expressing interest in their purchase (recipients) (Czubała, Jonas et al., 2012).

If we assume that competition is also an inseparable element of the market, then the moment of implementation of the aforementioned Act can be regarded as the beginning of the existence of the market of educational services in higher education in Poland. A completely new phenomenon appeared in the functioning monolithic structure – competition, and the market rule of balancing demand and supply began to affect the forms of activity and the socio-economic condition of universities (Kaczmarczyk, 2013).

A. Buchner-Jeziorska emphasizes that the emergence of the market was the result of a number of phenomena and socio-economic processes directly or indirectly related to this area (Buchner-Jeziorska, 2005). According to the author, the direct reasons for the emergence of the higher education market should be sought in:

- complete lack of an idea for the state's education policy in the first half of the 1990s (the first, rather general document, which set out the assumptions for the state's education policy, was not developed until 1996),
- quick withdrawal of the state from the so-called *soft financing* of the public sector, which in the case of higher education has resulted in a drastic reduction in expenditure on this sphere, especially per student,
- introducing a market mechanism as the basic regulator of the functioning of higher education in Poland by enabling (pursuant to the Act of 1990) the establishment of non-state universities and charging fees for certain forms of education at state universities.

The indirect causes are:

- changes in the structure of demand for highly qualified staff, mainly in the field of business management,

- propagated ideology of building market economy, the pillars of which were supposed to be business people (entrepreneurs, managers, financiers etc.),
- increase in the market value of higher education, defined as the correlation between education and the amount of income received,
- growing educational aspirations of the Polish society in connection with the widespread recognition of higher education as a chance for professional success and obtaining high income,
- entering of subsequent baby boom cohorts into the market of educational services in higher education.

It is worth noting that the higher education market due to applicable legal regulations and the type of services provided was and still is quite unusual. Firstly, because we cannot talk about a completely free market here, because the state defines the conditions for its functioning, has appropriate regulatory instruments and has the right to intervene in a situation when market mechanisms do not work properly (Drapińska [2011] writes about the so-called quasi-market, i.e. a state-controlled market), and secondly because, apart from paid services, there are also forms that do not require payment from the buyer (full-time studies in public universities) (See: Kulig, 2004; Drapińska, 2011).

3. THE ESSENCE OF EDUCATIONAL SERVICE IN HIGHER EDUCATION

Generally, educational services of universities are professional services provided by entities that must meet specific, legally regulated requirements, their provision process lasts for a long time and is complicated. It should be added that the recipient plays an important role in determining the final result, much depends on his approach to the subject of services and individual commitment. The mutual relations between the service provider and the recipient are of equal importance. The situation is specific because over several years, many people from various areas are involved in the process of providing educational services, many of whom have direct contact with and thus some impact on the student, so that they can affect the student's subsequent assessment of the quality of the service as a whole (Kulig, Nowaczyk, 2011).

As already mentioned, educational services are more complex and of a different character than most standard services. According to M. Szablowski, among the phenomena that contribute to their difference are (Szablowski, 2004):

- the dual role of a student who is at the same time a client and product: the university provides a student with educational service and offers a product – a graduate to the labour market,
- exceptionally high student participation in co-creating the service (prosumption),
- difficulty in determining by the candidate the expectations of the service and its quality – the candidates do not have sufficient knowledge to assess them properly,
- high mental pressure when choosing a university – this is not only a consumer's decision, but also life choice, not related to market behaviour,
- one-time use of the service – as a rule, studies are undertaken once in a lifetime, the change of studies results in a loss of part of money and student's own work invested,
- very long lead time compared to other services,
- complex decision-making process – decision assessment will take place in the distant future, it will be made from the perspective of the later career path and the situation on the labour market,

- the ability to change expectations about the service while receiving it – this is a function of time and the student's personal development during studies,
- dilemma between the pursuit of knowledge (using the educational service in full) and the reluctance to put effort in studying,
- discrepancy between ambitions and level of self-esteem and the possibilities of achieving the expected results.

A. Drapińska, justifying the fact that the quality of higher education services can only be partially assessed while getting them, and full verification usually takes place only after they have been provided and usually from a longer time perspective, defines them as an *experimental good* (Drapińska, 2011).

As A. Kulig and G. Nowaczyk rightly note, educational services also have problems with standardization (Kulig, Nowaczyk, 2011). Of course, such attempts are made on many levels, because you can standardize procedures (e.g. documentation, applicable terms, etc.), content (curricula) or assessment methods, but it is difficult to introduce standards covering the level of knowledge, the appropriate ways of applying it, communication skills, etc. It is also difficult to precisely define all the elements that make up the university's service offer, the way it is shaped and perceived by the recipient. The starting point here are legal regulations that universities must comply with, but they only specify the basic functions of the educational service and still many areas remain underdefined (Kulig, Nowaczyk, 2011). Under the Act on Higher Education and Science (The Act of 20 July 2018 on Higher Education and Science, art. 11) the basic tasks of the university include:

- providing education in studies,
- providing post-graduate education or other forms of education,
- participating in scientific activity, providing research services and sharing the knowledge and technology with the economy,
- providing doctoral education,
- educating and promoting academic staff,
- creating conditions for the disabled to participate fully in the education process and scientific activities,
- raising students in a sense of responsibility for the Polish state, national tradition, strengthening the principles of democracy and respect for human rights,
- creating conditions for the development of students' physical culture,
- propagating and multiplying the achievements of science and culture, including collecting and sharing libraries, information and archives,
- acting for the benefit of local and regional communities.

4. MARKET APPROACH TO EDUCATIONAL ACTIVITY OF UNIVERSITIES

The market approach to education means that we are beginning to treat the activities of educational institutions, such as universities, as enterprises on the market (Ostaszewska, 2004), and students as the main (though definitely not the only one) group of clients. The concept of the education market includes assumptions about the mechanisms of functioning of education systems according to market rules, which are identified with the processes of adjusting supply to demand, competition and commercialization, i.e. profit-oriented activities (Szczepańska-Woszczyna, 2004).

The dynamic development of universities in Poland at the end of the 20th century was a consequence of the emergence of the higher education market. Since entering into force in 1990 of the aforementioned Act on Higher Education, a rapid quantitative growth of this sector began, understood both as an increase in the number of universities and persons undertaking higher education. The period of the most dynamic development was in the years 1993–1998 when the largest number of non-state universities appeared. In the following years, this upward trend was systematically and clearly weakened, and since the academic year 2006/2007 there has been a more visible drop in the number of students (*Szkoły wyższe i ich finanse w 2017 r.*, 2018, [https](https://www.oecd.org/dataoecd/48/6/41939423.pdf)). This is mainly due to the end of the baby boom of 1981–1985 and the fact that the studies were undertaken by the increasingly fewer graduates of upper-secondary schools. OECD forecasts say that this unfavourable trend will continue in the coming years and in 2025 the number of potential students in Poland will decrease by over 40%⁴.

In addition to demographic factors that undoubtedly affect the increase in competition on the higher education market, it is also worth paying attention to other phenomena occurring in the environment not only of Polish universities, including ubiquitous scientific and technical progress, development of information technologies enabling the use of new ways of teaching (e-learning), unlimited access to information and general development of student awareness (Palacio, Meneses, Perez, 2002). These phenomena can pose a significant threat to many universities, but at the same time, when noticed and properly used, can also become a chance for development.

It is also worth emphasizing that as a result of joining the Bologna Process⁵, Polish universities have also become participants in the global market. The internationalization of this educational sector and the increase in student mobility mean above all the internationalization of the learning process. As a consequence, we can observe not only the enhanced competition between national universities, but also with those abroad. On one hand, it gives a chance to attract students from other countries, on the other, it creates a threat, because an increasing number of Poles go to study abroad (Drapieńska, 2011).

As the above considerations show, the higher education system in Poland has changed dynamically over the last few decades. Initial transformations resulting from the emergence of the higher education market focused primarily on increasing access to higher education, often ignoring the qualitative aspect. Gradually, however, the higher education sector from

⁴ Change in % compared to the year 2005; see: (*Higher Education to 2030*, Vol. 1: *Demography* (2008), OECD [Access: 27.07.2018]. Access on the internet: www.oecd.org/dataoecd/48/6/41939423.pdf).

⁵ The implementation of the Bologna Process was initiated in 1999 by ministers from 29 European countries (including Poland) signing a document later known as the Bologna Declaration. The essence of this process was to be the rapprochement of higher education systems of European countries, ultimately leading to the creation of European Higher Education Area – EHEA in 2010. According to the assumptions, the detailed implementation of this process was to include: the introduction of a system of transparent and comparable degrees through the implementation of a diploma supplement, the adoption of an education system based on two / three levels of education, widespread use of the credit point system (ECTS – *European Credit Transfer System*), promotion of student, academic teachers, researchers and administrative staff mobility, promotion of European cooperation in increasing the quality level of higher education, promotion of the European dimension of higher education, particularly in the field of professional development, mobility and integrated curricula, training and research.

the bidding market became a buyer's market (Waltoś, Rozmus [ed.], 2016), which also forced a change in the current focus on quantity and a stronger shift towards quality. This became most evident from the 2006/07 academic year, when market saturation took place and the increasingly fierce competition between universities could be clearly seen. It can also be assumed that further processes of consolidation and closedown of some universities in our country are inevitable.

5. CONCLUSIONS

The university environment is constantly changing. The changes are so dynamic that universities must react flexibly and adapt to them on a regular basis. Both the introduction of market mechanisms in Polish higher education and the phenomena presented above cause that universities that are unable to cope with competition and increasing market demands often face serious problems. Therefore, long-term strategic thinking and the use of tools enabling strengthening or at least maintaining the current position of the university on the market is necessary. A particularly important issue here seems to be the knowledge of the factors that determine the competitiveness of an educational product, i.e. its market attractiveness for potential buyers.

An opportunity for the university to survive in this undoubtedly difficult period (demographic decline, market saturation, increased competition) and at the same time a partial alternative to the decreasing number of high school graduates may also be the development of an additional offer in the form of post-graduate studies or other forms of training. Broadly understood scientific and technological progress enforces the need for continuous improvement (implementation of the concept of *Life Long Learning*), providing access to various forms of study (first, second, third degree, postgraduate studies, MBA, courses, training) seems to be the right direction. In such a situation, building long-term relationships with students and an appropriate way of communicating with them using communication channels properly selected for the recipients are of great importance. These are the students who may be the first to be interested in updating and developing their knowledge and skills. Satisfaction with education during first and second-cycle studies and building strong relationships with students, and then skilfully supporting them with graduates, may result in their return to other forms of education. In this way, the so-called brand ambassadors, i.e. people recommending particular services in their immediate surroundings, appear.

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Reviewing standards, information for authors, the review form, instruction for authors and contact details to MMR Editors and to Publishing House are also published in the fourth number of *Modern Management Review*, no. 26 (4/2019).

Zasady recenzowania artykułów naukowych w Zeszytach Naukowych Politechniki Rzeszowskiej

Procedura recenzowania artykułów naukowych w Zeszytach Naukowych Politechniki Rzeszowskiej jest zgodna z zaleceniami MNiSzW opracowanymi w formie broszury „Dobre praktyki w procedurach recenzyjnych w nauce”, Warszawa 2011 r.

1. Do oceny każdego artykułu redaktorzy tematyczni (naukowi) powołują dwóch niezależnych recenzentów spoza jednostki naukowej afiliowanej przez autora artykułu.
2. W przypadku artykułów napisanych w językach obcych, co najmniej jeden z recenzentów jest afiliowany w instytucji zagranicznej innej niż narodowość autora artykułu.
3. Redaktorzy tematyczni (naukowi) dobierają recenzentów najbardziej kompetentnych w danej dziedzinie.
4. Między recenzentami i autorami artykułów nie występuje konflikt interesów; w razie potrzeby recenzent podpisuje deklarację o niewystępowaniu konfliktu interesów.
5. Procedura recenzowania przebiega z zachowaniem zasad poufności – recenzenci i autorzy nie znają swoich tożsamości (double-blind review process).
6. Każda recenzja ma formę pisemną i kończy się wnioskiem o dopuszczenie lub odrzucenie artykułu do publikacji.
7. Nie są przyjmowane recenzje niespełniające merytorycznych i formalnych wymagań.
8. Wstępnie zakwalifikowany przez redaktora naczelnego do wydania artykuł zostaje wysłany do recenzentów, którzy wypowiadają się na temat jego przyjęcia lub odrzucenia. Recenzenci mają prawo do powtórnej weryfikacji poprawionego tekstu.
9. W przypadkach spornych powoływani są dodatkowi recenzenci.
10. Uwagi recenzentów są przekazywane autorowi, który ma obowiązek poprawienia tekstu.
11. Ostateczną decyzję o zakwalifikowaniu lub odrzuceniu artykułu podejmuje redaktor naczelny czasopisma, zasięgając opinii członków Komitetu Redakcyjnego.
12. Kryteria kwalifikowania lub odrzucenia artykułu są zawarte w formularzu recenzji.
13. Formularz recenzji znajduje się na stronie internetowej Zeszytów Naukowych.
14. Nazwiska recenzentów współpracujących będą podawane raz w roku – w ostatnim numerze czasopisma, a także opublikowane na stronie internetowej czasopisma (nazwiska recenzentów poszczególnych publikacji lub numerów wydań czasopisma nie są ujawnione).
15. Szczegółowe informacje nt. recenzowania artykułów oraz przebiegu prac w redakcji czasopisma i Oficynie Wydawniczej są opisane w wytycznych dla autorów artykułów naukowych.

**Informacje dla autorów artykułów naukowych publikowanych
w Zeszytach Naukowych Politechniki Rzeszowskiej
zjawiska *ghostwriting* i *guest authorship***

Aby przeciwdziałać nierzetelności w nauce (*ghostwriting*, *guest authorship*), redakcje Zeszytów Naukowych Politechniki Rzeszowskiej prowadzą odpowiednie procedury charakterystyczne dla reprezentowanych dziedzin nauki i na bieżąco wdrażają podane rozwiązania:

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Z *ghostwriting* mamy do czynienia wówczas, gdy ktoś wniósł istotny wkład w powstanie artykułu, lecz ani jego udział jako jednego z autorów nie został ujawniony, ani nie wymieniono go w podziękowaniach zamieszczonych w publikacji.

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Formularz recenzji / Review Sheet

Zeszyty Naukowe (HSS i MMR) / Scientific Papers (HSS and MMR)

Tytuł pracy/Title:

A Prosimy o odpowiedzi na następujące pytania
Please respond to the following questions

1. Czy tytuł pracy jest zgodny z jej treścią?
Does the title of the paper reflect the content sufficiently? Tak Nie
 Yes No
2. Czy podejmowane problemy są aktualne?
Are the discussed issues up-to-date? Tak Nie
 Yes No
3. Oryginalność pracy
Paper originality **Max. 20 points**
4. Realizacja założeń sformułowanych w celu pracy
Goals realization formulated in the paper objective **Max. 20 points**
5. Poprawność języka i stylu pracy
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6. Dobór literatury i wykorzystanych źródeł
Proper selection of literature and sources **Max. 20 points**
7. Poprawność wnioskowania i jego zasadność wynikająca z treści pracy
Correctness on drawing conclusions and its relevance resulted
from the paper content **Max. 20 points**
- Suma punktów:
- Total no. of points:
8. Czy praca powinna zostać opublikowana?
Is the paper suitable for publication?
- Tak/Yes
- Tak, ale po wprowadzeniu wyszczególnionych w punkcie 9. uwag
Yes, but after the remarks specified in point 9 are corrected
- Nie, ponieważ/No, because

»<

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Uzasadnienie odrzucenia recenzji/ Justification of review rejection

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**9. Proponowane przez Recenzenta zmiany:
Suggested changes by the Reviewer:**

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**Instrukcja dla autorów artykułów naukowych publikowanych
w Oficynie Wydawniczej Politechniki Rzeszowskiej**

Jan KOWALSKI¹ (czcionka 10 pkt, pogrubiona, wyrównanie do lewej)

**TYTUŁ ARTYKUŁU (CZCIONKA 14 PKT,
WERSALIKAMI, WYŚRODKOWANY, POGRUBIONY,
ODSTĘP PRZED AKAPITEM 42 PKT, PO 18 PKT)**

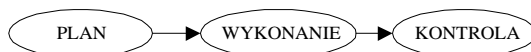
Streszczenie tekstu 1 akapit zawierający **100-150 słów**. Czcionka 9 pkt, wcięcia obustronne 0,5 pkt, wcięcie pierwszego wiersza 0,5 pkt, tekst wyjustowany.

1. WPROWADZENIE (czcionka 10 pkt, wersalikami, pogrubiony, wysunięcie pierwszego wiersza 0,5cm, numerowany, odstęp przed akapitem 12 pkt, po akapicie 3 pkt)

2. TYTUŁ ROZDZIAŁU (czcionka 10 pkt, wersalikami, pogrubiony, wysunięcie pierwszego wiersza 0,5cm, numerowany, odstęp przed akapitem 12 pkt, po akapicie 3 pkt)

Tekst referatu - przyjmowane są teksty jedynie w j. angielskim: czcionka 10 pkt, wcięcie pierwszego wiersza akapitu 0,5 cm, tekst wyjustowany, odstęp pojedynczy, odstępy przed i po akapicie 0 pkt. Prosimy nie stosować dodatkowych linii odstępu między akapitami.

1.1. Tytuł podrozdziału (czcionka 10 pkt, pogrubiony, wysunięcie pierwszego wiersza 0,75 cm, odstęp przed akapitem 6 pkt, po akapicie 3 pkt)



Rys. 1. Przykład rysunku i jego opisu (opis rysunku umieszczony pod rysunkiem, czcionka 9 pkt, wyjustowany, obustronne wcięcia 0,5 cm, wysunięcie pierwszego wiersza 1 cm, odstęp przed akapitem 6 pkt, po akapicie 3 pkt)

¹ Informacje o autorze: tytuł (stopień), imię i nazwisko, jednostka organizacyjna, uczelnia, miejscowość, adres uczelni, mail. Informacje w przypisie proszę podać zarówno w języku polskim, jak i angielskim. W przypadku kilku autorów artykułu proszę wskazać, kto jest autorem korespondencyjnym. Każdy z autorów jest zobowiązany do podania numeru ORCID. Instrukcja dla nieposiadających: https://www.ifj.edu.pl/library/open-access/materials/Instrukcja_ORCID.pdf

Tabela 1. Przykład tabeli i jej opisu (czcionka 9 pkt, wyjustowany, wysunięcie pierwszego wiersza 1 cm, odstęp przed akapitem 6 pkt, po akapicie 3 pkt)

| | | |
|--|--|--|
| | | Po tabeli należy zostawić odstęp 6 pkt |
|--|--|--|

Przykład zapisu wzoru:

$$A_2^1 = \sum_{i=1}^n \frac{b_i \cdot \cos^2 \alpha}{2 \cdot a \cdot c} \quad (1)$$

Wzór należy wyśrodkować, odstęp przed i po akapicie 3 pkt, numeracja wyrównana do prawej strony marginesu.

Przykłady cytowania – styl APA:

- Nazwisko autora wpisywane jest w nawiasie okrągłym oraz rok ukazania się publikacji, numery stron podawane są w przypadku dosłownego cytowania tekstu. Zgodnie z Standardem APA nazwiska, rok oraz numery stron oddzielone są przecinkiem: **(Kowalski, 1999)**.
- Jeżeli publikacja posiada 2 autorów podajemy ich nazwiska oddzielone są przecinkiem: **(Nowak, Kowalski, 2018)**
- Gdy publikacja posiada trzech, czterech lub pięciu autorów, w pierwszym cytowaniu wymieniamy wszystkich: **(Nowak, Kowalski, Wiśniewska, Wójcik, Kowalczyk 2018)** a przy następnych jedynie pierwszego zastępując pozostałych skrótem „i in.”: **(Nowak i in., 2018)**
- Cytowanie jednocześnie dwóch lub więcej publikacji różnych autorów: Autorów wymieniamy w kolejności alfabetycznej, oddzielając odniesienia do ich publikacji średnikiem. **(Buczak, 1999; Kowalski, 2018; Wiśniewski, 2013)**
- Cytowanie więcej niż jednej publikacji autora: Po nazwisku autora wpisujemy chronologicznie lata ukazania się publikacji **(Nowak, 2013; Nowak, 2018)**
- Jeżeli obie publikacje zostały wydane w tym samym roku, po jego podaniu wpisuje się litery alfabetu. Socjolog jest to osoba, która potrafi wyzwolić się ze swoich bezpośrednich uwarunkowań i zobaczyć rzeczy w szerszym kontekście. **(Nowak, 2013a; Nowak, 2013b)**.
- Gdy autorzy noszą to samo nazwisko: Publikacje rozróżnia się stawiając pierwszą literę imienia przed nazwiskiem autora. **(J. Nowak, 2018; Z. Nowak, 2016)**
- Gdy powołanie się na publikację ma pośredni charakter, należy podać dane źródła pierwotnego, następnie wyrażenie „za”, a na końcu dane źródła wtórnego, w którym podane zostało źródło pierwotne. **(Nowak, 2013, za Kowalski 2015)**.
- Powołując się na pracę zbiorową, należy podać nazwisko redaktora ze stosownym dopiskiem (red., red nauk.) ale w nawiasie kwadratowym, (Nowak, Kowalski [red. nauk.] 2013)
- Akty prawne: wskazujemy początek tytułu np. ustawy, rozporządzenia (w bibliografii pojawia się pełny tytuł), autor może wskazać konkretny paragraf lub artykuł,

który pojawia się jako strona (**Ustawa, 2005, art. 35 ust. 1**). Jeżeli autor wykorzystuje dwa lub więcej aktów prawnych z tego samego roku, wówczas podajemy pierwsze wyrazy tytułu aktu prawnego (**Ustawa o Straży..., 2001, art. 1. par.4**).

- W źródłach internetowych należy wskazać autora lub nazwę strony oraz datę opublikowania tekstu (**MNiSW, 2018**)
- Cytowanie dosłowne: Gdy przytaczany fragment ma ponad 40 słów, należy umieścić go w osobnym akapicie z wcięciem (5 spacji), bez cudzysłowu oraz tekst powinien być poprzedzony i zakończony wolnym wierszem. Gdy przytaczany fragment jest krótszy niż 40 słów, należy umieścić go w linii właściwego tekstu, w cudzysłowu.

Wszystkie publikacje, na które autor się powołuje lub które przywołuje powinny znaleźć się w bibliografii na końcu pracy w stylu APA

LITERATURA zestawiona alfabetycznie (czcionka 10 pkt, wersalikami, pogrubiona, odstęp przed akapitem 12 pkt, po akapicie 3 pkt).

Przykłady bibliografii:

- Nazwisko autora, Inicjał imienia. (rok wydania). *Tytuł książki*. Miejsce wydania: Wydawnictwo.

Nowak, J. (2016). *Współczesne problemy aksjologiczne*. Warszawa: PWN.

- Jeśli nazwisko autora odnosi się do kilku pozycji literatury, należy umieścić je w kolejności wydania, w miejsce nazwiska wpisując sześć łączników (—), np.:

Kowalski, A. (2016). *Etyka życia codziennego*. Warszawa: Wydawnictwo Naukowe PWN.

— (2018). *Wartości codzienne*. Warszawa: Wydawnictwo Naukowe PWN.

- W przypadku powoływania się w tekście na pracę zbiorową pierwsze w opisie bibliograficznym jest wtedy nazwisko redaktora:

Nowak, A., Kowalski M., red. (2012). *Współczesne problemy etyczne*. Warszawa: PWN.

- Opis bibliograficzny rozdziału w pracy zbiorowej przyjmuje taką oto formę:

Nowak, H. (2018). *Etyka życia społecznego* [w:] Kowalski E., red., *Etyka*. Warszawa: Państwowy Instytut Wydawniczy, s. 13-25

- Z kolei opis bibliograficzny artykułu w czasopiśmie przybiera następującą formę:

Nowak, S. (2015). *Płaszczyzna aksjonormatywna*. "Studia etyczne" Nr 4.

- Akty prawne :

Ustawa z 2.10.2005 o podatku dochodowy. Dz.U. 2005, nr 20, poz. 456, z późn. zm.

- Opis dokumentu elektronicznego musi zawierać datę dostępu, źródło dokumentu, typ nośnika, wersję, np.:

Staśkiewicz T. (2016). *Co by się stało gdybyśmy wszyscy zostali wegetarianami? Naukowiec z Oxfordu szokuje prognozami* [dostęp: 18.02.2018]. Dostęp w internecie: <https://innpoland.pl/125943,co-by-sie-stalo-gdybysmy-wszyscy-zostali-wegetarianami-naukowiec-z-oxfordu-szokuje-prognozami>

- Jeśli artykuł ma numer DOI (Digital Object Identifier), należy podać go na końcu zapisu bibliograficznego.

ZASADY PRZYGOTOWANIA REFERATU

- Treść artykułu prosimy napisać w edytorze Word, czcionką Times New Roman, zachowując dla wszystkich akapitów pojedynczy odstęp między wierszami.
- Preferowana objętość: 20 000-30 000 znaków (ze spacjami).
- Układ referatu powinien być opracowany zgodnie ze schematem i według instrukcji.
- Referaty powinny być napisane w formacie A4, przy czym należy zastosować następujące marginesy: **górny i dolny – 5,3 cm, lewy i prawy – 4,1 cm**. Nie należy wprowadzać numeracji stron.
- Wszystkie rysunki, wykresy i tabele powinny być umieszczone bezpośrednio w tekście lub wypełniać całe strony (**nie mogą przekraczać marginesów**). Rysunki należy zgrupować.
- Numery i tytuły rysunków, wykresów oraz tabel należy umieścić nad nimi (wyrównanie do lewej), a wskazanie źródła pod nimi (również wyrównanie do lewej).
- Dla całego tekstu pracy należy stosować **przypisy styl APA**.

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MODERN MANAGEMENT REVIEW

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KOMITET REDAKCYJNY

Dane kontaktowe do redakcji:

Redaktor naczelny
dr hab. inż. Stanisław GĘDEK, prof. PRz
Politechnika Rzeszowska
Wydział Zarządzania
Katedra Ekonomii
Powstańców Warszawy 10
35-959 Rzeszów
e-mail: gedeks@prz.edu.pltel. +48 17 865 1403

Osoby do kontaktu/adresy e-mail do przesłania artykułów:

Redaktorzy tematyczni (naukowi)

dr hab. Andrzej GAZDA, prof. PRz
Katedra Systemów Zarządzania i Logistyki
e-mail: agazda@prz.edu.pl
tel. +48 17 865 1803

prof. dr hab. inż. Igor LIBERKO
Katedra Ekonomii
e-mail: iliberko@prz.edu.pl

prof. dr hab. Zhanna POPLAVSKA
Katedra Marketingu
e-mail: z.poplavska@prz.edu.pl

dr hab. inż. Janusz STROJNY, prof. PRz
Katedra Przedsiębiorczości, Zarządzania i Ekoinnowacyjności
e-mail: januszs@prz.edu.pl
tel. +48 17 865 1201

dr hab. inż. Mirosław ŚMIESZEK, prof. PRz
Katedra Metod Ilościowych
e-mail: msmieszka@prz.edu.pl
tel. +48 17 865 1234

prof. dr hab. inż. Leszek WOŹNIAK
Katedra Przedsiębiorczości, Zarządzania i Ekoinnowacyjności
e-mail: lwozniak@prz.edu.pl
tel. +48 17 865 1165

Redaktor statystyczny

dr Paweł HYDZIK
Katedra Metod Ilościowych
e-mail: phydzik@prz.edu.pl
tel. +48 17 865 1602

Sekretarz redakcji

dr Elżbieta KURZEPA
Katedra Prawa i Administracji
e-mail: e_kurzepa@prz.edu.pl
tel. +48 17 743 2096

Członkowie

dr Agata GIERCZAK
Katedra Marketingu
e-mail: agatag@prz.edu.pl
tel. +48 17 865 1823

dr inż. Grzegorz LEW
Zakład Finansów, Bankowości i Rachunkowości
e-mail: lewgrzes@prz.edu.pl
tel. +48 17 865 1914

dr inż. Paweł PERZ
Zakład Finansów, Bankowości i Rachunkowości
e-mail: pperz@prz.edu.pl

dr Justyna STECKO
Zakład Nauk Humanistycznych
e-mail: jstecko@prz.edu.pl
tel. +48 17 865 3957

dr Dariusz WYRWA
Katedra Przedsiębiorczości, Zarządzania i Ekoinnowacyjności
e-mail: dwyrwa@prz.edu.pl
tel. +48 17 865 1376

dr Beata ZATWARNICKA-MADURA
Katedra Marketingu
e-mail: bezat@prz.edu.pl
tel. +48 17 865 1474

Adres pocztowy i afiliacja Komitetu Redakcyjnego

Politechnika Rzeszowska
Wydział Zarządzania
Powstańców Warszawy 10
35-959 Rzeszów, Polska

Redaktorzy językowi

Glen GRIFFITHS (język angielski)
Dr Tatiana GUGNINA (język rosyjski)
Dr Alewtina ŁAWRINIENKO (język rosyjski)
Ruth MALOSZEK (język niemiecki)
Magdalena REJMAN-ZIENTEK (język angielski)
Piotr CYREK (język polski)

Informacje dla autorów

<http://www.oficyna.prz.edu.pl/pl/zeszyty-naukowe/modern-management-review/>

Dane kontaktowe do wydawcy

Kierownik Oficyny Wydawniczej
mgr inż. Joanna BIENIASZ
Politechnika Rzeszowska
Powstańców Warszawy 12
35-959 Rzeszów
e-mail: jbie@prz.edu.pl
tel. +48 17 865 1195