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# Problems of Infrastructure Markets with Particular Emphasis on the Postal Market in the Context of Digital Exclusion

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**Abstract:** For many years, infrastructure markets have been treated as a strategic element of each country. Substantial technological changes forced postal and telecommunications operators to adapt their services to the information society, use new business opportunities, and take account of the emerging and rapidly developing direct and indirect competition. The aim of the presented article is developing a model of action to ensure access to information using the postal infrastructure which, until full digitization, will fulfil the constitutional needs of citizens. In order to achieve the indicated aims, the article refers to the nature of the regulation, which constitutes a point of reference to the examined problem. In addition, selected economic policy tools are presented, which allow the development of a model of action that will reduce the problem of digital exclusion. The article uses research methods such as critical analysis of scientific literature, synthesis and generalization, the Delphi method, multidimensional comparative analysis, and graphic visualization.

**Keywords:** regulation; infrastructure markets; digital exclusion

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## 1. Introduction

The early 1990s witnessed the transformation of the economies of Central and Eastern European countries into market economy systems based on freedom of competition and the development of a knowledge-based economy. For this reason, it was necessary to take measures to liberalize foreign trade, introduce anti-monopoly regulations in the key economic industries, and privatize most state-owned enterprises. However, it should be stressed that the mere abolition of the legal monopoly of the largest companies has not created competitive markets. In industries in which information is transmitted by means of special technical infrastructure (e.g., the postal and telecommunications sector), the entities which own the infrastructure have maintained an actual monopoly (dominant position) on the service markets as well. It should be pointed out that despite the adoption and implementation of regulations concerning the protection of competition, postal and telecommunications operators could still effectively fight off the competition on national and local markets, which significantly limits access to information and development of the information society [1,2]. This has forced regulators to introduce public regulations. The regulations would speed up the process of demonopolization and affect the enterprises dominant on the markets which have the infrastructure necessary for the competitive provision of key business services, information transmission services.

This aspect is particularly important in the context of digital exclusion. This phenomenon illustrates the difference between those individuals and societies that have access to information technology and those that do not. This disparity is the result of the rapid development of information technology. Nowadays, we may even identify a new kind of social stratification, which involves

a division between those with Internet connection and those without one. One of the reasons for this “digital gap” is the lack of adequate broadband infrastructure. It is, therefore, crucial to ensure access to information using the postal infrastructure before the public is equipped with adequate telecommunications infrastructure and skills. It should be pointed out that, from a regional perspective, the degree of urbanization is an essential factor facilitating access to and use of information and communication technologies.

It is necessary to refer to the law derived by Jipp, which regulates public relations in connection with the development of electronics communication networks and physical infrastructure, only to ensure a certain level of access when a certain level of GDP has been achieved. Jipp law serves as the basis for planning infrastructure markets. Simply put, it indicates the need for intervention in the development of the network, depending on the level of GDP. However, the authors also point out the significance of the independence of the market regulator for the development of a given infrastructure market, and thus if society does not keep up with it, this causes deepening digital divisions and the need for the state to address this problem [3,4].

Therefore, it is important that regulation should involve the imposition of statutory or administrative obligations on these enterprises in order to achieve specific public objectives. Accordingly, the phenomenon (function) of “regulation” emerged and “sector-specific regulatory law”, including “pro-competitive sector-specific regulatory law” was created.

## 2. The Essence of Digital Exclusion

There are currently many definitions that cover various aspects of the phenomenon of digital exclusion. L. Arendt divided them into three groups [5]:

- definitions referring to technological determinism, focusing on material aspects and zero understanding of the term “access”;
- definitions whose authors emphasize the importance of the extent to which modern information and telecommunications technologies are used, and the resulting inequalities in access and the benefits of their use [6–8];
- definitions whose authors treat the problem of digital exclusion in a comprehensive manner, where access depends on the existence of the necessary infrastructure, i.e., possession of computer equipment with a connection to the global network and economic, cultural, and organizational factors, as well as the level of their competences.

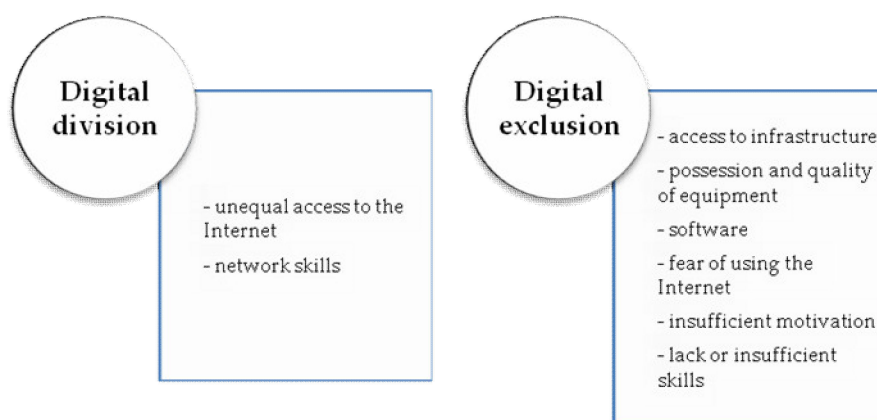
Digital exclusion is a complex phenomenon, which “is made up of many different factors that make people fall into a group of people at risk. It involves both physical access to the internet and a whole range of psychological premises.” Factors can be divided into two groups: objective and subjective. Objectives include access to infrastructure, possession and quality of equipment, software, etc. The second group includes psychological reasons, such as fear of using the Internet, lack of or insufficient motivation, lack of or insufficient skills.

The problem of digital inequalities is very multidimensional, and approaching e-integration solely from the perspective of eliminating the phenomenon of digital exclusion is currently insufficient. That is why adequate regulation on infrastructure markets and the independence of the regulator of these markets are so important.

The authors draw attention to the distinction between the concepts of digital exclusion and digital division. Unsymmetrical access to modern technologies combined with skills of using the network describes the concept of “digital division”, which is defined as inequalities in access to the Internet, the intensity of its use, knowledge of how to search for information, quality of connection and social support, as well as inequalities in the ability to evaluate quality and diversity of network use. The dimensions of digital division mentioned in the literature (access to technical means, the autonomy of their use, use of networks, social support, technical competences and skills) may lead to inequalities. The social consequence of digital inequality is digital exclusion. Digital exclusion is a term usually

applied to social groups deprived of access to modern IT infrastructure (in particular—access to ICT networks) and thus excluded from participation in civilization development [9,10].

Digital exclusion is a complex phenomenon which is made up of many different factors deciding who fits into the group of people at risk. It involves both physical access to the internet and a whole range of psychological premises. Factors can be divided into two groups: objective and subjective. Objectives include access to infrastructure, possession of equipment and its quality, software, etc. The second group includes psychological reasons, such as fear of using the Internet, lack of or insufficient motivation, lack of or insufficient skills, which are graphically presented in Figure 1.



**Figure 1.** Differences between digital exclusion and digital division. Source: own study.

E-government services are the development direction for the European postal services market. Examples of European Union countries show that these services are used by the governments of individual countries to correspond and exchange documents with citizens. These services enable faster communication with offices and are of great convenience for citizens. In addition, they allow the storage of official correspondence on a dedicated platform. It needs to be emphasized that nowadays when an increasing percentage of correspondence takes place in the virtual sphere, a modern state should adapt its potential to this trend and provide citizens with efficient digital service. It should be pointed out that modern technologies guarantee a high level of security for such communication between the state and the citizen. On the other hand, persons who do not have the competence or the ability to receive digital correspondence from state authorities may be exempted from this form of communication and use the traditional formula of the postal service instead. To be able to provide the above-mentioned services, the state's task is to recommend, through appropriate economic policy tools, intensive investments in modern technologies and infrastructure.

Moreover, as part of this solution, European Union countries can counteract digital exclusion through widespread availability. The activity of postal operators in the area of e-services may result in strengthening the position of these operators on the postal services market.

### 3. Conceptualization of The Notion of Regulation

The economic sciences lack an unambiguous definition of regulation, but most often it is identified as a form of state influence, especially in areas of particular importance for the economy [11]. Regulation is defined as an identifiable, discreet model of government activity [12]. The concept of regulation is related to the issue of market freedom [13]. M. Weber defined market freedom as "the scope of autonomy of individual exchange reflectors in the fight for prices and in the competitive struggle" [14]. Market regulation is, therefore, a restriction of full freedom. This is a situation in which the presence on the market is materially limited by effectively interacting orders. When defining market regulation in terms of restrictions on market freedom, M. Weber distinguished four types, constituting forms or tools of market regulation:

- traditional;
- conventional;
- legal;
- voluntary.

Market regulations can be introduced to limit market failure as well as to promote and protect competition, and therefore for opposite reasons.

It is widely accepted that the introduction of regulations for a specific market, including the postal market, should be justified mainly by its unreliability. At the root of such logic there are primarily the following premises [15]:

- economic, e.g., the level of prices of goods offered on a given market, resource management;
- social, for example, the degree of satisfying the needs deemed socially necessary (which may include postal services, telecommunications, information transmission).

Referring to the examined problem, one should point to the views of J. M. Keynes, who opted for state interventionism in the market economy system. The Great Depression of the 1930s was an inspiration to protect the free market.

This model, functioning until the late 1980s, found the first critics at the beginning of the 1970s crisis. The key was M. Friedman, who expressed the view that state interference causes stagflation, i.e., high inflation accompanied by low economic growth. The following years were mainly a period of exercising the free market option.

The basic justification for regulation is most often the need to protect key public values, and this need is associated with market failure. It should be pointed out that societies in their political decisions define themselves to a greater or lesser extent by ensuring that governments supply certain public goods. This is how regulations regarding environmental protection, safety, health, finance, and reduction of other types of risk related to the business activity are born [16]. However, it should be emphasized that not all areas can be regulated. It is, therefore, important to define the limits of regulatory action.

American empirical research at the turn of the seventies and eighties of the twentieth century showed that state activity focused on regulation, paradoxically, to improve the economy's activity, sometimes led to (mainly by controlling too many of its sectors) excessive market rigidity. American economists have taken action to deregulate, particularly by postulating greater freedom to enter and exit the market. An exemplification of the government's deregulation policy was the economic policy implemented during the presidency of R. Reagan, the so-called Reaganomics, which brought positive economic effects in the form of reducing the recession of the early 1980s [17].

The stimulus that significantly contributes to asking questions about the areas, scope, and functions of regulation is the phenomenon of globalization, affecting the system of the world economy, with transnational organizations such as the World Bank, the International Monetary Fund, and the World Trade Organization. The analysis of globalization processes, according to the criteria selected appropriately, can be a starting point for indicating a range of conditions for taking or not taking regulatory action.

It should be emphasized that the phenomenon of "regulation" and "regulated industries" originated in the United States [18–23]. In Western Europe, on the other hand, as previously indicated, the concept of "regulation" appeared in the UK, during the reign of Margaret Thatcher. The government of Margaret Thatcher demonopolized and privatized companies and established independent sectoral regulators to which it assigned regulatory tasks and granted a wide scope of discretionary powers, including the selection of regulatory instruments [24]. However, the key moment of market regulation was the turn of the 1980s and 1990s, when the European Community (EC) began the process of liberalizing the infrastructure industries, which formed the foundation of the internal market. The air transport and telecommunications sector were regulated in the first place. Then the energy, postal services, and rail transport services markets were liberalized [25]. As a result of

these processes, new community regulatory law began to emerge [26], and independent regulatory authorities began to be established in the subsequent EC Member States.

#### 4. Regulatory Bodies and Their Independence on The Example of The Postal Market

Economic regulation, including pro-competitive regulation, is considered a public function conducted by various authorities, administration, and the judiciary. These include public economy regulating bodies, which include parliament, public administration bodies, ordinary courts, but also regulatory bodies in the strict sense.

It should be noted that EU directives impose an obligation on the Member States to ensure that these bodies (regulators) meet strict criteria. These include, above all, independence and professionalism.

The literature usually indicates three aspects of the regulator's independence [27]:

- independence from political authorities;
- independence from regulated entities and other private interest groups;
- organizational autonomy, necessary to maintain the above two.

The first type of independence in the formal aspect means the existence of legal regulations defining the regulator's relations with the parliament, government, and other state administration bodies, guaranteeing the regulator autonomy in the scope of the regulatory tasks entrusted to it.

The most frequently mentioned in political independence are:

- defining the scope of tasks, competences, and responsibility of the regulator in the most legible and precise way possible;
- structural separation of the regulator from the ministry responsible for the sector's policy and its independence from ministerial supervision;
- literal definition of professional criteria required for managerial positions;
- participation of authorities (e.g., legislative and executive authorities) in the process of delegating to the position of the president of a regulatory agency;
- the president's term of office and his irremovability during the term of office, except in strictly defined cases;
- guaranteeing the regulator full autonomy in the field of personnel policy;
- providing the agency with a sustainable source of funding adequate to the tasks entrusted to it and not susceptible to political influence, excluding the agency from legislation limiting the amount of wages in the state administration, the possibility of annulling the regulator's decision only through judicial or legislative (by changing the applicable law).

It is reasonable to create formal and legal safeguards for political independence, especially in countries where there is no established tradition of independent public institutions. It should be emphasized that formal requirements are neither the only nor sufficient; as important as formal independence is the actual independence of the regulator. Even if there are formal guarantees of independence, authorities can informally influence the regulator's decisions, e.g., threatening to reduce the agency's budget, appointing dependents to managerial positions, threatening or introducing legal changes limiting independence.

What is important, the formal adoption of even the most modern regulations protecting the independence of the regulator does not ensure its actual independence, because it does not automatically change the wider institutional environment in which it operates, nor the tradition or political culture of a given country. Political independence from the regulated sector is equally important. It allows one not to submit to the pressure of the government administration. Unfortunately, however, it does not eliminate the danger of subordinating the regulator to regulated companies. Entities operating in the regulated industry usually strive to subordinate the regulator to their benefits. In this case, the regulator makes decisions in line with the benefits of the industry, at the expense of consumer interests, industry efficiency, and the entire economy.



The subordination of the regulator to private benefits may be the result of the relationships between its needs and the needs of the regulated industry, or the use of information advantage by economic entities [28].

The relationship between the two aspects of independence described above should be emphasized. Stronger political autonomy gives industry lobbies the opportunity to use their associations and political influence to exert informal pressure on the regulator's decisions. It should be emphasized that increased political independence reduces the likelihood of subordinating the regulator to industry interests. In order to maintain real independence, the market regulator, like any organization, should control the resources necessary for its operations as much as it is possible [29]. It is emphasized that in order to maintain political independence and independence from regulated enterprises, the necessary organizational and financial autonomy of the regulator should be maintained. To this end, appropriate solutions are adopted in the fields of internal organization, personnel policy, and agency financing. It is particularly important to what extent the regulatory agency makes its own decisions, and to what extent only the exercising power is employed.

The presented article attempts to determine the independence of the regulator infrastructure market regulators (due to article restrictions, the focus was on the example of the postal market), a holistic approach to research in this area was proposed. In the multidimensional comparative analysis method, the selection of diagnostic features is pivotal—among the many variables, selecting those that have the greatest impact on the studied phenomenon and provide the most important information. This is a basic factual and statistical problem. In principle, the selection of features should not be subjective, but based on a specific procedure. Following this, the procedure is as follows:

- determining the initial set of features (variables) based on substantive criteria;
- subjecting this set to a formal and statistical analysis;
- on this basis, selecting the optimal set of explanatory variables.

The use of formal and statistical criteria makes it possible to eliminate the variables that do not meet the required criteria. This does not mean, however, that the others must be included in the research. The optimal set that meets certain criteria should be selected from the received set.

In order to develop an indicator determining the level of independence of infrastructure market regulators, a comprehensive approach to research in this area was proposed. A set of three indicators defining the independence indicator of the postal market regulator was developed (Figure 2).

Expert judgment was used to determine the weight of individual indicators in this study. The essence of this method in the conducted research was to collect expert assessments, which allowed the determination of the weight of individual indicators that shape the independence of the market regulator in the analyzed sector and confirmed the validity of the adopted criteria.

A team of recognized national specialists in the field of postal services market participated in the study. They included representatives of the university and the research institute, as well as postal market entities. Experts have substantive knowledge and experience in the subject of the study. As part of the study, individual in-depth interviews were conducted, taking into account knowledge of the postal market and experience. These variables have a significant impact on the determination of factors affecting the independence of the market regulator. During the development of the sample structure, the necessity of conducting interviews with scientists dealing with issues of the postal sector and practitioners who represent selected entities of the postal market was taken into account. This study used the Delphi method element, i.e., expert judgment. The Delphi research method is classified as heuristic. It applies the analysis of complex problems, characterized by dependence on difficult-to-quantify required functions. The most popular methods of Delphi are used to forecast phenomena or situations of reality. The scope of application of the Delphi methods can be much wider. They can be used to study the future and the present. The selection of experts is of fundamental importance for the results of the research. The principle of their diversity in terms of education and professional practice applies. Experts should have positive personality traits, such as independent

thinking. It is important to follow the rules of the Delphi research procedures, including first and foremost for all persons and the secrets of expert opinions. Most often, three research steps are enough to obtain unanimous expert opinions. An important role in the implementation of the Delphi methods is undertaken by the research manager. The Delphi research method can be the stationary version or the correspondence version, and each of these versions has its strengths and weaknesses. It is very beneficial to use the methods of the Delphi whole with other research methods [31–33].

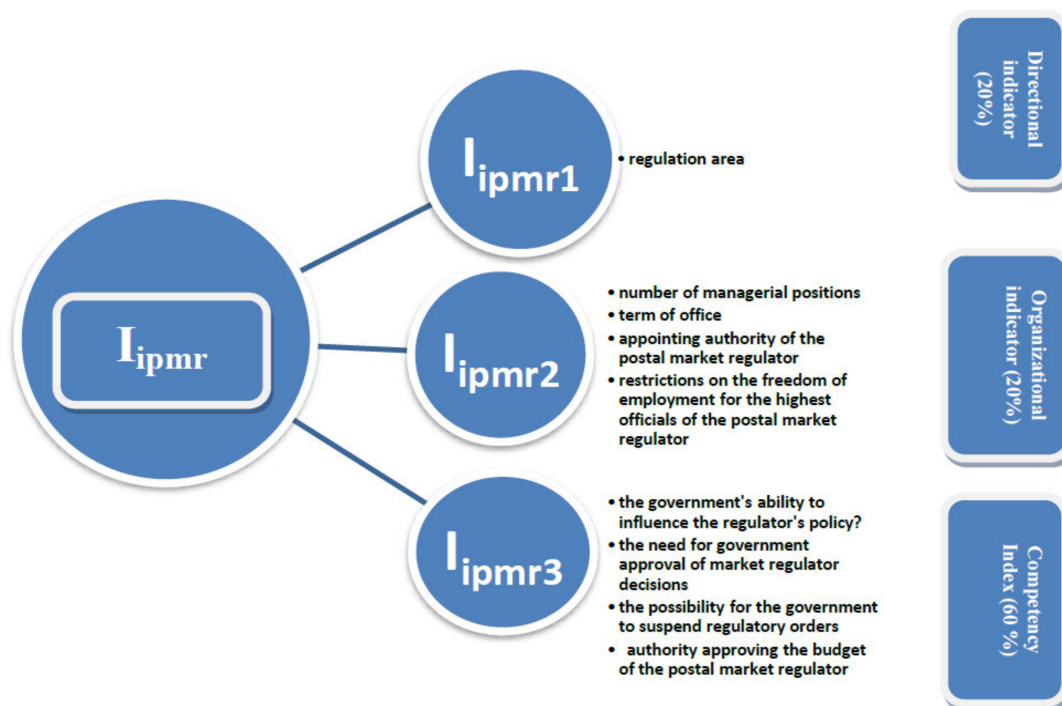


Figure 2. Structure of the independence indicator of the postal market regulator. Source: [30]

The essence of this method in the conducted research was to collect expert assessments, which allowed for determining the long-term evolution of factors shaping competition in the analyzed sector. Experts had substantive knowledge and experience in the subject of the study. As a result of the study, the structure of the indicator of the level of independence of the postal market regulator was developed by assigning weights to individual components of the indicator. The  $I_{ipmrr1}$  index, including directional aspects, was found to be 20%, influencing the final value of  $I_{ipmrr1}$ . Similarly, the weight was assigned to the organizational indicator— $I_{ipmrr2}$ . However, in the experts’ opinion, the  $I_{ipmrr3}$  index was considered the most important, taking into account the competences of the regulator, which, in the opinion of experts, at 60% affected the final value of  $I_{ipmrr}$ . Table 1 presents one variable (diagnostic feature), which was included in the independence index of the  $I_{ipmrr1}$  postal market regulator—in the strategic area.

Table 1. Variables (diagnostic features) included in the independence indicator of the postal market regulator—in the strategic area of  $I_{ipmrr1}$ .

Sr. No.	Variable Name	Assumed Weight	Point Criterion (0.1)
1.	$z_1$ Regulation area	1	0—other regulation areas 1—only post

Source: own study.

Another indicator whose structure was subject to expert analysis was the organizational indicator— $I_{ipmrr2}$ . Table 2 presents four variables (diagnostic features) included in the independence indicator of the postal market regulator—in the organizational area of  $I_{ipmrr2}$ , with an indication of the weights adopted as a result of the study.

**Table 2.** Variables (diagnostic features) included in the indicator of the independence of the postal market regulator—in the organizational area of  $I_{ipmrr1}$ .

Sr. No.	Variable Name	Assumed Weight	Point Criterion (0.1)
1.	$X_1$ number of managerial positions	0.3	0—for 1 management person for <1 management staff
2.	$X_2$ Term	0.2	0—for the term of over 5 years 1—for a term of up to 4 years
3.	$X_3$ appointing authority of the postal market regulator	0.3	0—Ministry of postal market 1—other organs
4.	$X_4$ restrictions on the freedom of employment for the highest officials of the postal market regulator	0.2	– none 1 – yes

Source: own study.

These variables were assigned appropriate weights, which, based on the study conducted by the author, should take 0.3 values for such variables as:

- number of managerial positions;
- appointing authority of the postal market regulator.

The arguments that support giving such a weight value are an indication that these variables are of a strategic nature. In addition, according to experts, the concentration of regulatory authority only in the hands of one person should be regarded as a high level of limitation of the independence of that authority. However, the dispersion of power, according to the author of the study, allows a reduction of pressure on key regulatory decisions.

The procedure for appointing the postal market regulator is also important. Ministry of Economy e-mails with such rights should be treated as a limited aspect of the regulator's independence, especially if we deal with connections in the context of the designated operator. These variables should explicitly be regarded as a manifestation of the limiting independence of the regulatory body.

Lower weight (0.2) was assigned to other variables:

- the possibility for the government to influence the regulator's policy; and
- authority approving the budget of the postal market regulator.

These features, of course, are also crucial in the context of determining the level of independence, but they have been given a slightly lower rank, arguing with operational level action.

The next step, aimed at calculating the  $I_{ipmrr1}$  index, was assigning 0 or 1 to individual features, depending on the impact of the feature on the independence of the regulatory authority. Impact on regulatory authorities through the ministry competent for mail, which clearly threatens the independence of the market regulator (especially when the ownership arrangement of the designated postal operator points to the country).

Another indicator was the index of independence of the postal market regulator—in the area of competence of  $I_{ipmrr3}$ , which contained four variables (diagnostic features), included in Table 3.



**Table 3.** Assumed weights and point values for variables of the  $I_{ipmrr1}$  index.

Sr. No.		Variable Name	Assumed Weight	Point Criterion (0.1)
1.	$Y_1$	possibility for the government to influence the regulator's policy	0.2	0—yes 1—no
2.	$Y_2$	necessity of government approval of market regulator decision	0.3	0—yes 1—no
3.	$Y_3$	possibility for the government to suspend regulatory orders	0.3	0—yes 1—no
4.	$Y_4$	authority approving the budget of the postal market regulator	0.2	0—Ministry of postal market Other organs

Source: own study.

These variables were assigned appropriate weights, which, following the study of experts, in the opinion of the author of the study, should take values of 0.3 for such variables as:

- the need for government approval of market regulator decisions;
- the possibility for the government to suspend regulatory orders.

Based on the study, it was shown that these variables are a starting point for building specific tasks, being a signpost in determining the level of independence in the area of competence. These actions should clearly be treated as a manifestation of the limiting independence of the regulatory authority.

A slightly lower weight (0.2) was assigned to variables such as:

- the government's ability to influence the regulator's policy; and
- authority approving the budget of the postal market regulator.

These features are of course also pivotal in determining the level of independence, but they have been given a slightly lower rank.

The last stage, aimed at calculating the  $I_{ipmrr1}$  indicator, was assigning 0 or 1 to individual features, depending on the impact of the feature on the independence of the regulatory authority. The possibility of influencing regulatory bodies through the ministry competent for mail (or government), clearly threatens the independence of the market regulator. The adopted assumptions made it possible to calculate  $I_{ipmrr}$ , which is presented in Table 4.

Analysis of the number of postal operators in selected European countries, which is presented in Table 5, showed that the lower  $I_{ipmrr}$  values were accompanied by a small number of postal operators. This phenomenon can be clearly seen in the example of Malta and Great Britain. By contrast, countries (e.g., Italy, Poland), where this indicator was at a very high level of  $-0.96$ , indicating a high level of independence of the postal market regulator, are characterized by a large number of postal operators. This makes it possible to conclude that the independence of the postal market regulator may limit or increase the development of competition on the postal market of a given country.

As the above analysis shows, the greater the independence of the market regulator, the greater the competition. Competing operators are more willing and faster to introduce modern technologies, including digital postal services, which is undoubtedly associated with the need to eliminate digital exclusion in society so it can fully benefit from these services.

**Table 4.**  $I_{ipmrr}$  value in selected European countries.

Country	$I_{ipmrr1}$	$I_{ipmrr2}$	$I_{ipmrr3}$	$I_{ipmrr}$
Austria	0	1	1	0.8
Belgium	1	0.8	0.7	0.78
Bulgaria	1	0.8	1	0.96
Cyprus	1	0.5	0.8	0.78
Czech Republic	1	0.8	1	0.96
Germany	0	0.8	0.8	0.64
Denmark	0	0.2	0.8	0.52
Estonia	0	0.4	0.8	0.56
Greece	1	0.8	1	0.96
Spain	1	0.8	1	0.96
Finland	1	0.8	1	0.96
France	1	0.8	1	0.96
Croatia	1	0.8	1	0.96
Hungary	0	0.5	1	0.7
Ireland	0	0.7	0.5	0.44
Italy	1	0.8	1	0.96
Lithuania	1	0.8	1	0.96
Luxembourg	0	0.8	0.7	0.58
Latvia	0	1	1	0.8
Malta	0	0.7	0.3	0.32
Netherlands	1	0.5	0.3	0.48
Poland	1	0.8	1	0.96
Portugal	1	1	0.5	0.7
Romania	1	0.8	1	0.96
Sweden	1	0	0.6	0.56
Slovenia	0	0.5	1	0.7
Slovakia	1	0.3	1	0.86
Great Britain	0	0.5	0.5	0.4
Iceland	1	0.2	1	0.84

Source: own study.

**Table 5.** The number of active postal operators in the years 2013–2016 in the European Union and the  $I_{ipmrr}$  value (indicator of independence of the postal market regulator).

State	2013	2014	2015	2016	$I_{ipmrr}$
<b>Italy</b>	2517	2469	2519	2776	0.96
<b>Poland</b>	161	166	172	151	0.96
<b>Great Britain</b>	28	23	23	18	0.40
<b>Malta</b>	21	23	24	26	0.32

Source: own study based on report on core indicators for monitoring the European postal market, ERGP (17) 36, 2017, pp. 24–25.

## 5. Pro-Competitive Regulation in Selected Infrastructure Sectors

In addition to the independence of the postal market regulator, an important area is the stimulation of pro-competitive regulation, whose purpose is to try to equalize opportunities in access to strategic technical infrastructure, at the same time counteracting the problem of digital exclusion.

When defining the concept of regulation, reference should also be made to pro-competitive sectoral regulation, according to T. Skoczny, who believes that it should be understood as a set of instruments of public intervention in the economy, the aim of which is to promote the creation and development of competition in industries which in the past were usually completely monopolized, but which were exposed to competition as part of liberalization processes. In this sense, the act of demonopolization itself may be regarded as an instrument of pro-competitive regulation. It should be stressed that, in principle, sector-specific pro-competitive regulation does not directly use the instruments of administrative control (including franchising and licensing) and administrative police (including supervision over the safe operation of facilities), however, the determination of precise and transparent limits of economic freedom and, for example, the maintenance of infrastructure in full integrity, may have a positive impact on the development of competition in various sectoral markets [22].

Particular attention should be paid to the fact that the pro-competitive objective of sector-specific regulation is not unidirectional. This objective primarily includes instruments to create conditions for the development of competition and access to information in selected infrastructure sectors. However, this is a narrow approach. Pro-competition additionally aims at providing common services (services of public utility) which will least hinder competition in other sectors of public utility. It should be stressed that adequately developed instruments for the provision of services of public utility not only guarantee the availability, including affordability and quality of these services, but also will not allow the providers of common services (on account of the additional funds received) or entrepreneurs operating exclusively on lucrative competitive markets to gain a competitive advantage. The main objectives of pro-competitive sector-specific regulation include:

- creating conditions for the development of competition;
- the provision of services of general economic interest or services of public utility.

The key purpose of economic regulation in infrastructure sectors is to determine conditions for the development of competition, understood as a mechanism ensuring the highest possible efficiency of management, aimed at providing consumers with the highest possible level of welfare [34]. The main aim of introducing pro-competitive regulation is to replace the mechanism of competition in areas where it cannot function due to the specific nature of a given sector (e.g., the necessity to provide services of public utility).

Moreover, pro-competitive regulation is aimed at providing equal access to strategic technical infrastructure. It is intended not only to ensure access to this infrastructure (eliminating the possibility of refusing such access), but also to guarantee that access will be provided under the same conditions which apply to the infrastructure manager or companies belonging to its group, i.e., so-called non-discriminatory access to the infrastructure.

Moreover, it is important to ensure the equality of entrepreneurs operating on specific sectoral markets (including telecommunications and postal markets). Excessive costs of providing common services or their lower profitability in relation to the markets of competitive services may result in reduced interest of entrepreneurs in providing such services.

Pro-competitive regulation exists primarily in the so-called infrastructure sectors (telecommunications, energy, transport, and post meet all the characteristics of the infrastructure sector). An essential feature of these economic sectors is their network nature, which means that economic services cannot be provided without the use of a specific technical infrastructure, including networks and facilities for the organisation and operation of a given sector. It should be emphasized that under each

sector-specific law, the legislator separately defines a set of service facilities for their maintenance (e.g., telecommunication network, postal network), which are characteristic of a given sector.

As a result of economic, historical, and technical conditions in the infrastructure sectors of each economy, vertical integration prevails. A key role is played by vertically integrated entrepreneurs, i.e., entrepreneurs who have the infrastructure (usually on an exclusive basis) which allows them to provide services. Additionally, there are entrepreneurs operating in these sectors who need to access this (external) infrastructure (alternative operators) to provide services. It should be stressed that vertically integrated economic entities may build particularly strong entry barriers on service markets. Access to infrastructure is, therefore, a key prerequisite for access to the market for services provided in these sectors, both by its managers and by other entrepreneurs.

The second crucial feature of the infrastructure sectors is that the infrastructure facilities are used for the provision of economic services which are considered essential by societies and states to meet specific social and economic needs and must, therefore, be common by nature.

Infrastructure provision markets are monopolistic in nature, not only when they result from the exclusivity of available infrastructure (e.g., power distribution or railway infrastructure), but also when alternative (competitive) networks exist (as in the telecommunications sector). At the level of this market, a designated operator that is required to provide other operators with access to networks has operated or is operating [35].

Common service markets are markets in which service provision is, to a greater or lesser extent, exempt from market competition rules; however, they are accessible to the public by means of mechanisms established by law to compensate economic entities providing the services for higher costs than those resulting from the market mechanism. An example includes the market of common postal services.

The third type of business service markets available in infrastructure sectors is those provided on a competitive basis.

It should be stressed that the state's regulatory activities are aimed at achieving two basic objectives, namely:

- the development of competition in the infrastructure sectors; and
- providing stakeholders (citizens) with public services, in particular with access to information.

According to the authors, this approach is too narrow. It is necessary to include social aspects in these objectives, aimed at reducing digital exclusion.

There are three types of markets in infrastructure sectors:

- infrastructure provision markets—monopolistic in nature, not only when they result from the exclusivity of available infrastructure, but also when alternative (competitive) networks exist (as in the telecommunications sector);
- common service markets—markets in which service provision is, to a greater or lesser extent, exempt from market competition rules; however, they are accessible to the public by means of mechanisms established by law to compensate economic entities providing the services for higher costs than those resulting from the market mechanism (as in the postal sector);
- markets for services provided on a competitive basis.

Sector-specific regulation, as the means of the state's influence on telecommunications and postal entities, is implemented by specialized public administration bodies characterized by high independence (this is a requirement arising from EU directives), even though they remain in the sphere of central government administration. The problem of interrelations between competition law and sector-specific regulation law is also attributed to the fact that both groups of legal tools are applied by different bodies. The legal provisions included in the sector-specific regulation law are implemented by the so-called market regulators, having the status of central government administration bodies, which in the case of the telecommunications and postal market is the Office of Electronic

Communications, while the anti-monopoly law regulations are implemented by another central body, namely the President of the Office of Competition and Consumer Protection.

The above bodies should cooperate with each other, as demonstrated in Figure 3.

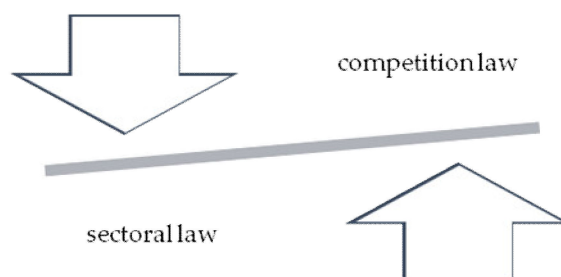


Figure 3. Cooperation between sectoral law and competition law.

The model of cooperation ensures harmonization of individual strata of regulation [36]. Co-regulation and self-regulation play an important role in the regulatory infrastructure. They are complementary regulatory tools, which are usually not an alternative to “hard law”, but are incorporated into applicable legislation. Self-regulatory operators adopt certain rules of conduct which apply to themselves and third parties. They agree to abide by them and to enforce them without external coercive measures. Co-regulation involves cooperation between public authorities and economic operators. Under this regulatory mechanism, the regulatory authority generally has the power to control or even impose penalties. Co-regulation and self-regulation mechanisms increase the freedom of market participants by simplifying regulations, intensify their efficiency, and increase the importance of their co-responsibility [37]. Furthermore, the limitations of co-regulation resulting from the dependence on the monitoring and sanctions in place, as well as compliance with standards relevant to the security of society, should be emphasized [38].

Currently, there is no doubt that sector-specific regulation [39]—apart from competition law—is one of the most important social and economic policy tools enabling public authorities to intervene in the economy, both at national and supranational level [36].

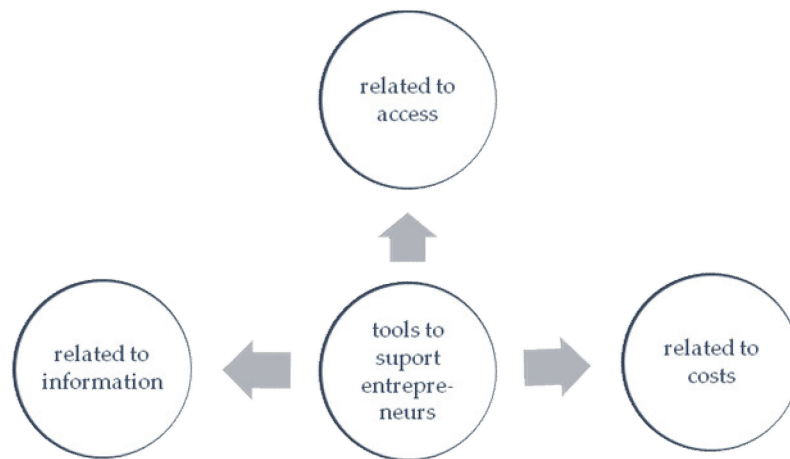
Sectoral policy tools include:

- tools for direct intervention;
- tools to support entrepreneurs.

The need to provide enhanced telecommunications and postal services forces the authorities to use tools of direct intervention.

The main tool used under the policy of direct intervention on the telecommunications market is public aid. The funds are permanent or temporary financial instruments for indirect financing and implementation, in cooperation with the EC and the Member States, of the objective, as set out in Article 174 of the Treaty on the Functioning of the European Union [40], of promoting the harmonious development of the Union as a whole by improving its economic, social, and territorial cohesion [37].

Tools for supporting entrepreneurs on the market are introduced when there are certain limitations in the use of regulatory or direct intervention tools [41]. The tools for supporting infrastructure entrepreneurs may be divided into three groups, which are presented in Figure 4.



**Figure 4.** Tools to support infrastructure entrepreneurs. Source: own study

The above tools allow the support of infrastructural entrepreneurs, which contributes to the development of the telecommunications and postal markets.

Information tools are an instrument to support telecommunications and postal entrepreneurs. Information tools are actions that reduce entrepreneur uncertainty resulting from imperfect information, which is one of the reasons for market failure. The information is collected and made available to postal and telecommunications entrepreneurs free of charge. For example, in Poland, the regulator, i.e., the President of the Office of Electronic Communications (UKE), has imposed an obligation on telecommunications and postal entrepreneurs to submit a report on telecommunications and postal activities. The President of UKE collects, accumulates, and makes available information on the telecommunications and postal market, thanks to which telecommunications and postal entrepreneurs can achieve their development goals conducive to the development of the information market and society. An Information Point has been established in Poland, responsible for collecting and processing data related to the location and course of technical infrastructure, including telecommunications. It is to provide investors and operators with information helpful in planning investments.

Another group of support policy tools comprises access tools. Access tools are associated with access to technical infrastructure. They apply to access to other people's real estate and areas in order to install a telecommunications network.

Another group of support policy tools consists of limiting transaction costs of entrepreneurs in contact with entities outside the telecommunications sector in matters related to network development. The appearance of these tools results from the statement that the external (in relation to the telecommunications sector) conditions for the development of the network contain excessive and unreasonable requirements that prevent or hinder the creation of an infrastructure of key importance for society and the economy.

## 6. Discussion

The purpose of this article was to develop a model of action ensuring access to information with access to postal infrastructure, which is full of digitization, meeting the constitutional need for assistance.

The results of the research presented below are based on scientific research.

The results are of the presentation of two models of activities in order to gain access to information by means of postal infrastructure, which until full digitization meets constitutional requirements. They cover two types of models:

- supporting;
- future service model.



In the supporting model, digital exclusion takes on a significant scale, thus it is necessary to use the postal-telecommunications infrastructure to a considerable extent. The role of government administration bodies is to conduct an active state policy, both oriented at entrepreneurs, through the involvement of postal operators, as well as at the society, through adequately selected tools.

Depending on the situation of a given country, if it is required to take measures aimed at the development of infrastructure, it will be necessary to use entrepreneur-oriented tools which will enable investment activities to be undertaken. However, the assumption that infrastructure may reach an optimal level may be misleading, as this will be difficult to achieve. It is, therefore, crucial to maintain the postal infrastructure until a high level of telecommunications infrastructure is achieved, as is demonstrated in Figure 5. This solution is characteristic for countries with a low level of economic development.



**Figure 5.** Model of providing society with information for countries with a low rate of economic development. Source: own work

The second solution is the future service model based on modern infrastructure. The postal infrastructure no longer plays a key role in access to information, as is demonstrated in Figure 6.



**Figure 6.** Model of providing society with information for countries with a high rate of economic development. Source: own work

In this model, the infrastructure is at a very high level of development. The focus is directed towards the development of society.

The path from the supporting model to the model of the future should be based on a society with digital awareness. It requires the use of:

- educational tools;
- information tools.

A model solution for the areas of regulation in pursuit of the best regulatory solutions is to use the tools presented in Figure 7.

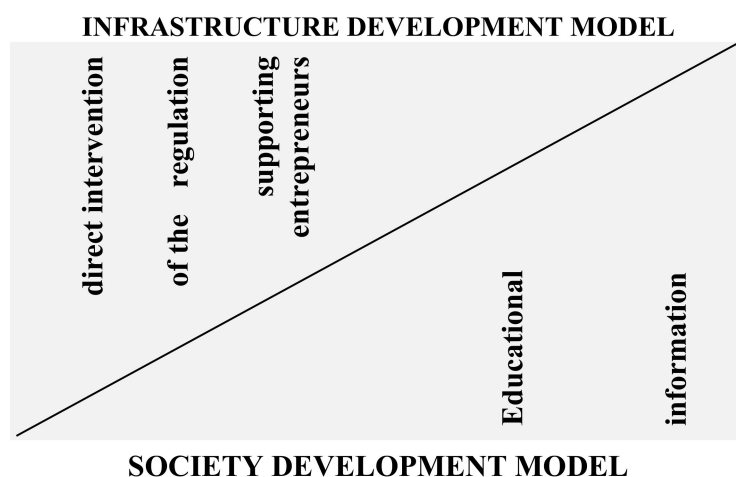


Figure 7. Model solution. Source: own work

## 7. Conclusions

Summarizing the considerations of the model of activities aimed at ensuring access to information using postal infrastructure, it should be noted that the development of modern technologies generates new services and products, the use of which determines the continuous development of infrastructure. Therefore, the role of the state is to continuously develop the telecommunications infrastructure. However, it is necessary to specify the scope of these activities. Accordingly, it is necessary to constantly monitor the level of infrastructure development and to confront it with market needs. In order to respond adequately to the new market situation, economic entities change the way they create new products, relying solely on modern infrastructure.

However, in a model approach, the telecommunication and postal market regulator should distinguish the public interest: of society or of economy. Nevertheless, a situation may occur where the public good may be marginalized as a result of different features of the political, institutional, and legal systems, as well as social conditions that prevail in a given country, and therefore the regulator of a given country is most aware of its social conditions, which is conducive to the removal of any imperfections, such as digital exclusion.

The selection of one of the two models proposed in the article, a supporting or future service model; however, it requires in-depth socio-economic analysis.

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