

Regional Resilience Redefinition: Postpandemic Challenge

Scientific Papers of the University
of Pardubice, Series D: Faculty of
Economics and Administration
2020, 28(4), 1158.
©The Author(s) 2020
DOI: 10.46585/sp28041158
editorial.upce.cz/SciPap

Vladimír Žitek 

Masaryk University, Faculty of Economics and Administration, Department of Regional Economics and Administration, Czech Republic

Viktorie Klímová 

Masaryk University, Faculty of Economics and Administration, Department of Regional Economics and Administration, Czech Republic

Abstract

Regional resilience is understood as the ability of the socio-economic system to respond to rapid changes caused by various external factors. Such an external factor is the crisis caused by the Covid-19 pandemic in the spring of 2020, to which economies in many regions have not been able to respond adequately. They did not anticipate such a situation and have paid insufficient attention to some matters. The paper aims to identify new challenges that should be reflected in the development strategies of regions striving for a higher level of resilience to unexpected pandemic crises. The analysis is performed on the example of the prepared Strategy of Regional Development of the South Moravian Region for 2021-27. We have created a proposal of specific measures that should be involved in his type of strategic documents. In some generality, three topics proved to be critical. These are 1) the internet and cybersecurity, 2) health and social care, and 3) the availability and standardization of public and private services. The ability to move activities to the internet has met significant limits that need to be removed or overcome. The health and social care system will have to be re-evaluated in terms of the overall regional concept. The actual unavailability of basic services meant for many inhabitants a further deterioration of the uncomfortable situation.

Keywords

Regional Resilience; Strategic Document; Pandemic Crisis; Covid-19; Security; Economic Development; Czech Region

JEL Classification

R11, R58

Introduction

Regions, as well as the national economies and the whole world, are gradually going through individual phases of the economic cycle. While the arrival of a positive or negative change is usually expected for some time, there are also moments when this is not possible and the negative external shock comes without warning. These are the situations in which regions have to demonstrate their resilience and ability to face the change, adapt to it and eliminate its effects. These impacts are often considerable, and the duration of the journey back to balance can be very long. An example of such an unexpected shock is the global pandemic of Covid-19, which occurred in the spring of 2020. Under the pressure of this situation, schools were closed, business activities were restricted, people used home offices and social contacts were reduced. That has led to an unprecedented economic downturn, which is comparable to the downturn during wartime in many regions and states. Not only the government restrictions but also people's subconscious fear of the disease itself and future economic development contributed to the economic downturn.

Because governments had no experience with such a situation, all their measures seemed unsystematic and often illogical. At the same time, the shutdown of the economy led to an increase in government spending, which first took the form of compensating for the incomes of people who could not do their jobs or had to stay at home with their children. Subsequently, many different programmes were created and implemented to compensate for the loss of income for entrepreneurs and stimulate household consumption. Therefore, governments solved through a massive budget deficit both the pandemic's direct effects and particularly the consequences of their own measures. Significant amounts of public budgets also flow into the improvement of the environment so that it is better able to cope with the next waves of this pandemic and similar situations in the future. The possibility of the emergence of other similar global threats has to be reflected in the territory, as this is the only way to increase regional resilience.

The main motivation of our research was the topicality of this issue and a wide range of diverse challenges that

Corresponding author:

Vladimír Žitek, Faculty of Economics and Administration, Masaryk University, Lipová 41a, 602 00 Brno, Czech Republic
Email: vladimir.zitek@econ.muni.cz

emerged in connection with the necessary response to the Covid-19 pandemic. Although the topic of regional resilience is not new, the current problems give it a completely new dimension. The pandemic has also shown that such complex problems need to be addressed at all territorial policy levels. Regional development strategies are a key tool that enables regional governments to implement measures that eliminate the impact of crisis situations on the economy and society in the future. As 2020 is the time when these documents are being prepared and finalized, this matter is becoming highly topical. Furthermore, our motivation for the research was strengthened by the fact that we had the opportunity to cooperate in preparing such a strategy in one of the Czech regions (Jihomoravský) and then consult and comment on it. We contributed to a rational evaluation of the situation and the adoption of a correct decision.

The topicality of this issue and the urgency of its solution is also evidenced by the European Union's initiative called Next Generation EU, which intends to invest EUR 750 billion during 2021-2027 to address the negative impact of the pandemic (European Commission, 2020). This initiative is based on three pillars, which are (1) support to member states with investments and reforms, (2) kick-starting the EU economy by incentivising private investments and (3) addressing the lessons of the crisis. The initiative includes several programmes, the most important of which is the Recovery and Resilience Facility. The condition for the member states to draw funds from this programme is the creation of a National Recovery and Resilience Plan. Another program, React-EU, offers additional funding to the existing cohesion policy operational programmes to support the regions and sectors most affected by the crisis. In the Czech Republic, the budget for the Integrated Regional Operational Program was increased in this way.

Literature Review

The concept of regional resilience is widely applied in the works of many authors. It is generally understood as the ability of the socio-economic system of a region to adapt to rapid changes caused by various factors (Koutský et al., 2012; Martin, 2012; Svoboda and Klementová, 2014). In this sense, various types of interventions are often mentioned. They have their origin in a wide range of economic phenomena, collectively referred to as economic crises, and may also result from demographic development, urbanization processes, technological changes and natural disasters. The concept of regional resilience is gaining a new dimension in the light of the pandemic crisis that hit the world in spring 2020. Although it will undoubtedly be the subject of a number of studies and analyses in the coming years to assess the pandemic's effects, it is already clear that the world will never be the same again. New experience must be immediately reflected in the strategic documents that underpin regional management and anticipate medium-term developments. Christopherson et al. (2010) state that public administration needs to respond thoughtfully and not change public policy settings in a hurry. It implies that it is necessary to subject the individual areas of regional development to a critical evaluation so that it is clear where their weaknesses are.

Many authors (Hassink, 2010; Martin, 2012; Ženka and Slach, 2018) agree that the key to regions' ability to cope with extraordinary fluctuations in the economy is their economic structure. They mean particularly the representation of the industry and the size of companies located in the region. Masik and Grabkovska (2020) state that regions should strive for greater flexibility in the business environment, which can be achieved mainly by supporting the creation and development of small companies. Ženka and Slach (2018) concluded in their research that even for the old industrial regions (verified on the example of the Ústí and Moravian-Silesian Regions), the crisis might not be a bigger problem than for others. They demonstrated that the resilience of regions may not only be linked to higher technological sophistication and value-added and that there has been an increase in traditional and related industries. Nevertheless, the current situation suggests that regions with a high proportion of R&D activities and knowledge-intensive services will be better able to cope with the crisis (Prokop et al., 2019). Filippetti et al. (2020) draw on their calculations and state that regions with high innovation performance have higher employment during and after the crisis as well.

Martini (2020) tried to prove the relationship between economic structure and resilience on the example of Italian regions. Her study shows that resilience is not a fixed regional attribute (a region resistant to one shock is not resistant to another one). She emphasizes that it is not only about the ability to resist after a shock but as well as the ability to develop new growth paths in the region. It, therefore, follows that any mix of specialization and regional specific factors cannot ensure resilience. Precisely, because building resilience is not an easy task, it must be part of public policies. Behrens et al. (2020) showed in a sample of Canadian clusters in the textile and clothing industry that clusters do not have the ability to protect their businesses. Still, in some cases, they may delay their end.

Rios and Gianmoena (2020) confirmed in their research that there is a strong connection between the quality of governance and regional resilience. Their analysis showed that a region with a high level of corruption is less successful in dealing with the impacts of the crisis. In their opinion, the solution is to increase the salaries of regional officials or increase women's share in public administration. They also found out that many other factors are crucial at the regional level. An example of them is the share of the young population, the level of volatility in the business

cycle, human capital, past employment growth rates and sectoral specialization.

However, the current crisis is atypical in many respects. It is specific, at least from the point of view of European countries, because it is caused by a disease, which puts considerable pressure on the health system. This problem is discussed by Eissa (2020), who has defined six specific recommendations for public policy on how to make the economy more resilient. The basis is the restructuring of expenditures, the result of which is the extension of the absorption capacities of medical facilities and the re-examination of the effective allocation of resources for sustainable investments. Gong et al. (2020) then identified four types of resilience. These include health resilience (population recovering from the disease), the resilience of the health system (capacity, structure and organization), economic resilience (recovery from economic consequences) and psychological resilience (the ability to live together again without fear of infection).

It is confirmed that the intensity of the effects of a pandemic crisis is spatially uneven and has a significant impact on the economy, well-being, transport and everyday life (Bailey et al., 2020). In addition, negative economic impacts may occur in regions where the disease has not spread. Typical examples are regions dependent on tourism (Gössling et al., 2020; Hall et al., 2020). If we want to overcome this pandemic crisis, we have to design a tailored response at the city and regional levels (Bailey et al., 2020). Brousselle et al. (2020) mention the need to develop new government strategies that reflect the constant flow of crises similar to the Covid-19 pandemic and increase the resilience of the population and community. For policymakers, this task requires more than just partial changes. The preparation of a regional development strategy is an excellent opportunity to implement it.

Methods

The main objective of this paper is to identify new challenges that should be reflected in regional development strategies in regions striving for a higher level of resilience to unexpected pandemic crises. The partial objective is to design a proposal of specific measures, which should be part of these strategic documents.

The analysis is performed on the example of the prepared Strategy of Regional Development of the South Moravian Region for 2021-27 (Czech Republic). This case study can be generalized to some extent, and its results can become a common part of strategic documents at the regional level. The case study is based on an expert assessment of the text, content analysis of the mentioned strategic document and interviews with experts involved in creating this Strategy.

The theoretical basis of our approach is the concept of regional resilience (e.g., Hassink, 2010; Christopherson et al., 2010; Martin, 2012), which in the last ten years has become the subject of deep interest of scientists dealing with regional sciences and policymakers. The concept of regional resilience has become popular worldwide, and attention has also been paid to the Czech and Slovak regions (Hudec et al., 2018; Koutský et al., 2012; Ženka et al., 2019). With the emergence of the Covid-19 pandemic, this approach is gaining new and huge dimensions (e.g., Bailey et al., 2020). The starting point of our research is the idea of a potential recurrence of a pandemic crisis, which can affect the regional system at any time and unexpectedly. As it has become clear that we have not been sufficiently prepared for such a negative situation, it is necessary to change and shift the perception of specific topics and problems.

The Strategy of Regional Development of the South Moravian Region for 2021-27 went through the standard process of preparing strategic documents. The experts were significantly involved in its design, both at the level of representatives of key stakeholders (e.g., universities, the South Moravian Innovation Center, CzechInvest, the Chamber of Commerce) and the level of other experts on regional development in the region. Representatives of universities, agencies, authorities and crucial companies had the opportunity to influence the strategic document and everything seemed to be finished by submitting a quality document for approval to the Regional Council in spring 2020. The last phase of the comment procedure by external experts took place in mid-March, which was exactly at the time of the rapid onset of the Covid-19 pandemic in the Czech Republic. Although the South Moravian Region was not hit by the first wave of the Covid-19 when it was spread mainly from Italy and Austria (spring holidays associated with skiing in these countries were in South Moravia a week before the intensive spread of the virus), the restrictive government measures were applied there by the same way as in other regions. At the same time, there was an unprecedented cyber-attack on the computer systems of the largest medical facility in the region, the Brno University Hospital. That started the discussion, which was also reflected by the regional authorities, and the approval process of the Strategy was postponed. Nowadays, a crucial political barrier, and opportunity at the same time, are elections to the Regional Council in autumn (October 2020), which can fundamentally affect the document's final text.

The Strategy defines six priority axes and consequently suggests the vision for each of them in connection with the activities of the working groups. The priority axes and visions are shown in Table 1.

Table 1. Priority axes and visions of the Strategy of Regional Development of the South Moravian Region for 2021-27.

Priority axes		Visions	
1	Education and sport	1	Education and sport that fully develops the potential of the region's inhabitants
2	Health and social matters	2	An accessible and sustainable care system for all those in need
3	Transport infrastructure and transport services in the territory	3	Smooth and sustainable transport in the South Moravian Region
4	Environment, technical infrastructure, rural development and agriculture	4	Clean region thanks to modern technologies and common sense
5	Competitiveness, entrepreneurship, innovation and research	5	Innovation and entrepreneurship in the South Moravian Region
6	Public administration, community facilities, culture, tourism and security	6	Region caring for its wealth

Source: Jihomoravský kraj (2020a)

During the spring and summer of 2020, the South Moravian Region's political representation decided on a rational solution to this situation, which fully reflects the recommendations that arise from many scientific studies' conclusions. The Strategy's approval was postponed until the spring of 2021 (Jihomoravský kraj, 2020b), which favored a factual aspect over a political one. At that time, the region's new political representation will have more information and analysis results, the benefit of hindsight and better knowledge of the real effects of the pandemic. Thanks to this, it will be possible to change public policy settings and adjust the Strategy's individual measures. This article can also contribute to it.

In the next part of the paper, our attention will be paid to analyzing individual priority axes. Their weaknesses and possibilities of reflection on previous experience that will strengthen the South Moravian Region's regional resilience in the medium term will be discussed. With regard to the defined objectives and the described approach, priority axes 3 and 4, which cover thematic areas sufficiently addressing the investigated problem, will not be discussed further. The proposal of measures in these two areas does not require significant modification in the sense of increasing the resilience of the region in the light of similar crisis situations. In our article, we do not present a comprehensive system of measures, but we supplement the current strategy measures with measures aimed at increasing regional resilience.

Results and Discussion

Looking at the priority axes and visions, it might seem that more emphasis needs to be placed on the idea of regional resilience. However, such an approach, especially in the case of defining priority axes, is not necessary, and the relevant reflection should be a matter of specific objectives and thematic measures. On the other hand, some reflection on visions might already be desirable, especially in the case of the last two axes (5th and 6th), where these slogans represent certain clichés and, simultaneously, directly call for a correction in the light of current experience. Vision 5 must undoubtedly include the word "research", which is not only about its understanding in terms of technological innovation but particularly as activities whose results are aimed at the prevention and protection of public health. For the sixth priority axis, we recommend emphasizing the word "safety". This word, which was perceived completely differently a few months ago, has now acquired a broader dimension in the perception of individuals, society, institutions and companies. The proposed vision may sound like this: "Safe and friendly region". Such vision embodies both resilience and attractiveness and solicitude (care). An alternative option is the "Region with a high standard of services taking care of the safety of its inhabitants". Here, greater emphasis is placed on the regional authorities as a factor that ensures the basic features of a calm life of the population and public and private sector organizations' smooth functioning.

Education and sport

Within the analysis of this priority axis, a distinction needs to be made between the two areas it covers, even though both have been affected by the crisis in approximately the same way. Education includes all levels of the system, from kindergartens, through primary and secondary schools to higher education. The current Strategy proposes a number of logical measures related to capacity building, improving schools' technical equipment, the availability of educational leisure activities, support for international interactions, and increasing the quality of education in peripheral areas. No attention has yet been paid to the issues of ensuring distance learning. That was also really reflected in the pandemic situation. No one was prepared to change teaching methods, and many schools and their teachers were unable to use them. Other problems occurred on the part of pupils and students. Discussions are already concerning the issue of disrupting the educational process and the ability to continue education after a six-month break. Teachers became task assignors, and parents replaced their work if it was within their possibilities and capabilities.

In light of the experience gained, it is necessary to define and supplement the following measures:

- Increase the computer literacy of primary and secondary school teachers.
- Ensure the readiness of complete teaching in distance form, including testing of acquired knowledge.
- Support children from socially disadvantaged families in the possibilities of acquiring (or lending) necessary information technologies for computer work and communication via the internet.
- Prepare plans for financing Internet connection fees in times of pandemic situation.

Dietrich et al. (2020) also dealt with the issue of distance education during the pandemic crisis. Based on a questionnaire survey among students, similar conclusions have been formulated. In addition, they emphasize that distance learning tools have to be adapted to the current generation of students (Y / Z generation). Distance education tools were originally developed for motivated students, but today's education system has to deal with students whose motivation is negatively affected by many distractions and stress sources. Therefore, the authors of the study recommend focusing also on working on students' ethics and breaking the monotony of distance learning. The study also showed that problems with technical equipment and internet connection affect not only students but teachers and their work at home as well.

The education and literacy of young people can obviously be considered in the long run as a fundamental prerequisite for the safe functioning of the regional economy. At the same time, both compulsory schooling and secondary education determine the chance of university admission. Maintaining a high level of education is a key prerequisite for achieving the goals in other priority axes. In addition, as also pointed out by Dietrich et al. (2020), a similar crisis can recur at any time, and therefore it is necessary to prepare students for the unexpected future.

Sport cannot be evaluated very much in terms of the interest of this article. For example, obesity has been confirmed to be a health and, in the context of a coronavirus pandemic, a safety risk. However, attention must be paid to its prevention, regardless of the de facto support for organized sport and sports infrastructure (this is already included in priority axis 2 in the current Strategy). Regular exercise is a matter of each person's morally free qualities and can hardly be significantly influenced by public authorities. Those measures that can support the efforts of individuals are already included in the Strategy.

Health and social matters

With respect to the main idea of the paper, it can naturally be expected that the priority axis focused on health and social services will be in the spotlight. This presumption lies in the fact that the pandemic was caused by a disease that burdened the health care system to some extent, and also in the fact that it had the most severe consequences for the elderly people, especially those living in various types of social care facilities. In the second case, it does not really matter whether the spread of the disease in these facilities was caused by the clients' age or the associated increased incidence of serious medical diagnoses (diabetes, cancer, cardiovascular disease, etc.).

The basis for the reflection on the impact of the Covid-19 pandemic must be what is mentioned in the form of a general cliché in the first measure of this priority axis, i.e., "Ensuring, availability and optimization and quality of health services in the region." It is evident that the concept of optimization will acquire an entirely new meaning. In the future, it will not be possible to see it only in the economic dimension of this term. Healthcare must become part of national security that reflects the pandemic lessons, which will lead to a reassessment of the absorption capacity of the healthcare system and structure of investments (Eissa, 2020). The health system must be able to accept patients in crisis situations elsewhere than in large hospitals in the regional capital (Brno). That is probably the unspoken lite motif of the whole axis, which should now be openly stated. The authors of the strategic document quietly circumvent what everyone suspects. The key problem remains in maintaining, and in some cases strengthening, certain types of health care in district towns, which can be defined in the form of the following measures:

- Evaluate or re-evaluate the current structure of ambulatory and inpatient care in facilities located outside the regional capital.
- Increase awareness of the possibilities of performing various types of medical examinations in facilities located outside the regional capital.

The latter designed measure is closely related to the former one. In times of crisis, it can significantly help maintain the functioning of the whole system or alleviate the degree of its paralysis. Even in other periods, it can substantially contribute to increasing the quality of the system. Medical facilities in the district and other towns are able to perform some medical examinations within several weeks, while the waiting time for the same examinations in Brno hospitals is several months. Therefore, strengthening specialized care can be of considerable preventive importance. At the same time, other goals of the Strategy can be addressed, such as increasing incentives for medical staff focused on their decision to work outside the regional capital. If hospitals in the district and other towns tend to limit the range of provided care, it will be complicated to convince doctors and other medical staff to work in the region. In this sense, the reduction in health care availability, further exacerbated by the ageing population, poses a significant security risk and affects the economic stability of some areas of the region.

Concerning the social area, the individual measures included in the current Strategy are well formulated and

generally valid and constitute a comprehensive system. What should also be emphasized in connection with the above are the goals in the field of population ageing. The basic requirement is to maintain an active lifestyle even in old age. Society has become too oriented to supporting young families and children. Now it seems time to change this approach, which many commercial entities have already understood. Seniors are beginning to play an increasingly important role in the economy. Many of them have already been involved in a supplementary pension scheme or have been able to generate savings during their working careers. Therefore, they are well funded and want to spend the rest of their lives actively.

It is crucial to change our thinking about the movement of seniors to collective social care facilities. These facilities cannot be built more and more and, in addition, there may be a shortage of necessary staff in the future. Besides the social exclusion of older people, which became absolute isolation in the pandemic crisis due to the ban on visits, seniors' concentration also caused infection sources. The regional Strategy should therefore modify the existing measures and further specify them, for example, as follows:

- Create a comprehensive system of active ageing and popularize it towards seniors and their close relatives.
- Provide and implement education of seniors in the field of computer (technological) and financial literacy.
- Systematize the support of home care, including ensuring continuous information about its possibilities.
- Diversify financial resources into the social care system, including stimulation of funding by private entities.

Competitiveness, entrepreneurship, innovation and research

This priority axis has two parts. The first is referred to as "Research, development and innovation" and the second as "Labour market and entrepreneurship". At first glance, from an economic point of view, this is an area that decisively determines the region's competitiveness. A number of researches carried out in the past have shown that non-innovative companies suffered significant losses during the economic crisis. Spescha and Woerter (2019) showed that Swiss companies performing R&D activities are more resilient to economic crises than non-innovative firms. Amore (2015) proved that experience with innovation during recessions improves a firm's ability to invest in R&D when a new crisis hits. Similar conclusions are reached by Roper and Turner (2020), who point out that companies in the United Kingdom reduce their willingness to invest in R&D and innovation with the onset of the COVID-19 crisis. However, if companies maintain these investments, they have higher survival chances, stronger growth and higher profitability.

The importance of the presence of universities and research infrastructures has become apparent since the first days of the pandemic crisis. Universities entered the social space in a unique way and used a number of their personnel and infrastructural capacities to solve the situation. This fact is confirmed by Misra and Pinheiro (2020) who have shown that universities leveraged their engagement with the local community to enhance resilience during the Covid-19 pandemic. We can also mention several examples from the South Moravian Region. Volunteers from the Faculty of Medicine helped in hospitals, students of pedagogical programmes looked after children of medical staff in the premises of Masaryk University, future graduates of informatics rescued the information systems of the University Hospital Brno that had been ruthlessly affected by a cyber attack. Research infrastructure has also provided crucial assistance. The biomedical research facilities carried out activities aimed at patient testing and coronavirus research, and technology-oriented facilities provided solutions to the critical shortage of protective equipment.

The current Strategy already envisages increased support for research and development. However, its limit is a too strong focus on applied research and technology. The pandemic highlighted the role and importance of basic research as a starting point for broader development. In reflection on these facts, the following recommendations can be designed:

- Support basic research in areas of grand societal challenge, in particular concerning the prevention and treatment of major diseases.
- Increase support and popularize localized disciplines with a significant international reputation, such as biomedicine and genomics.
- Strengthen the perception of the third role of universities in all relevant areas.

Internationalization is still worth a short note. It represents the term that we have recently used in connection with universities (and research in general) very often and hiding under it all forms of international cooperation. Its importance for the region's development remains the same today. Only the focus of its perception has shifted. Relationships and reputations have proven to be decisive factors contributing to the faster transfer and sharing of professional information that can be used in real time to benefit the economy and society.

An important topic is the entrepreneurship and the labour market. We can now observe the national government's unconceptual effort to help many groups of economic entities by providing various forms of support. In the future, we will be able to assess what effect the specific measures had. In line with the current Strategy, to support local businesses and to pay further attention to ensuring the standard of services in all parts of the region will be continuously important (see Priority Axis 6). The example of areas whose economies depend on one sector (e.g., automotive or tourism) has shown the importance of striving for a diversified economic structure. From the theoretical point of view, this is stressed, for example, by the concept of related variety (Boschma and Iammarino,

2009; Frenken et al., 2007). An essential role in the crisis was also played by companies that were able to modify their activities and offer new products that address emerging needs. Paradoxically, many of these companies were able to achieve record growth and profitability during this economic crisis. In this context, it became evident how important is the localization of companies dealing with so-called key enabling technologies (KETs). These technologies are widely used in many fields and represent the basis for the emergence of innovations (Montresor and Quatraro, 2017; Wanzenböck et al., 2020). These experiences imply a proposal for the following measures:

- Encourage the diversification of the economic structure of the regions.
- Support the development of key enabling technologies.

Commuters are a completely new topic brought about by the pandemic. The term involves inhabitants of the region who commute abroad every day to work, often tens of kilometers. In the case of the South Moravian Region, they travel particularly to Austria and less often to Slovakia. In the case of other Czech regions, these workers also commute to Bavaria and Saxony (Germany). The term commuter, which was used daily by the media in March and April 2020, has not been used until then and cannot be found in any regional strategy. Now it is apparent how important this group is and how high security risk it poses. However, these persons cannot be viewed only negatively, because they spend all their income, which is higher than the Czech average, or a substantial part of it, in the region's economy for goods and services offered by local enterprises. For all these reasons, commuters need to be given some attention, for example, in the form of the following measures:

- Create a system of registration and communication with residents who cross the border daily for work purpose.
- Propose possible measures to stimulate these inhabitants working in areas of critical infrastructure (especially health services) to return to jobs in the region.

Public administration, community facilities, culture, tourism and security

As mentioned above, the vision of this priority does not correspond with the new situation and we recommend renaming it to "Safe and friendly region". This new vision expresses a greater emphasis on the security of the region. Therefore, this part of the paper reflects the proposed change. Culture and tourism belong to the areas of interest falling into this axis. Although these sectors are among those most affected by the crisis, it does not seem that this fact will significantly impact the stability of the South Moravian Region. It will undoubtedly negatively affect the economy of many parts of the region, but it will not be a real economic resilience test. It is also likely that the main tourist season has partially eliminated many problems and losses. Nevertheless, companies in the field of tourism had to reduce their planned investments. However, the onset of the second wave of the pandemic in autumn 2020 could be a big hit for them. The experience from other regions proved that tourism faced enormous problems, especially in areas that are dependent on foreign tourists. A specific case is represented by restaurants, bars and cafes in Brno, which are dependent on the students. At the time of distance learning, there are a limited number of students here. Based on these facts, there is a need to complement the Strategy with one measure:

- Promote the regional tourist attractions and gastronomy among the inhabitants of the region and the Czech Republic.

The situation in the area of community facilities is entirely different. The topic of a quality high-speed internet connection is becoming crucial, the urgency of which increases significantly in critical situations of a longer-term nature (pandemics, state of emergency, etc.). The internet is becoming an infrastructure where work and educational activities can move and where it is possible to obtain the necessary information and spend leisure time. Providing this service in all parts of the region, including rural and peripheral ones, is a basic precondition for the functioning of society in crisis situations. The original measure called "Development and maintenance of the functional state of community facilities of municipalities (including barrier-free access and high-speed information networks)" needs to be divided. We propose to separate the availability of the internet and give a significantly higher weight to it. The proposal may be as follows:

- Build a high-speed internet infrastructure and permanently strengthen it.
- Design the concept of building public wi-fi networks, including the possibility of authenticated access to anyone and anywhere.

Services for inhabitants represent another vital part of community facilities. Compagnucci and Morettini (2020) emphasize the role of public policy in ensuring spatially equal access to basic services. In this sense, the proposed measure "Ensuring the availability of an adequate range of everyday services" appears to be insufficient. Following the development of the restriction and its possible progress in the event of a recurring crisis scenario, it is necessary to increase the urgency of these measures:

- Ensure a (high) standard of service availability with regard to the real needs of inhabitants (e.g., with regard to the share of seniors, low-income groups, etc.).
- Support the functioning of small businesses and provide the financial infrastructure.

The topic of the availability of health services has already been partially discussed above. The pandemic crisis showed how important it is to ensure the availability of sales of common food and drugstore goods, drugs and medicines, and how problematic and discriminatory the inability of card payments or unavailability of ATMs can be. The role of public administration and their bodies in ensuring this standard of accessibility is irreplaceable.

The last area that can dramatically endanger the functioning of regions, municipalities, institutions and companies, is cybersecurity. In recent months, the hackers' practices protected by governments of some states have proved to be sophisticated, and at the same time, easy to implement. The current Strategy states "Support for cybersecurity of information systems of public administration and regional contributory organizations." It is clear that cybersecurity is also a question of the human factor. It is just a specific person who lets hackers into the system. It is necessary to set up a system of knowledge and responsibility to eliminate the threat of human error. Another parameter of cybersecurity is the up-to-dateness of operating systems and anti-virus protection of individual computers and servers. Only in the last place, but not according to importance, is the security of our own information systems, setting rules, frequency and the way of storing their backups, both all data and e-mail communication. From the point of view of the normal functioning of the economy and society of the region, this is one of the critical elements of its resilience. It is, therefore, necessary to propose the following measures:

- Set up a system of permanent education and training in the field of computer literacy and security for employees of the region, municipalities and contributory organizations established by them.
- Support the system of permanent education and training in the field of computer literacy and security for critical infrastructure staff in the region.
- Ensure the purchase of licenses and regular updates of operating systems and anti-virus programs on all computers owned by the region, municipalities and contributory organizations established by them and define clear responsibility for the implementation of this measure.
- Secure all information systems used by the public administration and their contributory organizations and set up a system for their backup, testing and maintenance.

Conclusion

In connection with external shocks such as economic crises or natural disasters, which have a negative impact on the structure of the regional economy, the topic of regional resilience is usually mentioned. The resilience is understood as the socio-economic regional system's ability to respond to these changes, eliminate their impact, and return to its original equilibrium level. An important role in this process is played by public authorities, which can, through well-established strategies and management systems, prepare the conditions for easier managing of crisis scenarios.

In 2020, the world was hit by the Covid-19 pandemic, which in a short time paralyzed the functioning of the economy and society, stopped production, imprisoned people in quarantine and isolation. A number of activities and processes showed that, despite the proclamations, the society was not well prepared for such a thing. The basic question posed by this recent experience is: What else can we do to ensure that the effects of negative shocks are not so dramatic when the crisis repeats? However, it must be emphasized that public policies cannot be changed rapidly, but every step needs to be well thought and considered.

On the example of the prepared Strategy of Regional Development of the South Moravian Region for 2021-27, which was elaborated with great care and whose final version is undoubtedly of high quality, it was possible to show where there are white spaces that need our attention now. Through expert analysis of the individual priority axes, we proposed a number of measures that should complete the strategic document and whose implementation will contribute to increasing the region's resilience. In our paper, we have offered 26 such measures. These recommendations can be summarized into three major topics:

- internet and cybersecurity,
- health and social care,
- availability and standardization of public and private services.

Although the whole world seemed to be online before the pandemic, the crisis proved that it is not entirely true in practice. And if, at first glance, yes, it potentially brings other problems. Today's world certainly has considerable opportunities to move its functioning to the internet. It only needs two things: technical equipment and human skills. Both of them can be influenced and supported to some extent by the region. For example, in the case of the equipment of secondary schools and their ability to implement quality distance learning, the region has direct responsibility for this, as it is their founder. However, attention must also be paid to the technical equipment of the beneficiaries - pupils, students, households and other entities. And all this does not only have hardware requirements. It is also necessary to be equipped with licensed updated software, which is a prerequisite for the safe operation of computers and the internet.

Health and social care must be re-evaluated, both in terms of the overall concept and in terms of the structure or optimization of the network. The importance and weight of these topics will increase with the expected demographic development in the future. The ageing of the population could become a security threat even without pandemic situations, and the regions must tighten their forces so that they can prevent this. The health care system needs to be modified so that care is as accessible as possible in facilities outside regional capitals. At the same time, biomedical research at universities needs to be supported. Its capacity and potential will undoubtedly play an essential role in the future.

The availability of basic private and public services and the creation of its standard are often discussed. However, the urgency to find a solution does not seem to have been too high. It turned out that the inability to buy basic groceries, pick up medicines, or withdraw money at ATM in localities where it is not possible to pay by a card created complicated situations for certain groups of people whose mobility is restricted by the state of emergency. It is the effort associated with setting the standard of basic services that could become a springboard for the previous two topics. If the approach within the set of priority axes will be redefined and the proposed measures will be supplemented, the regional resilience will increase after their implementation. Thanks to better prepared regions, other similar crises will be coped with a lower negative impact on the economy and society.

Finally, we would like to mention a few limitations of the results of our research. All proposed measures reflect the immediate experience of the first wave of the Covid-19 pandemic or the effects of government regulations that have restricted the functioning of routine processes. From this point of view, it is a comprehensive approach in the investigated areas, where the synergy effects resulting from the implementation of individual measures can be observed. There are several limitations to our research and proposals. First, public policies are always a result of a political process (e.g., Borrás and Edquist, 2013). In other words, we mean the compatibility with the preferences of the ruling parties and the identification of politicians with the study results. Experience from the Czech Republic revealed that political decisions are also influenced by the date of the elections. Political interventions in this country were postponed due to the regional elections, which allowed a faster onset of the pandemic's second wave. The availability of funds, which must be promised by the central government, also plays a role. It is evident that regional governments cannot declare the achievement of goals for which they do not have sufficient resources. Researches from other areas of public policy have confirmed that for government intervention to be sufficiently effective, a sufficiently high financial amount must be allocated for them (e.g., Montmartin and Herrera, 2015). The situation is complicated by a series of other budgetary interventions, some of which may lead to a reduction in regional and municipal budget revenues. The limitation of our results also represents a time aspect of the implementation of these measures (or their urgency). It was not the purpose of our paper to address this issue. It is clear from the whole text that some interventions cannot be postponed, as the pandemic does not end but continues with other waves. On the contrary, other activities may be implemented later. That is also reflected in many authors' frequent arguments (e.g., Gong et al., 2020), who point out the likelihood of occurrence of further impacts. At the same time, many of them (e.g., Christopherson et al., 2010) encourage public authorities to make responsible decisions and thoughtful reactions. It is necessary to carry out sufficient analyses, evaluate the gained experience carefully and react systematically over some time.

Acknowledgement

This paper was prepared with the support of the research project GA CR No. GA20-03037S "Towards a dynamic knowledge-based business model for open innovations".

References

- Amore, M. D. (2015). Companies learning to innovate in recessions. *Research Policy*, 44(8), 1574-1583. DOI:10.1016/j.respol.2015.05.006.
- Bailey, D., Clark, J., Colombelli, A., Corradini, C., De Propriis, L., Derudder, B., Fratesi, U., Fritsch, M., Harrison, J., Hatfield, M., Kemeny, T., Kogler, D. F., Lagendijk, A., Lawton, P., Ortega-Argilés, R., Otero, C. I., & Usai, S. (2020). Regions in a time of pandemic, *Regional Studies*, 54(9), 1163-1174. DOI: 10.1080/00343404.2020.1798611.
- Behrens, K., Boualam, B., & Martin, J. (2020). Are clusters resilient? Evidence from Canadian textile industries. *Journal of Economic Geography*, 20(1), 1-36. DOI: 10.1093/jeg/lby064.
- Borrás, S., & Edquist, C. (2013). The choice of innovation policy instruments. *Technological Forecasting and Social Change*, 80(8), 1513-1522. DOI: 10.1016/j.techfore.2013.03.002.
- Boschma, R., & Iammarino, S. (2009). Related variety, trade linkages, and regional growth in Italy. *Economic Geography*, 85(3), 289-311. DOI: 10.1111/j.1944-8287.2009.01034.x.
- Brousselle, A., Brunet-Jailly, E., Kennedy, C., Phillips, S. D., Quigley, K., & Roberts, A. (2020). Beyond COVID-19: Five commentaries on reimagining governance for future crises and resilience. *Canadian Public Administration-Administration Publique du Canada*, 63(3), 369-408. DOI: 10.1111/capa.12388.
- Compagnucci, F., & Morettini, G. (2020). Improving resilience at the local level: The location of essential services within inner areas. Three case studies in the Italian Marche region. *Regional Science Policy and Practice*, 12(5), 761-786. DOI: 10.1111/rsp3.12343.
- Dietrich, N., Kentheswaran, K., Ahmadi, A., Teychené, T., Bessière, Y., Alfenore, S., Laborie, S., Bastoul, D., Loubière, K., Guigui, C., Sperandio, M., Barna, L., Paul, E., Cabassud, C., Liné, A., & Hébrard, G. (2020). Attempts, Successes, and Failures of Distance Learning in the Time of COVID-19. *Journal of Chemical Education*, 97(9), 2448-2457. DOI:10.1021/acs.jchemed.0c00717.
- Eissa, N. (2020). Pandemic Preparedness and Public Health Expenditure. *Economies*, 8(3). DOI: 10.3390/economies8030060.
- European Commission, (2020). *Europe's moment: Repair and prepare for the next generation*. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_940. [cit. 2020-10-22].
- Filippetti, A., Gkotsis, P., Vezzani, A., & Zinilli, A. (2020). Are innovative regions more resilient? Evidence from Europe in 2008–2016. *Economía Política*, 37, 807–832. DOI: 10.1007/s40888-020-00195-4.
- Frenken, K., Van Oort, F., & Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional*

- Studies*, 41 (5), 685-697. DOI: 10.1080/00343400601120296.
- Gong, H., Hassink, R., Tan, J., & Huang, D. (2020). Regional Resilience in Times of a Pandemic Crisis: The Case of COVID-19 in China. *Tijdschrift voor Economische en Sociale Geografie*, 111(3), 497-512. DOI: 10.1111/tesg.12447.
- Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism* (in press). DOI: 10.1080/09669582.2020.1758708.
- Hall, C. M., Scott, D., & Gössling, S. (2020). Pandemics, transformations and tourism: be careful what you wish for. *Tourism Geographies*, 22(3), 577-598. DOI:10.1080/14616688.2020.1759131.
- Hassink, R. (2010). Regional resilience: a promising concept to explain differences in regional economic adaptability? *Cambridge Journal of Regions, Economy and Society*, 2010(3), 45-58. DOI:10.1093/cjres/rsp033
- Hudec, O., Reggiani, A., & Šišerová, M. (2018). Resilience capacity and vulnerability: A joint analysis with reference to Slovak urban districts. *Cities*, 73, 24-35. DOI:10.1016/j.cities.2017.10.004.
- Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, 3(1), 3-10. DOI: 10.1093/cjres/rsq004.
- Jihomoravský kraj. (2020a). *Strategie regionální rozvoje Jihomoravského kraje na období 2021-27 (pracovní verze č. 17)*. Brno: Jihomoravský kraj.
- Jihomoravský kraj. (2020b). *Strategie regionální rozvoje Jihomoravského kraje na období 2021-27 (pracovní verze č. 23)*. Brno: Jihomoravský kraj.
- Koutský, J., Rumpel, P., Slach, O., Hlaváček, P., Olšová, P., Novák, V., & Toušek, V. (2012). *Profilace měkkých faktorů regionálního rozvoje jako nástroj posilování regionální odolnosti a adaptability*. Certifikovaná metodika Ministerstva pro místní rozvoj. Ústí nad Labem: UJEP.
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of Economic Geography*, 2012 (12), 1-32. DOI:10.1093/jeg/lbr019
- Martini, B. (2020). Resilience and economic structure. Are they related? *Structural Change and Economic Dynamics*, 54, 62-91. DOI: 10.1016/j.strueco.2020.03.006.
- Masik, G., & Grabovska, M. (2020). Practical dimension of urban and regional resilience concepts: a proposal of resilience strategy model. *Miscellanea Geographica – Regional Studies on Development*, 24(1), 30-34. DOI: 10.2478/mgrsd-2019-0028
- Misra, D., & Pinheiro, R. (2020). Engaging with local communities: Five key lessons that businesses can learn from universities. *Industry and Higher Education*, (in press). DOI: 10.1177/0950422220966964.
- Montmartin, B. A., & Herrera, M. (2015). Internal and external effects of R&D subsidies and fiscal incentives: Empirical evidence using spatial dynamic panel models. *Research Policy*, 44(5), 1065-1079. DOI: 10.1016/j.respol.2014.11.013.
- Montresor, S., & Quatraro, F. (2017). Regional Branching and Key Enabling Technologies: Evidence from European Patent Data. *Economic Geography*, 93(4), 367-396. DOI: 10.1080/00130095.2017.1326810.
- Prokop, V., Stejskal, J., & Hájek, P. (2019). The role of information sources in firm R&D activities – The case of German knowledge intensive industries. *Engineering Economics*, 30 (3), 294-303. DOI: 10.5755/j01.ee.30.3.20942.
- Rios, V., & Gianmoena, L. (2020). The link between quality of government and regional resilience in Europe. *Journal of Policy Modeling*, 42(5), 1064-1084. DOI: 10.1016/j.jpolmod.2020.02.005.
- Roper, S., & Turner, J. (2020). R&D and innovation after COVID-19: What can we expect? A review of prior research and data trends after the great financial crisis. *International Small Business Journal: Researching Entrepreneurship*, 38(6), 504-514. DOI:10.1177/0266242620947946.
- Spescha, A., & Woerter, M. (2019). Innovation and firm growth over the business cycle. *Industry and Innovation*, 26(3), 321-347. DOI:10.1080/13662716.2018.1431523.
- Svoboda, O., & Klementová, T. (2014). Ekonomická výkonnost a výzkumná aktivita jako významný faktor ekonomické odolnosti regionů. In *XVII. mezinárodní kolokvium o regionálních vědách*. Brno: Masarykova univerzita, 179-185.
- Wanzenböck, I., Neuländtner, M., & Scherngell, T. (2020). Impacts of EU funded R&D networks on the generation of key enabling technologies: Empirical evidence from a regional perspective. *Papers in Regional Science*, 99(1), 3-24. DOI:10.1111/pirs.12473.
- Ženka, J., & Slach, O. (2018). Ekonomická odolnost českých starých průmyslových regionů. In *XXI. mezinárodní kolokvium o regionálních vědách*. Brno: Masarykova univerzita, 20-27.
- Ženka, J., Slach, O., & Pavlík, A. (2019). Economic resilience of metropolitan, old industrial, and rural regions in two subsequent recessionary shocks. *European Planning Studies*, 27(11), 2288-2311. DOI:10.1080/09654313.2019.1638346.