MUNI
ECON

Plná verze článku / Full paper

OSTÁRKOVÁ, J. (2021). What does one need to do to get database of regional resilience indicators? "Step-by-step" approach. In (Klímová, *V., Žítek, V., eds.) XXIV. mezinárodní kolokvium o regionálních vědách. Sborník příspěvků*. Brno: Masarykova univerzita, pp. 100-107. ISBN 978-80-210-9896-1. DOI 10.5817/CZ.MUNI.P210-9896-2021-12.

VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ECONOMICS | DEPARTMENT OF INTERNATIONAL ECONOMIC RELATIONS

What does one need to do to get database of regional resilience indicators? "Step-by-step" approach.

Jana Ostárková

Department of International Economic Relations

Faculty of Economics

VŠB-Technical University of Ostrava

Czech Republic

Content

Acknowledgement

The paper is supported by the SGS project (SP2021/50) of the Faculty of Economics, VŠB-TUO

Současné výzvy ekonomického rozvoje

Motivation (1)

- **Resilience** is a term used across all disciplines from environmental sciences to sociology and psychology to materials engineering. In recent years, it has come to the fore in the field of economic studies. Currently, the term is used in various fields and various contexts, mainly **as an element or attribute that an entity or system should achieve and the desired state that should be supported by these entities** (Martin, Sunley, 2015).
    - Due to the economic crises that have affected the whole world in recent years and affected the world economies and their regions, **the concept of resilience is becoming increasingly part of political discussions on building regional development**.
- **Crises**, especially the economic crisis of 2007-2009, **have become a driver for the study of regional economic resilience**, both in terms of state or lower territorial units and cities, making resilience a goal of regional economies.

Motivation (2)

- **To answer the question of why some regions are more resilient and what factors and indicators influence it**, regional economic resilience has become part of the research of many authors around the world (Martin, 2012; Rose, 2009; Cutter et al., 2008; Hill et al., 2008; Norris et al., 2008; Foster, 2006).
- Although the concept of resilience has become an **often-inflected topic** (with a significant increase in political pressure), it should be noted that **there is no generally accepted definition or agreed on the method of measurement**, which leads to often misunderstandings and many variants of understanding this concept (Staníčková, 2017a; Staníčková, 2017b).
- The **current pandemic crisis**, which has affected all world's economies and represents a nonfinancial shock compared to the previous crisis of 2007-2009, but, on the contrary, a health shock that resulted in an economic crisis.
    - This situation **results in a greater interest in the economic resilience of regions**, **making building resilience a driving force for regional development**, not only in terms of strengthening economic resilience, but also environmental and digital resilience, which represent a future trend for many economies.

1 Introduction

Aim of the paper:

- The aim of the paper is to **clarify the "step-by-step" approach for setting and creating the database** needed for further study of resilience and thus answer the question of what needs to be done to obtain a database of regional resilience indicators.

Theoretical part:

- The theoretical part is devoted to the fundamental bases of resilience trough literature review.

Empirical part:

- The empirical part deals with the evaluation of data set for further study of resilience.

2 Literature Review of Resilience Concept (1)

- **Literature analysis for the period 2016 to 2020** found that most authors maintain a comprehensive approach to the study of resilience in respecting the fact that the **region's economic resilience is influenced not only by economic factors but also by socio-economic factors**.
    - During this reference period, about 20 outputs were published focusing on the region's resilience, the updating of literature review will continue.
- The main indicators of **economic** resilience include **macroeconomic stability indicators**:
    - such as GDP, savings, household savings, gross domestic fixed investment, consumption, growth, trade, inflation, fiscal deficit to GDP ratio, sum unemployment and inflation, the ratio of foreign debt to GDP (Modica, 2018; Staníčková, 2017a).
- Some authors include indicators such as **population density**, the proportion of the young population, proportion of the old population, **net migration rate**, social capital, population level, **people at risk of poor or social exclusion**, people living in very labour-intensive households, people at risk of poverty after social transfers, severely disabled people, health care expenditures, **medical staff**, medical facilities, road deaths, **life expectancy of health**, infant mortality, cancer mortality, heart disease mortality, suicide (Gianmoena, 2018; Staníčková, 2017a).

2 Literature Review of Resilience Concept (2)

- Due to the growing interest in **climate change**, more emphasis is being placed on the environmental dimension of economic resilience.
  - The **European Union** puts ecological factors first in **building resilience and recovery**. The main dimensions of the EU's resilience are the **social and economic dimension**, **the geopolitical dimension**, **the green dimension**, and **the digital dimension** (European Commission, 2020a).
- In addition to these mentioned indicators and factors, the development of persisted **innovation** is also important for regional resilience (Staníčková, 2017a; Staníčková 2017b; Staníčková, Melecký, 2018; Martin, 2012; Gianmoena, Rios, 2018).
- Miller et al. (2016), the **economic** resilience index includes:
  - *economic diversity* (diversity of the employment sector), *entrepreneurship* (owners as a percentage of the total number of unemployed employees, average income of non-agricultural business owners), *active economy* (labour force participation rate)) and economic growth).
- At the same time, **social** resilience is distinguished, a set of indicators that form the social resilience index. Indicators of social resilience directly include:
  - *place adhesion* (expressed as a percentage of the population living in the same region as a year ago)*, percentage of owner-occupied housing units*, *highly educated population*, *civic engagement in terms of turnout*, *social capital association per 10,000 inhabitants*, *a healthy population in terms of life expectancy*.

3 Database

- The database consists of an indicator obtained through the database of the **European Statistical Office** (Eurostat); the following reference period includes the programming period of the European Union.
- The years **2000 to 2019** are analysed, and due to the availability of data, they are on the territory of the Czech Republic.
- The territorial level of analysing corresponds to the classification of territorial statistical units EU NUTS (nomenclature of units for territorial statistics) valid from 1.1.2021, for the purposes of analysing the **territorial level NUTS 2** (cohesion region) was chosen, which is further associated region of the Czech Republic.
- **Based on literature research**, **a set of 75 Eurostat database indicators** for the period 2000 to 2019 was compiled; this set of indicators has been divided into five dimensions, based on literature research, inspired by the resilience dimensions assembled in the framework of EU resilience-building by the European Commission. These **five dimensions** include:
    - the **societal dimension,**
    - the **economic dimension,**
    - the **social dimension,**
    - the **ecological dimension,**
    - the **innovative dimension.**

3.1 Data information

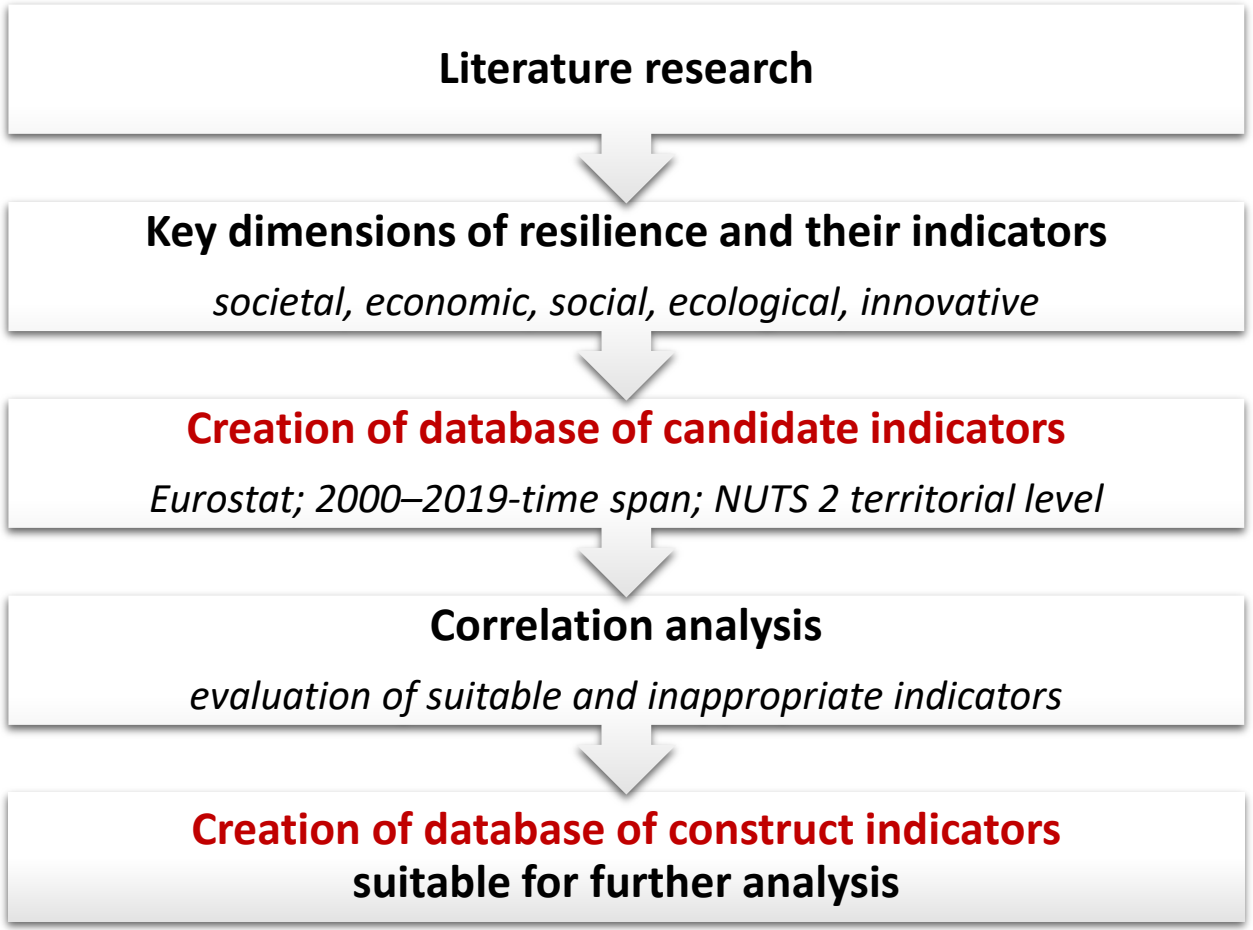
Territories		
Czech Republic	NUTS 2 (Cohesion regions	Code of the region
	Praha	CZ01
	Střední Čechy	CZ02
	Jihozápad	CZ03
	Severozápad	CZ04
	Severovýchod	CZ05
	Jihovýchod	CZ06
	Střední Morava	CZ07
	Moravskoslezsko	CZ08

Period			
2000-2019 (annual periodicity)			
Dimension/indicator	Total	Excluded	Construct
Societal dimension	23	14	9
Economic dimension	18	5	13
Social dimension	18	10	8
Ecological dimension	10	5	5
Innovative dimension	6	1	5
	∑ 75	∑ 35	∑40

Source: own elaboration based on calculations in IBM SPSS Statistics 27, 2021

- Given the size of the set of candidate indicators and the **need to verify the integrity of the set and the elimination of possible duplications**, it was necessary to subject these indicators to the verification of suitability for subsequent analysis and therefore **perform a correlation analysis of these 75 indicators for the whole analysed period**.
- A correlation matrix was first calculated within the correlation analysis, which reproduces the level of all mutual relations within a given set of indicators.
- **Pearson's correlation coefficient** was chosen as a correlation measure based on the used method of data standardisation.
  - The ideal state was considered the state when the correlation rate of some of the indicators did not fall below 0,3. At the same time, the correlation coefficients of suitable indicators would not exceed 0,9.
- As a result of the correlation analysis, **was reduced the total number** of indicators **from the original 75 to 40**.

3.2 "Step-by-step" approach



Source: own elaboration, 2021

4 Conclusion

The result of the analysis of the suitability of indicators for defining the dimensions of regional resilience and its indicators **is the compilation of a database based on a literature search composed of 75 candidate indicators divided into five dimensions of regional economic** which are: social dimension, economic dimension, social dimension, ecological dimension, and innovative dimension in their structure they inspire the resilience drawn up by the European Commission.

- Within the first dimension of the **societal dimension**, **nine indicators** out of **twenty-three candidate** were identified as constructed indicators.
- Within the **economic dimension**, **thrteen indicators** out of **eighteen candidate** were identified as constructed indicators.
- Under the **social dimension**, **eight indicators** out of **eighteen candidate** were identified as constructed indicators.
- Under the **ecological dimension**, **five indicators** out of **ten candidate** were identified as constructed indicators.
- In the **innovative dimension**, **five indicators** out of **six candidate** were identified as constructed indicators.

The result of this analysis was the compilation of a data set of 40 resilience indicators within the five dimensions of resilience in the Czech Republic at the NUTS 2 level of cohesion regions for the reference period 2000 to 2019 form available data from Eurostat.

Orientation of the further research

The orientation of further research using this database of indicators will be using **factor analysis and cluster analysis** for creating **regional cluster profiles according to extracted factors**.

Analysis will be timely oriented according to the EU programming periods – based on the EU Cohesion Policy, i.e., 2000-2006, in this case respectively 2004-2006 with regard to the accession of the Czech Republic to the EU, then 2007-2013, 2014-2020 with regard to data availability.

Thank you for your attention

Jana Ostárková

jana.ostarkova@vsb.cz
www.vsb.cz