

Regional Economic Resilience in the Face of Crises: A Systematic Literature Review

Recent years have been exceptionally turbulent due to various crises such as COVID-19, deadly wars, and natural disasters. As a result, regional economic resilience has again become a highly discussed topic in scientific literature. The first time regional economic resilience received such comprehensive coverage from the scientific community was after the Great Recession, primarily due to its relevance in protecting and improving people's well-being during and after the crisis. Around the same time, scientists attempted to explain and conceptualize this fuzzy subject for a modern landscape (Hill et al., 2012; Simmie & Martin, 2010). The following years (Boschma, 2015; Martin & Sunley, 2015) saw multiple further attempts to improve, expand, or even redefine the crucial aspects of this phenomenon. More than a decade's worth of scientific literature introduced various major and thought-provoking ideas. Unfortunately, this means that regional economic resilience's aspects, scope, and empirical measurements are not completely clear, hindering its application to policy and decision-making.

This paper conducts a systematic literature review that explores existing economic resilience literature to address the abovementioned issues by outlining and summarizing achievements in this field. After defining the research protocol, the first step was to perform a search for scientific material. Using scientific databases of Scopus and Web of Science, three separate search methods were used to include all the essential and relevant literature.

$$\begin{aligned} & \text{TITLE} - \text{ABS} - \text{KEY} ((\text{economic} *) \text{AND} ((\text{"regional resilience"} \text{OR} \text{"region resilience"}))) \text{AND} (\text{LIMIT} \\ & \quad - \text{TO} (\text{SUBJAREA}, \text{"SOCI"}) \text{OR} \text{LIMIT} - \text{TO} (\text{SUBJAREA}, \text{"ECON"})) \text{AND} (\text{LIMIT} \\ & \quad - \text{TO} (\text{LANGUAGE}, \text{"English"})) \text{AND} (\text{LIMIT} - \text{TO} (\text{DOCTYPE}, \text{ar}) \text{OR} \text{LIMIT} \\ & \quad - \text{TO} (\text{DOCTYPE}, \text{ch}) \text{OR} \text{LIMIT} - \text{TO} (\text{DOCTYPE}, \text{cp})) \quad (1.1) \end{aligned}$$

$$\text{TITLE} - \text{ABS} - \text{KEY} (\text{"regional economic resilience"}) \text{AND} (\text{LIMIT} - \text{TO} (\text{LANGUAGE}, \text{English})) (1.2.)$$

$$\text{TITLE} (\text{"regional"} \text{AND} \text{"resilience"}) \text{AND} \text{LANGUAGE} (\text{english}) (1.3.)$$

Formula (1.1.), (1.2.), and (1.3.) are for Scopus Search 1, Search 2, and Search 3 queries, respectively. Please note that citation quartile calculations for Search 3 were done after the search.

$$\begin{aligned} & \left(\left(\left(\left(\left(\text{TS} = (\text{economic} *) \right) \text{AND} \left(\text{TS} = ((\text{regional resilience}) \text{OR} (\text{region resilience})) \right) \right) \right) \right) \text{AND} \text{LA} = (\text{English}) \right) \right) \text{AND} \text{DT} \\ & = (\text{Article} \text{OR} \text{Book Chapter}) \text{AND} (\text{WC} = (\text{Economics}) \text{OR} \text{SU} = (\text{Business \& Economics}))) \quad (2.1.) \end{aligned}$$

$$(\text{ALL} = (\text{"regional economic resilience"})) \text{AND} (\text{LA} == (\text{ENGLISH})) (2.2.)$$

$$(\text{TI} = (\text{regional})) \text{AND} \text{TI} = (\text{resilience}) \text{AND} \text{LA} = (\text{English}) (2.3.)$$

Formula (2.1.), (2.2.), and (2.3.) are for WoS Search 1, Search 2, and Search 3 queries, respectively. Please note that citation quartile calculations for Search 3 were done after the search.

Search method 1 was focused on finding articles that closely matched the usage of the regional economic resilience definition. Search method 2 was aimed to cover a wider variety of sources and publishers from different disciplines. Search method 3 again focused on a broader range of literature but was limited based on the papers with the top quartile of citations from the set. It was done to ensure the most influential scientific works were included in the systematic review. Based on these methods, a database of ~550 papers was built after all the searches were conducted. Following the research protocol, a "deduplication" process was performed, and all papers were screened for the relevance. This resulted in ~210 articles in scientific journals, book chapters, and conference papers suitable for complete eligibility testing.

The eligibility criteria ensured that the papers' content focused on regional economic resilience and was sufficient in scope. The entire list of eligibility criteria:

1. **Resilience Scope** – this study focuses on the entirety of regional economic resilience, which is a complex multi-dimensional phenomenon. Focusing only on separate parts of regional economic resilience could skew the research results. Thus, papers representing regional resilience only with ecological, business, or industrial aspects were excluded.
2. **Topicality and Relevance** – regional economic resilience must be one of the core points of the study. Studies that only briefly mention regional economic resilience might not necessarily have enough time to present and explore such a complex phenomenon. Thus, they were excluded.
3. **Research Scope** – empirical studies that explore only one or two regions were excluded. Such a small sample of research objects means the study can adequately explore the specific cases, but it does not necessarily capture a broader regional scope. Thus, it would be hard to distinguish if the selected sample and conclusions stemming from them are not affected by the selection basis.
4. **Multi-dimensional Aspect** – regional economic resilience is often considered multi-dimensional. As a result, empirical studies that represented it with a single attribute (such as employment) instead of a set of attributes were excluded. A single attribute alone might not be able to proxy regional economic resilience complexity.
5. **Regional unit** – although some might argue about the differences between micro- and macro-regions, this study decided to have a city as the smallest regional unit (and everything above – counties, states, etc.). Studies focusing mainly on firms and households were excluded, as they might not accurately represent the broader regional situation.

Figure 1 shows the PRISMA flow diagram of the systematic literature review. It was done based on (Page et al., 2021) and adjusted to represent three search methods (screened separately to calculate search methods effectiveness). The screening process included the title and the abstract review. In case the abstract showed that the study broke any of the eligibility criteria, the study was excluded without a full-text eligibility assessment. The full eligibility assessment is currently in progress, and the final paper might have different numbers.

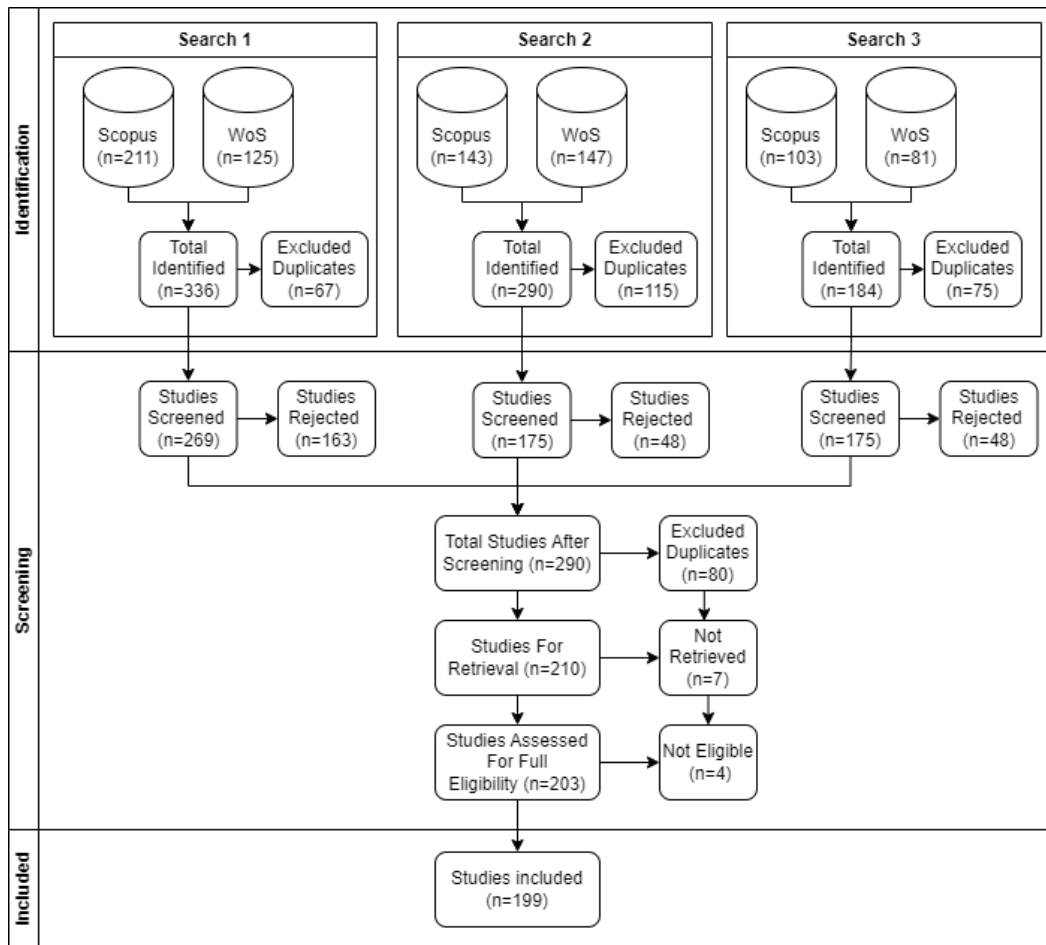


Figure 1 PRISMA flow diagram.

Data for eligible papers was collected with the help of Microsoft Excel, Zotero, and MAXQDA software. The author of this research performed content analysis and extracted data variables (see Table 1) with the help of the software. To cross-check the author's decisions, various language models (Humata.AI, SciSummary, ChatPDF, FileGPT) were also used to extract the data variables values. Afterward, the author-extracted values were compared with values extracted by language models. In case of discrepancies, the author returned to double-check and assign the correct values.

The data variables represent important study aspects, which were later compiled, analyzed, and used to determine the systematic literature review results. Some data variables' values were initially bounded with the exact set (such as *isTheoryOnly*, *publishYear*, etc.). In contrast, others were determined during content analysis (such as *empiricalModels*, *rerRepresentingAttributes*). Not all the studies had the entirety of data variables analyzed; some of the studies had variables for which deterministic values could not be extracted, and some of the values were used to select which other data variables needed to be determined (for example, *empiricalModels* was only explored if *isTheoryOnly* was false). Some of the studies might have multiple values assigned to the same variable (for example, a study can explore shocks over a long period, meaning it would get assigned values such as *multiple*, *economic*, *man-made*, *epidemic*, etc.)

Data Variable	Possible Values
isTheoryOnly	True or False
publishYear	Positive Integer
studyByRegion	East Asia and Pacific, Europe and Central Asia, Latin America & the Caribbean, Middle East and North Africa, North America, South Asia, Sub-Saharan Africa, Multiple (according to The World Bank)
studyByIncomeGroup	Low-income, Lower-middle-income, Upper-middle-income, High-income, Multiple (according to The World Bank)
regionType	City, County or District, Metro Area, State or Province, Country, Abstract Region, Multiple
regionalClassificationName	Names for regional classification used in the research (such as EU NUTS2)
methodology	Quantitative, Qualitative, Both
empiricalModels	Names of empirical models used in the study (such as Econometric spatial cross-section model)
empiricalDataStartYear	Positive Integer
empiricalDataEndYear	Positive Integer
shocksOrigin	Economic, Institutional, Organizational, Environmental, Man-made, Technological, Epidemic, Multiple (Sutton & Arku, 2022)
shocksName	Official or not official shock names (such as Covid19)
rerTypes	Absorptive, Bounce-back, Adaptive, Transformative, Multiple (Martin & Sunley, 2020)
rerIndexUsage	Existing, New, Not used
rerRepresentingAttributes	A list of attributes used to present resilience

Table 1 Data variables used in the research and possible values.

The statistics from data variables were used to formulate the preliminary research results:

- The majority of the analyzed publications had empirical models and used quantitative methodology. The two periods covered by empirical data the most were The Great Recession and COVID-19. Discussion-only papers were the minority, indicating that theoretical research in regional economic resilience is not yet oversaturated.
- Regional economic resilience description most often included adaptive factors, with bounce-back in second place, absorptive in the third, and transformative being mentioned the least. Employment, GDP, and innovation were the leading attributes used to represent regional economic resilience, with other attributes discussed much less.
- Most empirical studies used statistical modeling or created new regional economic resilience indexes, highlighting that there is room for improvement by defining a new multi-dimensional index or proving one of the existing ones as more reliable.
- The top three leading regions in this research were North America, East Asia and Pacific, Europe and Central Asia, the latter having the most research into this topic. In addition, high-income and upper-middle-income countries dominate by the amount of research conducted. This calls attention to the fact that regional economic resilience research might not be as advanced in lower-income countries, and the key aspects for these countries might differ from what we expect.

At the time of writing, the results are not yet final, as documents analysis is still ongoing. More detailed and accurate results will be presented in the final paper.

This limited study could be improved, including more research into screening, eligibility assessment, and data variables mapping. Even though language models provide a decent substitute, their reliability in scientific research analysis is still not fully established. In addition to this, including different databases and papers in different languages could provide an even more accurate state of regional economic resilience research.

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