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Challenges in defining and measuring social resilience

Over the past two decades, resilience has gained considerable popularity in both social and economic sciences, reinforced by the effects of various economic and social shocks and the pandemic that has spread worldwide. On the other hand, more and more detailed and extensive studies have been launched on the various types of resilience (social, economic, ecological, etc.), which, in addition to the undoubtedly useful scientific results, have highlighted the elusive nature of the phenomenon and the lack of a centripetal force to channel the various lines of research in a single direction and unify the various interpretative frameworks.

The paper attempts to provide a conceptual overview of one type of resilience, social resilience, based on the available theoretical framework. With the help of previous research results, I will define a set of indicators for this concept to test and verify it in the context of empirical research. Refining the indicator set and the definition also provides an opportunity to distinguish between different types of resilience partially, thus contributing to a more accurate scientific understanding. The added value of the paper is that some of the indicator groups have been tested empirically, thus demonstrating the scientific value of the method.

Keywords: resilience, social resilience, indicator set, social science, definition

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Introduction⁴

Resilience can also be defined as one of the star concepts in economics and social sciences of the last decade, given that the growing interest since the global economic crisis of 2008-2010 has been greatly amplified by the social and economic responses to the global pandemic that started in 2020, and the subsequent energy crisis, mainly affecting the European region, and of course the eruption of the Russian-Ukrainian war conflict as a precursor. Academic research is not primarily characterized by immediate and rapid response. Still, we can be sure that resilience studies will emerge over time, in the context of the Israeli-Palestinian conflict, as well as in the aftermath of, or resistance to, shocks elsewhere in the world.

This trend, which has repeatedly confirmed scientific interest, reinforces the methodological need to place resilience somewhere on the axis of a scientific discipline or at least to clarify its role and task to produce more coherent and consistent results in future research. Indeed, the current scientific community does not take a position or does not take a unanimous position, on how we should view resilience. From time to time, the legitimate question arises, as a kind of double dichotomy, as to the role of resilience in the current understanding of science, and different positions are taken on this (Brand and Jax 2007; Keck and Sakdapolrak 2013), however, precise definitions and hence consistent measurement are often lacking, or at least newer research does not necessarily build on previous theoretical findings.

Nevertheless, it is not confident that it is worthwhile to channel such a multifaceted phenomenon into a theoretical framework. However, the various attempts at definition all point in the same direction, so it is still conceivable to create some general theoretical framework that would serve as a basis for future measurements, thus unifying the currently rather extensive and fragmented methodological background. The differentiation of the concept does not make things any easier

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⁴ This paper is based in part on my conference presentation on “The meaning of social resilience: interdisciplinary status or a new viewpoint?” and the paper published in the conference proceedings (Mahler 2024)

since researchers now distinguish between at least a dozen types of resilience (technical, ecological, economic, urban, community, etc.).

The aim of the paper is to present the current disparate theoretical and empirical findings on resilience, and social resilience in particular, and to clarify the definition of the concept on the basis of the available theoretical frameworks. It also aims to review the indicators used to measure social resilience and to reconsider them in order to define a set of indicators that measure the concept alone. On this basis, the paper will attempt to demonstrate the validity of this set of indicators by empirically testing part of it.

In line with the above objectives, the paper is divided into three main parts, following a review of the theoretical background, three popular interpretations of resilience are presented, as well as dilemmas related to the concept. I also take a position on whether resilience can be seen as a tool or a new paradigm.

In the second part of the thesis, I further elaborate on previous research findings by presenting a set of indicators of social resilience, which I have purified from indicators specific to other types of resilience.

The third part of the thesis focuses on testing this indicator set, highlighting two sets of indicators that are measured qualitatively and demonstrating their scientific validity in a rural context.

Theoretical background

Many theories have been developed in the field of social and economic sciences in the last decade or two that define the phenomenon of resilience, but it is worth starting from the technical sciences since this is where the concept itself originates. In its original sense, resilience refers to the ability of a flexible material or object to withstand external influences and return to its original, i.e. equilibrium, form. A second step is the interpretation that has emerged in ecological sciences (ecosystem resilience), which refers to the dynamics and absorptive capacity of a phenomenon, i.e. the extent to which a system can withstand external stress before it can assume a new stable form of functioning (Brand and Jax 2007). To date, these two approaches have formed the basis of interpretation in the social and economic sciences.

An important starting point for the theoretical foundation of resilience is the fact of an external effect since resilience can always be interpreted as a response to such an effect (Adger 2000; Folke 2016). A given social, economic unit or group (e.g. a regional economy, a labour market, a particular city, etc.) may encounter different shocks differently. On the one hand, we can distinguish between shocks with a rapid course and, on the other hand, protracted (e.g. demographic) crises (Keck and Sakdapolrak 2013). Both naturally elicit different reactions from the unit under study, and hence, the resilience of the response is different in one case and the other. The other element, different from the existing understanding in engineering, is the emergence of absorptive capacity, i.e. that resilience implies not only the existence of the capacity to "bounce back" but also the existence of a deeper transformation, change or adaptability in response to shock (Brand and Jax 2007; Keck and Sakdapolrak 2013; Martin and Sunley 2015). Furthermore, the lack of resilience also hinders renewal (Pirisi 2017).

Three more dimensions of interpretation are essential to highlight, one is the dynamics of the system, i.e. whether we consider resilience as a process or as an output. (Keck and Sakdapolrak 2013), as this affects both its measurability and its interpretability. The second is the time dimension, in that the measurability and interpretability of resilience in the context of a protracted crisis is different from that resulting from an immediate shock (Grabner 2021). The third is the question of the meaningfulness of resilience, i.e. whether resilience is good or has no moral connotation, since the phenomenon can be positive or negative depending on the external and internal perceptions of the actors (Pirisi 2019; Székely 2015).

The above may well illustrate how complex and multifaceted the concept of resilience has become since its emergence in engineering. This complexity is reinforced by the conceptual differentiation or specialisation, as we now speak of community, ecological, regional, urban, organisational,

social, etc., as well as personal and social resilience (Bueno, Bañuls, and Gallego 2021; Davidson et al. 2016; Keijzer et al. 2021; Kwok et al. 2016; Lester and Nguyen 2016; Maclean, Cuthill, and Ross 2014; Mahler 2023; Martin 2012; Saja et al. 2019; Stone-Jovicich 2015; Suleimany, Mokhtarzadeh, and Sharifi 2022), the latter refers to the individual and collective levels of the phenomenon.

Resilience interpretations

In what follows, I will present three theories that are regular reference points in the resilience literature, and thus play an important character-forming role in the interpretation of the phenomenon.

The first Martin and Sunley (2015) a popular and regularly cited theory in the field of economics, which divides the phenomenon of resilience into three distinct phases, thus extending the traditional engineering concept. The first phase refers back to this in its very name (1), which is technical or engineering resilience, and refers to the rebound from shocks, while the second phase (2) is called 'extended ecological resilience', which assumes an absorptive capacity whereby the system is partially transformed by the shock but does not change its fundamental properties. The third phase (3) is "positive adaptivity", whereby the fundamental properties of the system are also changed in response to the crisis.

The typological approach is further deepened by Davidson et al (2016) who reviewed a significant spectrum of literature to establish a systematic principle and investigate whether resilience can ultimately be considered as a kind of pre-paradigmatic theoretical framework. Their results distinguish three types of resilience, based on different conceptual elements: (1) static (basic), (2) adaptive (adaptive) and (3) transformative (transformative). In their view, resilience can be seen as a pre-paradigmatic phenomenon in its current state, mainly because it is a rather differentiated field in terms of both conceptual frameworks and methodological approaches, and the lack of consensus and unclear positions make it difficult to represent it as a discipline.

The third approach focuses primarily on social resilience, which is particularly advantageous for the present analysis, since the theoretical framework of a subcategory of resilience also almost fully captures the theories presented above. Keck and Sakdapolrak (2013) is also noteworthy because it raises doubts about the suitability of social resilience for describing social phenomena. As mentioned in the introduction, some authors see the interdisciplinary nature of the subject as a positive element, while others criticise it, mainly because it can obscure the social, power, or essentially sociological nature of the processes.

The authors' literature review concluded that three aspects of social resilience can be described, namely (1) resilience capacity, (2) adaptive capacity and (3) transformative capacity. In addition to these, the main determinants of social resilience were taken into account, which are:

- Social relations and network structures (social capital, trust, reciprocity, mutual support, informal social interactions)
- Institutions and power relations (means of individuals' access to resources, the role of institutional determination in relation to socio-economic system and structure, cultural capital, losers and winners in the construction of resilience)
- Knowledge and discourses (the role of culture, perception of danger, preferences, knowledge and experience at individual and peer level)

Besides the various typological experiments, an important finding is that social or societal resilience can be described as a dynamic process rather than as a statement of fact or a characteristic of a social group and is therefore more difficult to capture (Gyurasicsné Fazekas 2024). In the same way, resilience can be understood in relation to a given economic, social, institutional and ecological environment, rather than in isolation, which illustrates the complexity of the concept, but raises the legitimate question of whether there is any basis for comparing the resilience of different regions, areas, social groups, etc. Furthermore, social learning, participatory decision-making and the capacity for collective transformation are seen as central to social

resilience, while technological innovation and power relations naturally have a significant impact on such transformation. It also follows that resilience can be understood in political or power relations.

All the three theories presented above have common elements that represent well the phenomenon of resilience, these are the definition of the three levels of resilience, which are essentially the same in all three theories, i.e. the first (1) when the impact of the crisis is fully absorbed by the system (engineering, static and coping), the second (2) in which the system is partially transformed by the shock (extended ecology and adaptive), and the third (3) in which the system is fundamentally changed by the crisis and continues to function with these new functions (positive adaptivity and transformativity). More or less the same threefold division is confirmed Grabner (2021) in the context of regional resilience.

Thus, it can be concluded that the theories of resilience are pointing in the same direction, there is no particular difference between the various definitions in the social and economic sciences, and the need for unification can be considered justified. I believe that the above division points to several aspects of resilience that are essential both at the level of interpretation and measurement. A further element can complement this, the dichotomy of process and outcome, i.e. the ability to be resilient is seen as an existing outcome or defined as a dynamic process.

This brings us to the other theoretical question of this paper, namely, whether resilience can be seen as a new paradigm or whether it can be presented as a descriptive tool. Some researchers argue that the concept should be split into a well-operationalized, well-specified descriptive element and a borderline object. This vague and malleable concept facilitates transdisciplinary, the involvement and collaboration of other disciplines (Brand and Jax 2007). While others argue that the concept of (social) resilience offers new perspectives for understanding vulnerable groups under stress, fits well with Bourdieu's field theory, the definition of power relations, and finally, the concept recognizes uncertainty, change, and crisis as normal rather than exceptional, thus - not stated but perceived - adding a new dimension to understanding (Chandler 2015; Keck and Sakdapolrak 2013). As the next stage in the evolution of the concept Grabner (2021) argues that (regional) resilience is a well-defined descriptive tool for interpretation, but it needs to be clarified in its application.

Based on all this, my position is that resilience is now more a tool for understanding how communities function in a crisis-ridden and ever-changing world, providing a new perspective for understanding complex phenomena, but one that does not present paradigmatic elements, while at the same time replacing pre-existing aspects (e.g. sustainability).

Indicator set

Given the theoretical framework described above, the set of indicators cannot be defined by a list of indicators, given the phenomenon's heterogeneous nature. It is, therefore, necessary to categorize resilience in some way, break it down into sub-areas, and define the different measurement characteristics at the level of sub-categories.

I distinguish three broad subcategories of resilience (Figure 1): economic, social, and environmental resilience, which can be further subdivided (Mahler 2024). These subcategories have already been introduced in the context of sustainability interpretations, similar to the pillar structure of sustainability (Nagy, Tóth, and Szép 2022). In the present subdivision, economic resilience has not been further subcategorized. However, this can be expanded in the future. Social resilience builds on the resilience built up by social relationships, and as discussed above, it includes community⁵ resilience, demographic resilience and institutional resilience. Environmental resilience refers primarily to existing physical assets, which is why infrastructure, urbanization and the ability to cope with disasters are included. This division is based on Yang et

⁵ In this study, the word "community" is used in a broader sense than is customary, irrespective of the level of organization. I refer to it as a social group rather than as a community of a particular locality.

al (2022)), but it also contradicts Yang's assumption that urban resilience is the integrating function in their theory, while the three subcategories described above are in the same level.

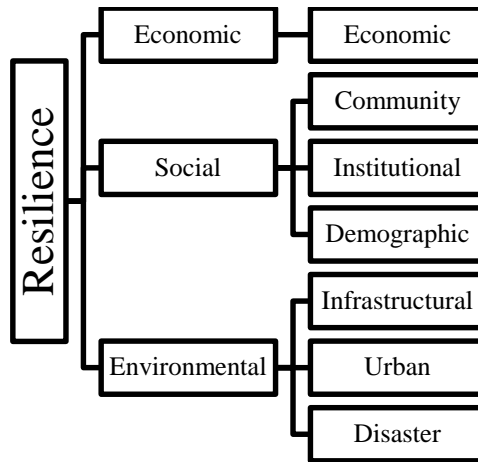


Figure 1: Subcategories of resilience
Source: Own editing

A further condition for defining the indicator set is to take into account two interpretative dimensions, one the individual and collective axis and the other the time dimension also covered by the theoretical framework, i.e. a protracted crisis or an immediate shock. Without going into further detail on these dimensions, in this chapter I will define a set of indicators for the collective and protracted crisis in relation to the social, and within it the community, subcategory at the local territorial level. The latter is also important because resilience can be understood at a transnational or even global level.

A variety of measurement tools have been developed to measure community resilience, perhaps the most popular being the *basic resilience indicators for communities* (BRIC), which have been adapted by many at local level, mainly based on available statistical data (Csizovszky and Buzási 2023) modifying the original set of indicators. The BRIC or similar statistical based index (Cai et al. 2018; Scherzer, Lujala, and Rød 2019) has a rather broad data set, including economic, infrastructure and environmental measures ranging from demographic data, but it is precisely its diversity that imposes limitations on the measurement tool, as it tends to overgeneralise and thus mask problems in sub-areas.

Avoiding this trap, the set of indicators I propose focuses exclusively on the community, examining resilience at the collective level, conditional on the ability of the community to respond to a protracted economic or social crisis.

In my previous research (Mahler 2024), I have analysed three years of literature and identified a total of 177 different indicators measuring social resilience in different studies, which I have classified into 15 categories, 11 of which are social and four of which are mixed. Of these 11 social categories, I selected five (cooperation, demography, education, social capital, deprivation), which I partly narrowed down and partly added new indicator items in line with the above objectives (Table 1). Resilience is always associated with a certain degree of risk-taking, and in the choice of indicators I have therefore sought to measure, among other things, the capacity to take risks. A good example is the equally complex phenomenon of measuring social innovation, for which complex methods of analysis have also been developed (Varga 2021).

Table 1: Proposed set of indicators to measure community resilience

Indicator group	Indicators	Description
deprivation	level of social inequality poverty indicators homeless population proportion of people receiving social benefits number of single-parent households proportion of people receiving home help proportion of disadvantaged population	Deprivation is primarily a group of indicators measuring social disadvantage, poverty, single-parent families and people with special needs, but also includes indicators measuring addictions, social services and language difficulties.
demography	Population over 65 years ageing indicator population density ethnic composition urbanisation rate emigration quality of emigration and resettlement unemployment rate	In addition to the basic demographic indicators (population data, age groups), the set of demographic indicators also includes various household data, urbanisation rates and crime. The indicators refer to a wide range of demographic observations.
Cooperation	social participation social cohesion social exchange of experience and information (knowledge transfer) adaptability and preparedness communication between individuals contact web	Social cooperation, including cooperation based on different social relationships and their outcomes, e.g. cohesion, embeddedness, knowledge transfer. It also includes social safety nets, which measure the existence of communication between actors, the way and direction of information flows.
Education	educational attainment (share of tertiary educated) number of higher education institutions secondary school drop-out rate	This group focuses on the overall level of education at the societal level, with a focus on the share of highly educated people, based on the indicators classified, both at the individual and household level. This is linked to educational infrastructure and various measures of education.
Social capital	social trust number of social innovations social responsibility and engagement social support	The social capital group consists mainly of indicators measuring the experience, strength and cohesion of the local community.

Source: Own editing

If we assume that the phenomenon of resilience is a new tool to better capture the changing world and the uncertain future of a community or social group, then the above indicators - which are well known in the social sciences, but in this case are highly "reusable" - can be of great service in shedding light on the elements of resilience.

A resilient community, based on the theoretical framework above, assumes that it is sufficiently resilient to respond quickly and effectively to problems. The first of the indicator groups listed in Table 1, *deprivation*, is seen as an obstacle to this resilience, as it can be assumed that deprived groups, due to their situation, are less able to react flexibly to problems that arise, and moreover, that they can hinder the whole community from acting.

The *demographic* indicator group can also be a measure of flexibility and responsiveness, as a community of young people is assumed to be able to cope with change more quickly and actively than an older community, and higher mobility is assumed to be easier for a younger community. The depth of social relations is measured by the *cooperation* indicator group, which shows the density and quality of communication between the two sides, as well as the direction, the way and

the effectiveness of the information flow. It is also partly an indicator of governance through community cohesion, be it civil or local government, and an indicator of group cohesion, the degree of group membership, and thus a measure of effective cooperation in times of crisis.

Education measures the level of education of the community, which may indicate the introduction of innovative and/or complex solutions at community level, on the one hand, and the existence of higher professional competences, on the other hand, which may have an impact on the strengthening of the community's decision-making competence and thus on the ability to react more flexibly or to manage the adaptation process more efficiently.

By measuring trust, empowerment, centres of power and social cohesion, *social capital* helps to gauge the degree of responsiveness within a community during crises, the existence of social support, which can measure the effectiveness of a resilient community's ability to adapt and absorb.

The set of indicators defined above is of course an arbitrary choice, and the empirical test can give an indication of its effectiveness. Another problem we may face is that some indicators are available statistical data series, while others require empirical data collection. This rightly raises the problem of the comparability of indicators, for which there is currently no adequate answer. If it is assumed that resilience is a measurable phenomenon, as the study assumes, then this requires the definition of a range of indicators, and this may involve dimensions that are likely to be known only through case studies or data obtained through qualitative data collection.

Beyond this, I believe that the above set of indicators is a good representation of the fact that if we want to measure a phenomenon as "simple" as resilience, it is not enough to consider only a few indicators, but we need a much deeper and more detailed set of tools. Of course, practice may override the availability and usability of toolkits, but a broader immersion may also lead to a deeper understanding later on.

Qualitative measurement of resilience

A good opportunity to test the qualitative elements of the set of indicators detailed above was provided by the secondary analysis of the records of the thematic workshops held in the southern part of Fejér county in 2022 in 35 municipalities with a total of 377 participants interviewed, in the framework of the project *Mezőföldi Mozaik 2022*⁶.

The project itself was primarily aimed at developing the capacity for initiative and action of local communities in the field, preceded by a detailed qualitative situation analysis. Although measuring resilience was neither an explicit nor an implicit objective of the research, the analysis of the records allowed me to examine, on the basis of a secondary interpretation, some elements of the above set of indicators, in particular the cooperation and social capital indicator groups. The analysis was thus primarily aimed at finding a link between resilience and the two sets of indicators mentioned above.

The Mezőföld is located in the southern part of Fejér County and in the northern part of Tolna County, the survey covered the settlements of Fejér County. The project is based on the fact that the part of Fejér County south of the M7 motorway is traditionally a more backward region, both economically and socially, which is regularly confirmed by statistical data. In this context, a development policy project has been proposed to support the launching of alternative local development projects, thus boosting the socio-economic development of the region as a whole. The people contacted were primarily active in the municipalities, partly municipal and partly civil, and thus presumably the over-represented group of municipalities in terms of their capacity to act. In the analysis of the notes from the exploratory workshops, I collected information that strengthened or weakened cooperation and social cohesion by settlement, and if there was a

⁶ The project was implemented by the Agóra Rural Development Foundation, which I would like to thank for providing me with the opportunity to carry out the second analysis (project ID VCA-KP-1-2022/4-000456).

reference to a crisis or stress situation, I marked it separately in the processing. In all 35 municipalities, ageing, the outward migration of the elderly and the lack of professionals skilled in community building were identified as everyday problems which, on the one hand, erode social cohesion and, on the other, make intergenerational cooperation more difficult. At the same time, local identity, local traditions as a link, the presence of NGOs and micro-communities as identity-builders and active citizens in localities are often highlighted. Another common theme is the issue of immigrants, who are welcomed by most municipalities.

Of the 35 settlements surveyed, only 10 were almost exclusively negative, with respondents highlighting a lack of community and local identity, a lack of cohesion and activity, prejudice against newcomers and internal conflicts. Seven out of the 10 municipalities spontaneously mentioned the difficulties caused by the closure and crisis caused by Covid, five of which had not been able to recover by the time of the survey. Respondents clearly linked the stress situation they had experienced with low levels of cooperation and social cohesion.

However, there were also positive examples in the study, with two municipalities where the pandemic was the catalyst for the strengthening of the local community, suggesting that the community had the potential to regenerate. In other cases, the 2013 snowfall was cited as the community's cooperative response to the crisis.

All this also means that for the indicator groups studied, cooperation and social cohesion were affected by the crisis, and that the weak community was not able to counteract the impact of Covid by reversing the causal relationship. We can assume that, although not pronounced in the other municipalities, Covid played a similar role. This also implies - confirming the theoretical hypothesis - that weak cooperation, weak social cohesion, is a weakening factor of community resilience, which prolongs the recovery from the crisis, weakening the adaptive capacity to a large extent. In conclusion, while the survey described above did not aim to measure any measure of the resilience of municipal communities, the results of the qualitative study confirmed that certain dimensions of cooperation and social cohesion are qualitatively related to the ability to respond to shocks, so they can be an accurate indicators of social resilience.

Discussion and conclusion

In my study, I have discussed the different interpretative frameworks of resilience in the literature, and on this basis, I have shown that the theories share a common ground, so that despite the fragmentation of the literature on resilience, it is actually pointing in one direction. There is, however, considerable variation across the different studies, but this is mainly due to the measurement of different types of resilience and the inclusion (or exclusion) of different dimensions.

Based on the theoretical framework, my view is that resilience is a multifaceted phenomenon that a single set of indicators cannot measure, as this leads to overgeneralisation and obscuring of the problems in the details. However, suppose the type of resilience and the different levels and dimensions of measurement are properly defined. In that case, it is possible to set up a set of indicators and test their usefulness. Of course, the attempts made so far also represent new experiences in the measurement of resilience, on the basis of which it is necessary to define the indicator set. Based on all this, my position is that resilience cannot be considered as a paradigm in its own right, but can be understood as a phenomenon balancing on the boundaries of different disciplines and helping to understand it, and accordingly I have defined the set of indicators needed for its measurement, which focuses exclusively on community resilience at the local level and aims to capture primarily the degree of resistance to long-term crises.

The main scientific contribution of this paper is to test the usability and availability of the defined set of indicators in the field. In the present study, I have used the results of a secondary analysis of a qualitative study to show that some of the indicators identified may be suitable for measuring resilience. Of course, one study is not sufficient to claim with complete certainty that the set of indicators is suitable, but it can be used to further the analysis. Obviously, the level and depth of

availability of certain indicators in the study has already been questioned during the compilation of indicator sets, making testing difficult or impossible for certain indicators without broader methodology. It is also a fact that most of the indicators were not available in statistical form, so the use of case studies or other quantitative or qualitative tools is essential to obtain appropriate measurements, which may be possible due to the methodology.

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