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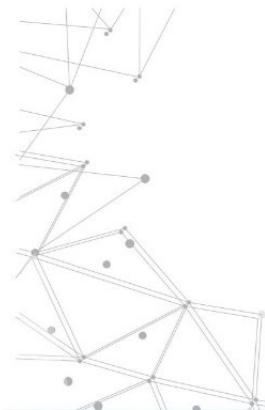
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# ReGrowEU

# BRIEF ON 2

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## ReGrowEU Brief no. 2

Conceptual and methodological approaches in the study of resilience

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## 1. Introduction

ReGrowEU Project “Advancing ground-breaking research in regional growth and development theories, through a resilience approach: towards a convergent, balanced and sustainable European Union” is a project conducted in 2018-2021 period within the National Plan for Research, Development and Innovation for 2015-2020 (PN III) – “Fundamental and Frontier Research” Programme, ID: PN-III-P4-ID-PCC-2016 by the „Al.I.Cuza” University of Iasi, the Bucharest University of Economic Studies and the „Babes-Bolyai” University of Cluj-Napoca. The project coordinator is Dr. Peter Nijkamp, Free University Amsterdam and Open University Herleen, Netherlands.

ReGrowEU aims to offer a comprehensive, state-of-the-art resilience model in a multidisciplinary, multi-level and multi-actor approach, strengthening knowledge about regional growth at European and Romanian levels, offering new approaches, methods and tools for EU policies which aim to ensure convergence, growth and regional development. The project responds to the challenges faced by the EU, to the need to better manage the identified risks, threats and to the concerns of identifying new approaches and tools for action, adequated to the current economic, political and geopolitical context and to the specificities of each Member State.

After the end of the first phase (2018), which resulted in a comprehensive report (“state of the art”) on theories of resilience, in the second stage (2019) the following activities were envisaged:

- The development of a database for the analysis of resilience from a multidimensional perspective
- The selection of relevant indicators for explaining economic resilience through econometric analysis
- The development of a multidimensional index to assess resilience capacity at regional level (intermediate stage)

- The development of a model to measure the contribution of resilience to regional convergence (intermediate stage)
- Making maps at European level
- Communication and dissemination of results
- Project management activities.

This brochure presents the scientific achievements, with a focus on the conceptual framework and models of analysis of resilience capacity, which are the solid foundation, the binding bond for all the activities to be undertaken in the later stages of the project. A special place is occupied by the emphasis on methodological landmarks that will be the basis of quantitative and qualitative approaches to resilience and which will mark many of the originality notes of the project.

## 2. Scientific accomplishments

### 2.1. Elaboration of a database for a multi-dimensional resilience analysis

The strategy for this activity was focused on the development of several thematic teams at the project level, with members from all three universities, dealing with the economic resilience, institutional resilience, environmental resilience, geo-political resilience and social/individual resilience. The themes were established as a result of research conducted in the first year of the project, when it resulted that resilience drivers are usually grouped on these major areas. The role of each team that brings together researchers from all three partner universities in the project was to build a sub-dimension of the database (economic, institutional, etc.), containing shocks and drivers of specific resilience, respectively drivers for each particular theme. Each team managing a sub-dimension built the database based on the literature that addresses the influence of certain institutions or economic, environmental, geo-political or social/individual factors on resilience. After identifying the drivers of resilience in accordance with the literature, the teams searched for databases where

these variables are found in one form or another. In the next step, the information related to each variable and database was detailed. The information concerned: the organisation that developed the database, whether it is accessible free of charge or not, whether it is national or regional, the data since the database exists and the regularity with which the data are collected, the subjective or objective nature of data related to each variable, etc. These details were necessary because, very often, although the variables identified were relevant for the research theme, the databases did not cover all EU countries and/or regions or were incomplete.

In parallel, each thematic team also developed a list of shocks. Some shocks are major shocks common to all regions and states in the EU – for example, the economic crisis of 2008, global warming, while others are specific only to the affected areas – for example, floods, depopulation, terrorist attacks, etc.

At this stage, the following key issues were established/clarified:

☑ **The definition of the system** that is the subject of the analysis (e.g.: analysis of economic resilience, analysis of institutional resilience, analysis of social resilience, analysis of resilience of the democratic system).

☑ **The conceptual definition** of resilience (the object of analysis) – the most commonly used definition of resilience focuses on the recovery stage, i.e. return to the same state before a shock. For a more detailed analysis of resilience, starting from a more complex conceptual framework, we proposed to consider several stages of resilience: vulnerability/risk, resistance, reorientation, bounceback, transformation, etc. Therefore, more than calculating a simple difference between the state of the system before the shock and the one after the shock, we also considered how high the decrease (resistance), the rate of recovery, the stability of recovery, the difference between the trend before the shock and the one after the shock, etc. Were.

☑ **The identification of the main indicators for measuring the resilience of a system** (resilience outcome). Using these indicators, the stages/dimensions of resilience can be established so as to determine

whether the system is resilient/resistant after a shock and to map systems (national, regional) according to resilience.

☑ **The identification of the main shocks** that affected the system. The identification of shocks made it possible to choose the period for conducting the system's resilience analysis. The analysed shocks had to have affected the system in several EU regions (diffuse shocks) in order to be able to carry out a relative analysis of regional resilience. The key question was: What are the most appropriate criteria for selecting shocks – similar or different shocks (as typology)? If selecting similar shocks offers the opportunity to analyse to what extent regions have become more resilient over time when affected by similar shocks, selecting different types of shocks helps us to differentiate their resilience in front of different types of shocks.

☑ **The measurement of the system's resilience** (resilience outcome) and the division of the regions into some groups/clusters according to their performance.

In order to capture clearly a concept as complex as resilience is, an index with several components was developed, each component representing different stages of resilience. Such an index is relevant because it analyses the performance of resilience through several stages and is not limited to the difference between the ante and post-crisis period. In addition, the index has the advantage of being able to incorporate the analysis of several stages of resilience in the light of several indicators considered relevant.

During the discussions within the project, two components of the index were highlighted, as they can differentiate the present study from other research identified in the literature, namely: A) Stability of return: Has the system stabilised after the return? (e.g.: The average growth rate in the period after recovery; B) Quality of processing: Is the resilience of the system "good" or "bad"? The return of the system to the pre-crisis state can hide certain structural changes, and a concept is needed to establish landmarks.

Depending on the index values, several regional typologies can be defined for each shock (e.g.: Very resilient, resilient, a little resilient, non-resilient).

The resilience analysis was also carried out in the light of all identified shocks. At this stage, common elements between the regions' reactions to all the considered shocks were searched (e.g.: Regions that were/were not resilient to all/none of the considered shocks; Also, if several types of shocks are taken into account, regions can be divided into resilient regions to one type of shock, but non-resilient to another, etc.).

☑ **The identification of the main indicators** for measuring the resilience of the system (resilience outcome). Once conceptual resilience is defined, we need the most appropriate indicators by which we can delineate the stages of resilience. How can we determine whether the system is resilient/resistant due to the shock? (The analysis of economic resilience most often uses three indicators: GDP per capita, employment rate, productivity).

☑ **The identification of the main shocks** that affected the system. Identifying shocks will help us to choose the period during which we will carry out the analysis of the resilience of the system. The shocks analysed must have affected the system in several EU regions (diffuse shocks) in order to be able to carry out a relative analysis of regional resilience (To reflect on how shocks will be selected. Similar or different shocks (as typology)? If selecting similar shocks gives us the opportunity to analyse whether, over time, regions have become more resilient when affected by similar shocks, selecting different types of shocks helps us to differentiate their resilience to different types of shocks).

☑ **The measurement of the resilience of the system** (resilience outcome) and the division on the regions into some groups/clusters, depending on their performance. Once relevant (temporary and spatial) shocks were identified and indicators for measuring system resilience (resilience outcome) were chosen, it was possible to move on to measuring the relative performance of the regions for each of the shocks, starting from the conceptual definition of resilience. In order to capture as clearly a concept as complex as resilience is, an index with several components can be developed, each component representing different stages of resilience.

Such an index is more relevant because it analyses the performance of resilience through several stages and is not limited to the difference between the ante- and post-crisis period. In addition, the index has the advantage of being able to incorporate the analysis of several stages of resilience in the light of several indicators considered relevant (e.g.: The index analysing the resilience of the economic system may have 3 sub-indices, namely strength, recovery, stability, and each of them can be calculated using 3 indicators: GDP per inhabitant, but also the employment rate and productivity:  $3 \times 3 = 9$  components). The share of the index components can be calculated using the main component analysis (ACP).



☑ **The definition of the conceptual framework** for the determinants of resilience. If in the previous stages we determined which of the regions behaved better/less well when exposed to certain shocks, the question still arises: What exactly explains the difference in performance? Depending on the analysed system, based on the existing literature, it was noted that it is necessary to develop a conceptual framework to guide us on the potent determinants (resilience drivers) that will be tested.

Consequently, each thematic group developed a specific conceptual framework, and in phase 3 of the project, after the completion of the model construction, conceptual frameworks would be integrated and lead to two Index based analyses: Performance and capacity.

☑ **The empirical testing of potential determinants and the development of an index of resilience capacity.** This action, beginning in Stage 2 continuing to be developed in Stage 3, aims to validate the previously defined conceptual framework. It has been established that panel analysis and structural equation modeling (SEM) are 2 selection possibilities.

From research conducted and joint weekly work sessions, it has emerged that once the conceptual model has been established and the importance of determinants (drivers) has been validated, the development of the resilience capacity index can begin. As in the case of the resilience outcome, we proposed that the share of the index components should be calculated using the main component analysis (ACP). Unlike the resilience index (which can only be calculated during shocks), the resilience capacity index, as it has been empirically confirmed to be relevant in explaining resilience at the time of the shocks analysed, can be calculated annually. It helps to monitor the vulnerability of systems and can help guide regional policies. The use of 1-2 determinants measured by non-conventional data (such as Google trends/Twitter) will add value to the analysis.

For the transformative capacity, several options have been considered and a series of simulations will be undertaken in Stage 3 to determine what the final approach will be, namely: A. to take resilient vs non-resilient regions/countries after a number of years after the shock and compare with the situation prior to the shock in terms of Europe 2020 indicators and/or alert mechanism indicators (used in the EU's economic governance system to anticipate an imbalance); B. consider the transformation in terms of evolution towards strengthening resilience capacity, integrating resilience

capacity into growth and development models; C. to have a few case studies to check which areas have evolved better (were resilient but have also adopted a better development model), for example: Urban-rural, depending on the degree of economic freedom; Of variables/cultural model; By the institutions; The degree of specialisation/diversification; The capacity for innovation; The structural differences center – periphery. However, all these options are already the subject of individual and small group research.

Following the clarifications at this first stage, it was still possible to select relevant indicators in explaining economic resilience through econometric analysis, developing a multidimensional index to assess resilience capacity at regional level and developing a model for measuring the contribution of resilience capacity to regional convergence

## 2.2. Selection of the relevant indicators for explaining economic resilience via econometric analysis

This activity continued with the same work strategy using thematic teams. In the first step, virtual Skype meetings were held between thematic teams to eliminate overlaps between variables. Some variables were identified by two or more thematic teams and were kept only once in the final database. In the second step, each thematic team divided the identified variables into main and secondary variables. This was due to the fact that at that time it was not clear which indicators would be included in the resilience index. It was discussed at team level that most indexes in literature include a limited number of variables (not more than 30) and therefore a selection of the most relevant variables will have to be made. In step 3, the databases with the considered variables were normalised so that data could be used in statistical analyses.

Many difficulties were encountered in choosing variables due to the related databases:

- ☑ Some variables, especially related to institutions and geo-politics dimensions, have databases available at national rather than regional level. Given that an analysis at NUTS 2 level is sought, the question has arisen whether the index should include variables for which no data for regional level is available. It has been established that we will develop Resilience Indexes with distinct composition at regional vs national level, and see what proposals can be made to improve regional statistics.
- ☑ For certain variables and indexes, relevant for this research, such as the Social Progress Index, we have collected data only for a few years, making it impossible to use them for analysing regional resilience to older shocks. Given the relevance, punctual analysis will be carried out as case studies that will complete the multidimensional picture of the resilience analysis.
- ☑ Certain data relating to variables are not collected annually, but once every two or three years. It is difficult for certain statistical analyses to work with these missing values and ways to approximate the values for these variables for missing years must be found.

- ☑ A somewhat similar situation is when the data does not cover all EU countries and regions.

**2.3. Elaboration of a multi-dimensional index for evaluating the resilience capacity at regional level**

Realizing the multi-dimensional index was the most complex activity in 2019. The team faced challenges related to the scientific part itself and also to the coordination of the thematic teams from activities 1-2, which during activity 3 had to work integrated and contribute to the development of the index by integrating contributions from each team.

The major scientific challenge came from the desire to create a multi-shock, multi-dimensional and multi-scale model. Most of the studied resilience indexes did not meet all these three conditions. From the beginning, we asked ourselves whether such a complex index, once created, can be used in practice to measure regional resilience (NUTS 2 level in the European Union). From the shocks' perspective, a model for measuring the resilience of the EU regional level had to relate to a disruptive event common to all EU states and regions. There are not many shocks common to all regions, which is why most literature investigates regional resilience in relation to the economic crisis of 2008. The conclusion of the project teams was to apply the index for this year, in a demonstrative manner, in relation to the economic crisis, mentioning that the proposed model is flexible enough to be used for any other shock from the proposed list of shocks. In the next stage the simulations will consider the reaction of the systems to various shocks in order to identify the drivers of resilience.

The desire for the model to be a multi-scale one was another challenge – the systems for which resilience is assessed are different and respond differently to shocks and drivers. Thus, we cannot understand in the same way the resilience of an individual and the resilience of a community. The situation is more complicated when we refer, for example, to government regimes that do not exactly overlap over a geographical/territorial

community – a public-private partnership that forms a regime of collaborative governance at the level of a city. There are also significant differences if we analyse resilience at organisational or country level.

Last but not least, the multi-dimensional approach to resilience drivers has raised many problems. In the literature review, most articles at regional level investigate the economic dimension of resilience. There are very few studies integrating, for example, the individual or geo-political perspective into an aggregate index. Because of these complexity, it has been decided that the global index should be standard, encompassing as much as possible of the ambitions of this research related to the multi-shock, multi-size and multi-scale nature of research, and that individual research should cover certain limitations resulting from the fact that the index has to be applied to NUTS 2 regions from all EU countries.

**2.4. Elaboration of a model for measuring the contribution of resilience capacity to regional convergence. Conceptual framework and models – methodological considerations**

**2.4.1. Environmental/territorial capital resilience**

Although environmental resilience has been extensively studied by scientific literature, most studies are rather theoretical and attempt to develop a framework for the analysis of post-shock environmental resilience. Either because of the lack of data or to better match the characteristics of the analysed territory, recent approaches have rather preferred an analysis of resilience performance. However, these approaches have only rarely been supported by empirical studies. An analysis of literature in recent decades revealed that out of 174 academic articles on environmental resilience (for the period 2005-2017), which proposed methods to measure the resilience of the territories in face of natural disasters or technological accidents, 39.7 % of the studies proposed and used qualitative methods, 39.1 % of the studies used quantitative methods to measure resilience, but only 10.3 % of the research carried out an empirical validation of resilience indicators (Cai et al., 2018). The preferred qualitative methods were the

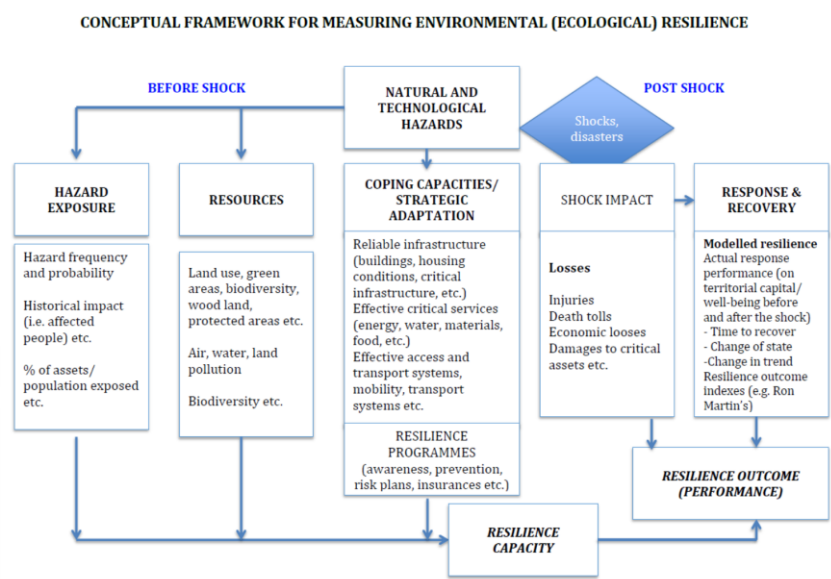
survey and focus groups, consequently, we observe a clear focus on community resilience indicators. In addition to these methods, other qualitative approaches such as self-assessment or benchmarking can be found, though less rarely, in the scientific approaches to measuring environmental resilience. In terms of quantitative methods, they focused largely on Big Data extraction methods, correlations, simple and multivariate regressions.

However, as mentioned above, empirical validation is quite rare. Some of the most recent studies that tried to measure environmental resilience focused on the response and recovery from the shock, sometimes in relation to the impact of the shock. Ainuddin and Routray (2012) measured the resilience of communities to earthquakes in two hazard zones in Baluchistan, calculating four sub-indices of resilience (social, economic, institutional and physical), which were subsequently aggregated into a community resilience index for the two areas. Harte, Childs and Hastings (2009) carried out a case study on community resilience to fire, but their analysis was only carried out at a post-shock moment – five months after the shock occurred. Cutter, Ash and Emrich (2014) calculated the basic indicators for community resilience (BRIC) in the form of a common set of variables focusing on six different social, economic, real estate and infrastructure, institutional, community and environmental fields (or capital). Building a subindex for each capital at the microregional (county) level, and then combining the average value of variables resulted in a sub-index score. The six sub-index scores were then summed up to calculate a final composite resilience score.

It should be recalled, however, that the main gap in the above-mentioned methodological approaches is the measurement of resilience exclusively post-shock. Sometimes even vulnerability and the resources of the territory are calculated after the shock. It can be observed that post-shock analysis can omit a significant part of the indicators that build up the vulnerability and resources of a territory. A broader approach to the concept and measurement of environmental resilience as a whole has been tried through the RIM model. The RIM (Resilience- Inference- Measurement) model has been used to measure resilience in several recent studies (Lam et al., 2015; Kemp and Boynton, 2012; Li et al., 2016).

The RIM model starts with the collection of real data for three elements (vulnerability, damage and recovery) for each community, then the analysis of K-means analysis is used to obtain the ranking of each community according to the resilience score, and finally, through the discriminant analysis, the socio-ecological variables that influence the resilience of a community are extracted.

Figure 1. Conceptual framework for environmental resilience analysis



Source: ReGrowEU

From this point of view, in order to cover the gaps from the post-shock approaches, the approach proposed in the ReGrowEU project follows two types of environmental resilience measurement: A) Theoretical resilience (modelled resilience), which will be estimated by model, depending on the drivers selected and B) The resilience performance, which will measure the behaviour of territories to the shocks mentioned in the previous section (Figure 1).

In this respect, a number of 83 indicators were proposed, most of them at NUTS 2 level. At these indicators, the EM-DAT database was, which includes data regarding the intensity and impact of major environmental shocks that have affected Europe over the last 30 years. The selection of indicators was made based on the literature review.

Considering the diversity of the meanings of resilience found in the literature, but also the multi-dimensional and multi-shock nature of the resilience analysis provided in the objectives of the RegrowEU project, the selecting process of the environment indicators involved: (1) The development of the systems for classifying indicators; (2) Finding the indicators according to availability for the categories of each classification system. In this respect, **three classification systems** have been proposed:

① **A first classification**, the most general, refers to the role of indicators in the analysis of resilience and comprises two main categories: Indicators of resilience to environmental shocks and geographical indicators, which can be used in the resilience analysis of a wide range of shocks (economic, political, social, environmental, etc.); Proxy indicators for connectivity/spatiality are used (8 in total, related to accessibility of transport networks and land use) falling under the second category, the rest are environmental resilience indicators;

② **The second classification** refers to the stages of resilience, as an integrative process, within environmental shocks. It follows the proposed analysis model for environmental resilience and comprises: Exposure indicators (measuring susceptibility to different types of hazards based on past events); Resource indicators (measuring those environmental parameters that can intensify or mitigate the effects of hazard and which may also variate in the occurrence of hazard); Adaptation indicators (referring to the human factor, infrastructure and services which can be mobilised in preventing and responding to shock, such as policies and measures implemented by human communities); Impact indicators (meaning the effects of the environmental shock on the human factor – victims, deaths, economic losses and critical goods losses); Return/performance indicators (increasing parameters varying



to a particular shock and encompassing an extremely wide range from environmental resource indicators, as mentioned above, to social and economic indicators). For impact indicators, the EM-DAT database has also been processed, which includes data on victims, deaths and economic losses as a result of major environmental shocks affecting Europe over the last 30 years, with the database constantly developing;

③ . **The third classification** follows the general conceptual framework of the project and groups the indicators used in the resilience index in two large categories: **Drivers** (indicators that quantify the factors that can help minimise the impact or increase the response capacity) and **outcomes** (indicators measuring the effects of the shock on the analysed region). Some indicators fall into both categories because they influence the intensity of the shock (driver), but may also be influenced by the shock manifestation, showing variations as a result of the shock (outcomes)

2.4.2. Institutional resilience

Institutional resilience is the ability of a system to cope with change without collapsing, by adapting to context (Boyd and Folke, 2012). The resilience of a system to shocks is closely relation to its institutional diversity, while the resilience of an institution is a function of its position and role within the system (Aligic, 2014).

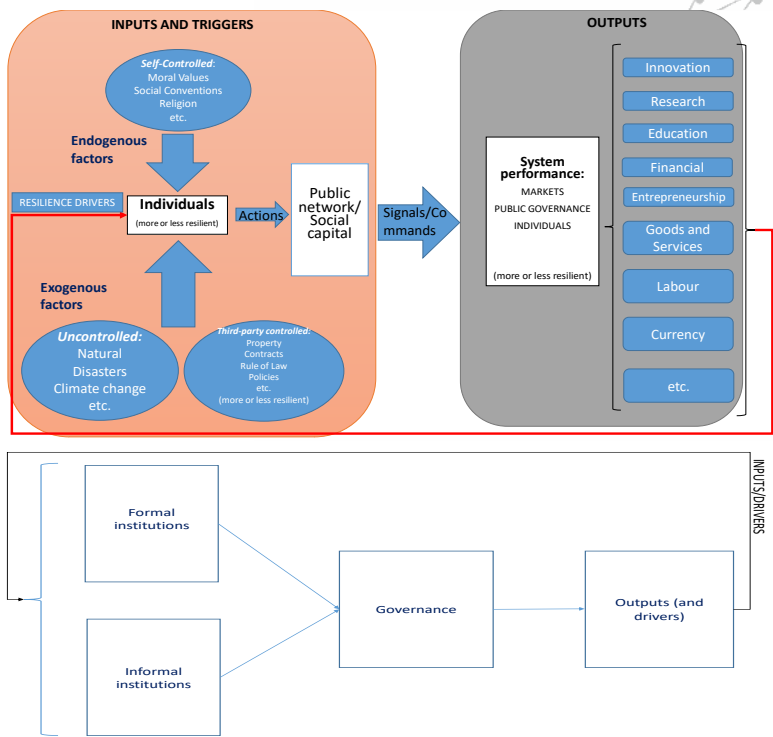
An institution is resilient to the extent to which it maintains its effectiveness over time despite changes and shocks (effectiveness shows the extent to which the institution fulfils its primary mission). Therefore, an institutional arrangement can demonstrate resilience even if its specific rules, organisational components and strategies change along the way, as long as it continues to achieve its basic mission. Even if the instruments facilitating the institutional arrangement (human resource, infrastructure, human resource, procedures, budgets) persist, it may disappear if its mission is fundamentally altered (Steinberg, 2013). The main institutional challenges in analysing the resilience of a country/region may be associated with the following questions:

- How much of the recovery, after a shock, is due to the institutions?
- Is the magnitude of the post-shock effect directly proportional to the quality of governance institutions/systems?
- More institutions mean more resilience?
- Do major institutional problems have direct connections with the distribution of resources and political power?

In this respect, the methodological/conceptual approach proposed for institutional resilience is:

- **Name:** Resilience of institutions OR Resilient institutions and governance
- **Meaning:** The capacity of institutions to preserve their functions and perform their specific role in society, when shocks, pressures, changes appear.
- **Arguments:** Analysed in different times, geographical spaces or at various scales, the state or dynamics of societies can be interpreted as a result of several factors of influence, endogenous and exogenous, acting on individual decisions and approaches, including institutions (formal or informal) and the governance system which can be considered of major importance. In this respect, individual behaviours generated, naturally, by personal interests in various conjunctures, based on the use of different forms of capital and governed by formal/informal institutions, can be considered inputs generating social relations (**inputs**) which are equally shaped by influence factors (**drivers/triggers**), expressing the overall social life, which generate signals specific to different markets. The certain characteristics and the functioning of the markets as well as the achieved results (**outputs**) are therefore the effect of the cumulative action of the participating agents and of the specific influence factors. At the same time, it should be noted that these results are also new factors of influence on individual behaviours, favouring or inhibiting self-arbiter decisions, having a direct impact on the resilience of the agents involved and on the system in which they are found or interact (Figure 2).

Figure 2. The integration of institutions into the resilience analysis



Source: ReGrowEU

In the set out context, institutions can be brought into discussion by their specific nature/content and also, individually, but it is important, however, how they print the dynamics of society as a whole. From this point of view, we consider that the proposed sub-index for research, subsequently integrated into the general resilience index should allow the identification/measurement/analysis of the sound institutions criterion, considered as an engine to strengthen the resilience of socio-economic systems at different scales (over-national, national, regional or local). At the same time, we note that, as a whole, the institutions are pillars of the governance systems, which would justify also the

integration of their characteristics into the analysis, in order to finally ensure, a real view of the resilience of institutions and and their certain connections with the resilience of the socio-economic system.

Including the institutional/governance component variables is more than necessary in a study aiming to measure the resilience of the EU countries/regions, and this is because, over time, empirical analyses have highlighted obvious correlations between strong and adaptable institutions and economic development (Acemoglu and Robinson, 2012; Eicher and Rohn, 2007; Acemoglu et al., 2004; Rodrik et al., 2004).

As a general rule, institutional fragility is associated with low levels of growth, while coherent, formal or informal institutional arrangements are linked to high rates of prosperity. Formal institutions are largely represented by laws and regulations applied to ensure the proper functioning of the market, legal systems, property rights, while informal institutions are not explicitly written, being defined by rules, conventions, codes, social capital, public networks, political choices, corruption, preferences, individual behaviours, etc.

Concisely, institutions are seen as rules by which society operates. The more they are respected and properly defined, the more they become favourable factors to increase resilience. However, it should be stressed that the existence of these conditions alone does not automatically guarantee institutional convergence, as each country/region must adapt its economic and institutional structures to its national specificities (relative to the constantly changing context). Therefore, in recovering development gaps and strengthening resilience capacity it is necessary to promote inclusive institutions to ensure the functioning of the rule of law at optimal parameters, thus providing a high level of public services and stimulating cooperation between people and their involvement in economic activities; On the contrary, if the focus is on extractive institutions, they will direct the income and wealth from one part of society to the benefit of others (Acemoglu and Robinson, 2012). Weak institutions create instability, distort income distribution, accentuate inequality, self-replicate/self-support, and expose individuals to various

shocks (street movements, violence), transposing themselves into other shocks.

From the institutional point of view, from the multitude of identified **shocks** (changes in political regimes/falling communism, administrative reforms, the Europeanisation process, adoption of the Euro, mass redundancies, mass privatisation, social seizures, technological shocks – digitisation, Brexit, political instability, etc.), our analysis takes into account: The fall of communism (1990); The integration process (with obvious impact for Central and Eastern European countries); Adoption of the Euro (2002 +; Different countries: 2007, 2008, 2009, 2011, 2014, 2015); The administrative reforms.

The research conducted so far focused on the study of theoretical and empirical specialised literature, based on which, it could be established a list of indicators specific to the institutional dimension, with the mention that the most common variables in various studies, at European and international level, refer to the six indicators of the governance system, belonging to the World Bank (voice and accountability, rule of law, corruption, political stability and absence of violence, government effectiveness, regulatory quality).

The analysis phases concerned:

- ① Establishing conceptual delimitations on the resilience of institutions;
- ② Identification of institutional factors that can stimulate resilience or, on the contrary, may be obstacles as referred in the literature;
- ③ Selection of those indicators/variables/drivers that establish the strongest correlations with resilience capacity (application of appropriate statistical methods: ACP, Factorial Analysis, PLS-SEM;
- ④ Depending on the availability of data, shocks that have generated large-scale effects from an institutional point of view will be included in the analysis (e.g.: The fall of communism, mass redundancies, administrative reforms, change of national currency with Euro, Brexit, etc.);
- ⑤ The development of a sub-index of the resilience of institutions, providing information on the elements that significantly contribute to strengthening resilience. Novelty will result from taking into account

variables that have not been included in the profile studies, covering several levels affected by the quality of formal institutions (education, innovation, entrepreneurship, goods and services market, etc.).

EU countries/regions will be grouped on the basis of scores obtained at the level of the sub-index and its constituents. Maps will also be made available to the general public and the relevant authorities. The most influential institutional components in strengthening the resilience capacity of states/regions will be subject to inclusion in the overall resilience index.

**Tabelul 1. Institutional indicators (selection):**

Integrity of the legal system	Control of corruption
Judicial independence	Trustworthiness and confidence
Political stability and absence of violence	Public trust in politicians
Respect of property rights	Contracts and laws
Rule of law	Government effectiveness
Voice and accountability	Values and social norms (morality, trust, responsibility)
Intellectual property protection	Social capital
Diversion of public funds	Human capital indicators
Irregular payments and bribes	Discrimination and cultural stereotypes
Wastefulness of government spending	Religion
Burden of government regulation	Entrepreneurial activity / contract / law compliance
Efficiency of legal framework in settling disputes	Community values, diversity
Efficiency of legal framework in challenging regulations	Globalization and digitalization indicators
Transparency of government policymaking	Others

Source: ReGrowEU (selection based on the sources mentioned in the text below).

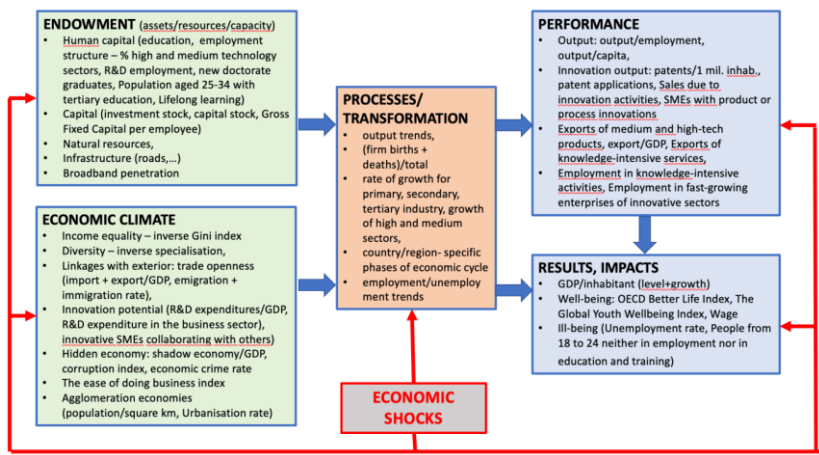
The total proposed list comprises more than 100 indicators at national and regional level describing the effects/involvements of an institutional framework effectively responding to shocks. The data sources identified are: statistics from the World Economic Forum, Heritage Foundation,

World Bank, IMF, Cambridge Econometrics, Gallup, European Values Survey, etc.

**2.4.4. Economic resilience**

An accurate understanding and assessment of the resilience of regional economies requires an overview of the state and dynamics of the economic system in the short, medium and long term. The dynamic, multidimensional approach is needed to capture the key aspects of resilience: Initial response to the crisis (partial or even complete absorption of the shock), medium-term recovery, involving the ability to adapt and transform, i.e. the capacity for improvement and long-term evolution, achieving better economic structure and better performance. The ability to absorb the initial shock, as well as the ability to adapt and transform results from the resources the region possesses, such as human capital, investment stock, gross fixed capital per employee, natural resources, economic infrastructure. The specific economic climate, defined by the diversity of production, economic and social inequalities, external trade links, migration, etc., is also important for innovation, good governance, agglomeration economies, etc. Given that a good short-term response to economic shocks does not guarantee better performance in the medium and long term, the recovery process and the post-recovery situation of the economy should also be taken into account for a deeper understanding of the key characteristics of the resilient regions. The performance of the system will have to aim at: The performance of the markets; Performance of the governance / government system; Individual performance.

Figure 3. An overall perspective on economic systems resilience



Source: ReGrowEU

The database developed for the analysis of economic resilience comprises more than 120 variables. Starting from the literature on resilience, it includes various indicators for the effective measurement of resilience of regional economies, such as GDP per inhabitant, employment rate and productivity levels. In addition, the current database includes potential determinants of the economic resilience suggested by the literature, such as the level of investments and human capital, the structure of the economy and the demographic structure of the population, the level of innovation and the agglomeration economies. The collected data cover various periods of time between 1980 and 2018 and have been collected from various official sources, such as European Regional Database, AMECO, Eurostat, ESPON or Harvard Business School. The group assumed the methodology set out in the first stage.



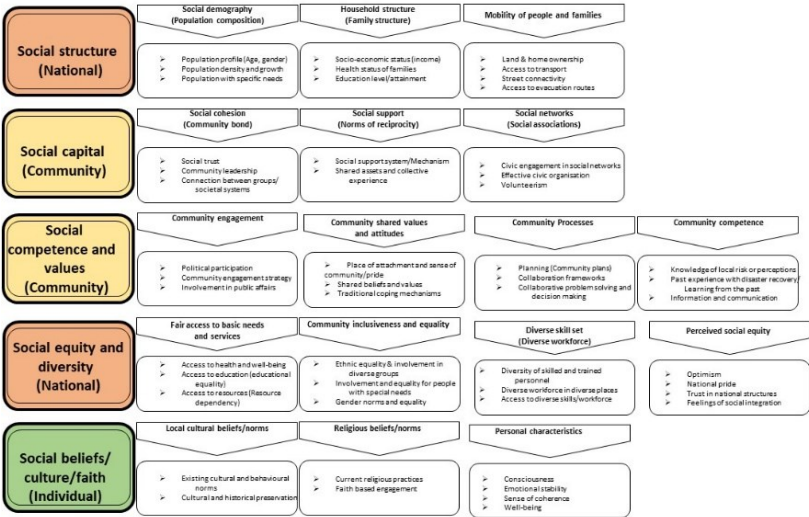
#### 2.4.4. Social resilience

Social resilience can be understood as a set of complex characteristics, connected in various ways within the framework of constantly changing social systems. Social resilience can be analysed from two perspectives: On one hand, it can be analysed from the perspective of a social system to absorb, adapt, or transform after a shock. On the other hand, it can also be analysed as the ability of a social system to anticipate, prepare, respond properly and recover from a shock (IFRC, 2016).

Combining the two perspectives, we might consider social resilience as the ability of entities and social mechanisms to anticipate, absorb and adapt to shocks while carrying out activities meant to ensure recovery and reduction of potential effects of shock on the community (Bruneau et al., 2003; Cox & Hamlen, 2015; Saja, Teo, Goonetilleke, & Ziyath, 2018). Social resilience is based on community resilience (at smaller group level) and individual, but also requires specific mechanisms to allow interaction between the two levels so that the social entity can effectively manage the shock. Social resilience can be seen as a dimension of the concept of resilience and is rather an ability/aptitude of a social entity that allows it to function properly in times of crisis/shock rather than a result.

Saja et al. (2018) proposed a comprehensive theoretical framework to understand social resilience by grouping potential indicators into five large dimensions. They propose a social structure dimension, one of social capital (social capital), social mechanisms, competences and values (social mechanisms/competence/values), one of social equity and diversity, and one of social beliefs, culture and spirituality (social beliefs/culture/faith). Being a less explored field, the group proposes a concept based on the structure proposed by Saja, a concept that will be developed on the basis of empirical research on Romania's case.

Figure 4. Conceptual framework for social resilience analysis



Source: ReGrowEU, adaptation of the 5S Model of social resilience – Saja *et al.* (2018)

The social structure as a dimension refers to key characteristics of society such as population profile, family structure (social-economic status, level of education) or family mobility (access to the car, accessibility of the area in which they live, interconnectivity of streets). Population profile (structure by gender, age, ethnicity, etc.) can be an important factor of resilience (Cutter, Burton, & Emrich, 2010). Socio-economic status, in turn, has been proven to be important, as it influences the speed and level of recovery after the shock (Kwok, Doyle, Becker, Johnston, & Paton, 2016).

The social capital refers primarily to family relations and attachment to the area of residence, to the ability to build relations and other external links of the community (building of “bridges” with other communities) and to the interaction between social groups and with state authorities, institutions and organisations. The most important features of this dimension are “bonding”, “bridging” and “linking”. These features have

been repeatedly identified as important in how a community reacts to disasters (Greene, Paranjothy, & Palmer, 2015; Poortinga, 2012). Social mechanisms, competences and values refer to the following characteristics: commitment to community, community goals, shared values, community processes and community competence. The extent to which the community is able to plan for shock situations, the extent to which members of society know and feel committed to these plans and objectives of society can be factors that influence the level of resilience (Meredith et al., 2011; Parkhill et al., 2015).

Equity and social diversity are about social justice. Social justice (the extent to which there is no marginalisation, where all groups within a community have fair and equitable access to resources) is a central concept of social resilience (Doorn, Gardoni, & Murphy, 2019). Groups in precarious situations are most vulnerable in the event of a shock (Le Masson & Lovell, 2016). The most important three characteristics of this dimension are: Fair access to basic needs and services, inclusion and community equality and workforce with diversified skills. For basic services, indicators such as access to education or access to services (number of doctors/100000 inhabitants, firefighters, law enforcement) should be followed. Gender equality, inclusion policies for disadvantaged groups, can be pursued as indicators of inclusion and equality. Equally important is the extent to which people perceive that the system in which they live is a fair system, which is reflected in the degree of optimism, confidence, and pride that people have towards the system.

Social beliefs, culture and spirituality regroup around three main characteristics: Local norms and beliefs and religious norms. The cultural dimension is considered to have an extremely important role in social resilience (Ostadtaghizadeh, Ardalan, Paton, Khankeh, & Jabbari, 2016; Panter-Brick & Eggerman, 2012). Religious beliefs and norms are considered to be particularly useful because they can support the process of shock management through religious belief (rituals) and support systems (religious groups). Indicators such as the degree of religious and religious practice can be extremely useful in estimating this characteristic of social resilience. Individual characteristics such as

emotional stability and a sense of coherence (the sense of a purpose in life) contribute significantly to social resilience. Taking into account the above mentioned, the group applied the following analysis steps: 1. Identification the main drivers (characteristics) of social, community and individual resilience; 2. Identification of the main sources of primary data (questionnaire – Country Resilience Index in validation) and secondary (data bases adapted to measure the indicators proposed by the model, where they exist); 3. Identification of the main methods of analysing and extracting a composite index of social resilience (weighting of dimensions and characteristics). The most appropriate method is likely to be PCA or some form of factorial analysis.

The main database, until empirical research is Gallup. Gallup Analytics is a database that continuously examines citizens from 160 countries, accounting for over 98 % of the world’s adult population. The Gallup database consists of more than 100 global questions as well as regionally specific questions. It includes global indices in the categories: Law, institutions, infrastructure, jobs, welfare, governance and others for the 2006-2018 period.

**2.4.5. Geopolitical dimension/resilience of the democratic system**

In the current geopolitical context of the European Union, potential risks are emerging – from the new populist movements threatening minority rights, to the classic challenges of corruption and capture of the state – risks that emphasise once again the fragility of democratic institutions, as well as the danger of erosion of citizens’ fundamental rights and manipulation of electoral processes. Given the current global context of volatility and uncertainty, the consolidation of resilient societies governed by sound democratic systems becomes the key priority of the Member States of the European Union. The current USA-led liberal world order shows signs of instability (Mearsheimer, 2018): Trump’s approach points to a US that has become and will continue to be increasingly protectionist, which has lost interest in international institutions and cooperation, as well as in promoting democracy in the world. Moreover, since President Obama and continuing with Trump’s administration, the latest trends in the global arena highlight an American foreign policy

geared towards managing China’s influence, thus turning to Asia and moving away from Europe. In this context, the reorientation of the US to Asia is added as a further threat to European security, which greatly increases uncertainty on the European continent and leads the EU, more than ever, to strengthen the resilience of its neighbours.

Geopolitical risks are by nature difficult to manage as they are induced from the outside, and their approach requires a common European dimension. Therefore, shocks affecting the proper functioning of the democratic system can be divided into two main categories: Those specific events of external origin (transnational) that have taken place in the past, (1) or certain trends/risks that emerge globally or at European level and which, through spillover effects threaten the proper functioning of the governance systems of the EU Member States (Table 1) (WEF, 2019).

A number of specific shocks were identified and included in the analyses.

The shocks were correlated with the different dimensions of resilience, the group proposing the integration into the resilience analysis of the democratic dimension as a specific dimension (Figure 5).

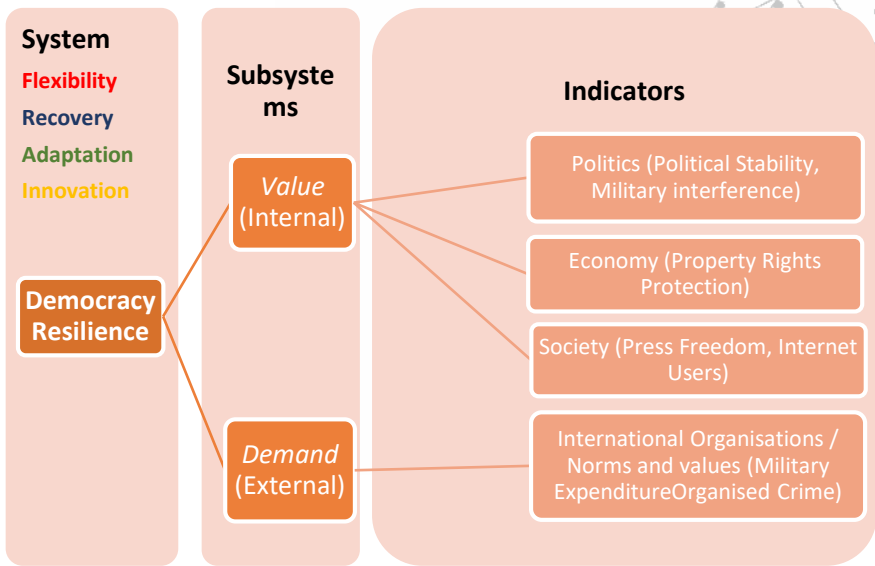
The main argument was that, above all, resilience refers to the specific properties and characteristics of a social-political system to cope with, survive and recover from complex challenges and crises (shocks) that could lead to systemic failure. According to key international and non-governmental organisations (World Bank, 2011; UNDP, 2012) the main features that could lead to a resilient system are: 1. Flexibility – the ability to absorb shocks; 2. Recovery – the ability to overcome shocks/crisis; 3. Adaptation – the ability to change in response to a shock in the system; 4. Innovation – the ability to transform in a way that tackles the crisis more efficiently or effectively (potential risks). In order to generate such a system, it is essential to be a democratic system.

Table 2. Types of geopolitical shocks

Past – Events	Future – Risks (abstracts)
The Fall of Communism (1989)	Protectionism (EU-US-China trade relations)
Transition	Populism
Enlargement of NATO	EU fragmentation/separatism
EU enlargement (2004/2007)	Polarisation of political power
9/11 – TBD	Strong leaders
Cessation of gas supply by Russia (2014)	Weak international institutions
Crisis in Ukraine (2014)	A crisis in energy resources (Russia and Saudi Arabia)
Sanctions against Russia (2014 to present)	
Refugee crisis	
Terrorist attacks	
U.S. Elections – TBD	
Brexit – TBD	
Protection/(Collection, Yellow vests, etc.)- TBD	

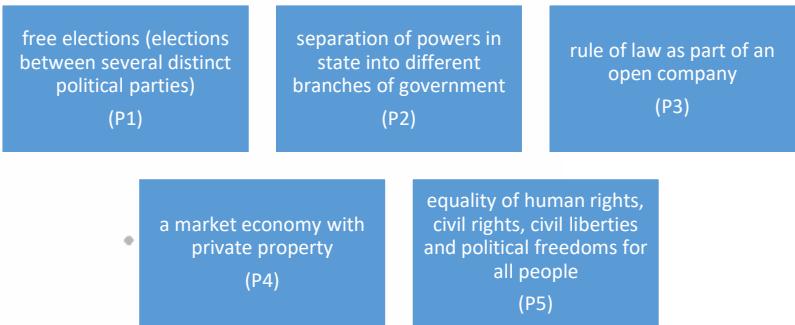
Source: ReGrowEU

Figura 5. Geopolitical dimension and democratic resilience

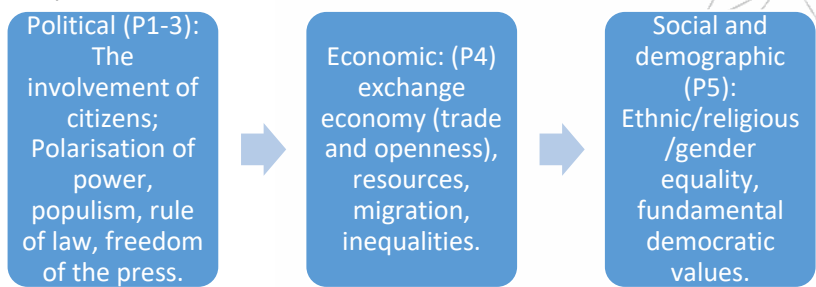


Source: ReGrowEU

It is considered that democracy as a governance system (or Western model of democracy) is characterised by the following pillars:



The democratic system is also multidimensional, comprising three subsystems:



A resilient democracy is a democratic system capable of continuously adapting in response to various internal and/or external shocks. In the end, the project will propose a model to which this adaptability is assessed and how it fits into the overall resilience model.

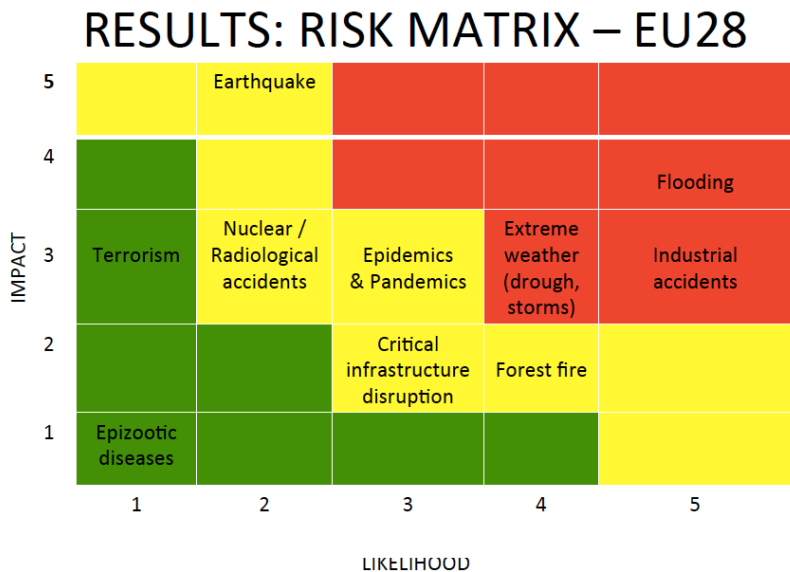
## 2.5. Maps at European level

At this stage of the project, maps were made for: Analyses of resilience of the tourism sector at regional level; Resilience of smart cities in Romania; Resilience of the peripheral regions of the EU; Maps on the dynamics of perceptions related to the ability of EU governments to perform in order to strengthen their capacity to cope with crisis/change periods (post-shock analysis); Maps on the effectiveness of public policies in EU countries; Maps highlighting the strategic vision of EU governments and their inclination for innovation; Maps that capture the quality of public services at EU level.

Also, in order to develop maps with risks and shocks at European level, as a preliminary step, the “Teritorial Capital” group proposed a matrix representation of environmental risks depending on the probability of production and their estimated effect (Figure 6). Extreme weather variations, floods and industrial accidents are found in the area with the highest probability and an important impact.



Figure 6. Risk matrix for the EU – 28



**Source:** ReGrowEU, based on EC (2017) Overview of Natural and Man-made Disaster Risks the European Union may face – Decision No 1313/2013/EU on a Union Civil Protection Mechanism.

In the next phase, after completing the performance and resilience analysis, maps for shocks and resilience (national/regional) systems will be developed on the dimensions considered in the analysis.

### 3. Future directions of research

In the next phase of the project the proposed models will apply: For the development of indexes and the analysis of resilience vs. resilience capacity; By integrating for the development of a resilience analysis model; To correlate with the theories of growth and development, respectively regional convergence.

Regional differences in economic development are more evident in the European Union compared to other developed economies, such as the US or Japan, especially after recent waves of EU enlargement. The most developed regions of the EU are about eight times richer than the least developed. Due to significant differences in regional development, the EU has introduced a set of policy measures to promote the integration and convergence of less developed areas between Member States. We are referring here to cohesion policy, one of the EU's best-funded policies. Many studies assessing the level of regional convergence in the context of cohesion policy have concluded that, based on GDP per capita at national level, overall disparities in the EU have recently decreased. On the other hand, an increasing dispersion in economic development can be found at the level of individual Member States' regions.

In the first step of this research objective, three large assumptions related to convergence have been investigated, namely: Absolute (unconditional) convergence assumption (per capita incomes of countries or regions converge in the long term, irrespective of other initial conditions); Conditional convergence hypothesis (there is a negative relationship between initial development and growth, but the impact of other factors could produce a different state of equilibrium for different regions); And the assumption of convergence of the club (the region belonging to a particular club moves from an imbalance position to its club-specific equilibrium position; In constant state, the pace of growth is the same in the regional economies of a club). The latter is particularly interesting from the perspective of the Member States in Eastern Europe which have recently joined the EU. Step two investigated empirical studies at EU level investigating whether and how convergence was actually achieved. These studies are important because they investigate as drivers of convergence capacity certain factors that are also taken into account in building the resilience index. For example, the share of the population with higher education is investigated in the literature on convergence and resilience alike.

This objective will be completed next year by testing the link between growth/development, convergence and resilience.

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RESEARCH CENTERS INVOLVED IN THE IMPLEMENTATION OF THE RegrowEU PROJECT

**"ALEXANDRU IOAN CUZA" UNIVERSITY OF IAȘI**  
**CENTER FOR EUROPEAN STUDIES - FACULTY OF LAW (CES)**

CES, as interdisciplinary department within the Faculty of Law, associates resources from various fields of European studies and regional development (economics, law, history, political and administrative sciences, geography, regional development, others) in carrying out specific programs of education, research, training, European documentation and information.

CES organizes master's programmes and Life Long Learning courses, develops research studies, local and regional development strategies in the field of European integration and policies, cross-border cooperation, regional development. The department edits two academic indexed journals (Eastern Journal of European Studies and CES Working Papers) and coordinates a book series in the field of European studies.

CES participates to programs of national and international cooperation regarding research, education and the dissemination of the knowledge and information about the EU and the integration process, it develops mobility programs for students and teachers, it promotes public - private partnership and debates on European issues, cooperating with public institutions, professors and researchers of similar academic centres from Romania and abroad.

CES is integrated in the Jean Monnet Network since 1993, coordinates since 2008 the activity of the European Documentation Centre (Europe Direct Network), and since 2009 has become Jean Monnet Centre of Excellence. In 2012, the Centre for European Studies received the Excellence Award for research and training in European affairs from the European Institute in Romania.

The scientific activities of the CES cover fundamental and applied research in various areas of European Studies, being focused on: (1) regional development, through the Competitiveness, regional development and convergence in Central and Eastern Europe program; (2) the EU's Eastern Neighbourhood Area, through the Geopolitics and Business Environment. The European Union as a global and regional player program.

**BUCHAREST UNIVERSITY OF ECONOMIC STUDIES**  
**THE RESEARCH CENTRE FOR MACROECONOMIC AND REGIONAL FORECASTING (PROMAR)**

The Research Centre for Macroeconomic and Regional Forecasting (PROMAR) (Director: Prof.Dr. Daniela-Luminita Constantin) was set up within the Bucharest University of Economic Studies at the beginning of 2007.

The main areas of scientific interest are: macroeconomic forecasting (sustainable economic growth, macroeconomic correlations, sectoral evolutions, sectoral-regional correlation, Romania-EU gaps, European integration), regional development forecasting (regional economic growth and policies - support for convergence and regional competitiveness, territorial cooperation, regional labour markets, internal and external migration, investment impact, regional clusters, territorial capital, urban-rural relationship, local development, metropolitan areas, regional development policies, regional planning, regional development financing, impact of using European funds on regional development, etc.) with approaches based on forecasting models, international comparisons, scenarios, strategies. Also,

contemporary currents of prospective economic thinking and epistemological analysis of inter- and transdisciplinary approaches are taken into account in order to predict the evolution of current economic theories.

The PROMAR Centre has established collaboration or partnership relations with other research centres within the Bucharest University of Economic Studies as well as with research centres of other Romanian universities, with research institutes of the Romanian Academy, with the National Commission of Forecasting, the National Institute of Statistics, the Ministry of Regional Development, the Bucharest-Ilfov Regional Development Agency, etc.

At international level, co-operation agreements have been established with the Regional Applications Laboratory (REAL) of the University of Illinois at Urbana-Champaign, USA, Department of Economic Geography and Geoinformatics of Wirtschaftsuniversitaet Vienna, the Research Centre of Regulatory Science – George Mason University, USA, etc. PROMAR has also been included in the cooperation networks developed through the international projects in which it has held the position of project partner (ASE-PROMAR), together with research centers of universities from over 20 European Union member countries plus Norway, Iceland, Serbia.

PROMAR members have been / are involved in a large number of research projects with national (ANSTI, CNCIS, CERES, CEEX, PN II, PN III, MDLPL, INCD-Urbanproiect, MDRAP, etc.) or international funding (Horizon 2020, FP7 , ESPON, SEE Transnational Program, EC-DG Regio, CERGE-GDN, World Bank, COST, etc.), as well as in projects within POS-DRU, PODCA and so on and so forth.

**BABES BOLYAI UNIVERSITY (UBB), CLUJ NAPOCA, ROMANIA  
CENTER FOR GOOD GOVERNANCE STUDIES**

Center for Good Governance Studies is an interdisciplinary research unit within the Public Administration and Management Department of the Faculty of Political, Administrative and Communications Sciences (FSPAC) at Babes Bolyai University (UBB), Cluj Napoca, Romania. The Center carries out research on good governance employing methods from public law and social sciences. It brings together experts with complementary background: law, public administration, sociology, political science. The Centre provides professional advice and research studies on good governance issues and works closely with policy-makers, institutions, and other stakeholders.

Good governance is a preferred topic in modern research about the administration. Claimed by economists, political and administrative scientists alike, the term was intensively used by the international organizations like the World Bank and the International Monetary Fund for assessing the results of their policies in the '80s, and then by The United Nations and the European Union in the '90s and afterward (culminating with the White Paper and the Charter of fundamental rights in the EU). The Center follows the dynamic of good governance principles in the context of different legal institutions, mainly public contracts (public procurement and public-private partnerships) and transparency/participation in public administration. Our research interests are linked also to the interplay between law and public management in modern public administration.

The ReGrowEU project - "Development of frontier research in the theories of regional growth and development in terms of resilience: towards a convergent, balanced and sustainable European Union" is a project carried out in 2018-2021 under the National Plan for Research and Development and Innovation for 2015 -2020 (PN III) - "Fundamental and frontier research" program, ID: PN-III-P4-ID-PCCF-2016-0166, by the "Alexandru Ioan Cuza" University of Iași (Contractor), Academy of Economic Studies from Bucharest (Partner 1) and „Babeş-Bolyai" University from Cluj-Napoca (Partner 2). The project coordinator is prof.univ.dr. Peter Nijkamp, Free University Amsterdam and Open University Herleen, The Netherlands.

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