

AN OVERVIEW OF THE EUROPEAN UNION RESILIENCE CAPACITY: SCIENTIFIC LIMITS AND METHODOLOGICAL ASPECTS RELATED TO ITS MEASUREMENT

Ramona Țigănașu

Centre for European Studies, Faculty of Law, "Alexandru Ioan Cuza" University of Iasi, Romania
ramona.frunza@uaic.ro

Abstract: *Over the last decade, the measures implemented to ensure development at European Union (EU) level were taken from the need to provide a stronger resilience capacity in order to respond adequately to various internal or external shocks that may occur and affect the economies. In the current globalised era, a shock is created, for example, on labour markets, which are facing new vulnerabilities like the volatility generated by the 'instant changes'. A disparate policy or a sectorial crisis could induce major consequences like migration waves or unemployment, simultaneously influencing more countries and regions at the same time. Considering these aspects, the purpose of this paper is to outline both the main scientific limits related to resilience concept and the methodological approach of measuring the resilience capacity of EU countries from a multi-dimensional perspective. Studying the assessment of resilience involves answers to questions such as: The EU as a whole experienced a progress in terms of resilience (the capacity to absorb shocks, to resist, to adapt and to transform), especially after the onset of the financial crisis from 2007-2009? What countries of the EU have the capacity to resist better to shocks or mitigate some turbulences? The crisis represented for some countries a new start for macroeconomic recovery? The eastern countries may recover the development gaps faster than the western ones? To what extent these states have the ability to integrate into their development models elements of adaptability/reaction? To what directions they should orient the resources? The countries may respond differently to these challenges, depending on their resistance status? An analysis based on resilience capacity from a multi-disciplinary perspective should provide a system-wide evaluation of the current situation in the EU, defined by political and economic crises, the globalisation effects, and the structural changes in the society. Importantly, the need for studying the resilience capacity also stems from the on-going search for reliable adaptability to a changing geopolitical environment. In addition, it can help identifying vulnerabilities in relation to various types of shocks and to propose appropriate measures to increase resilience capacity and speed up eastern economies' convergence process to EU standards. Particularly, the resilience approach can capture the weaknesses of the systems characterised by instability, insecurity, institutional weaknesses and structural fragilities, as well as inefficient governance. It can, thus, offer a scientific basis for the design of public policies.*

Keywords: *EU's resilience capacity; scientific limits; methodological aspects; integrative approach.*

JEL Classification: C18; O10; R10.

1. Introduction

One of the defining features of the economic dynamics at world level over the past decades has been the acceleration of the pace of change, which has generated asymmetric shocks at international, national, regional and local level. In its attempt to understand how economies can react more efficiently to impulses introduced in the system by the external environment, as well as to identify solutions for the more efficient valorisation of opportunities generated by changes, the specialised literature has gradually led to a new approach, crystallised around the concept of "resilience". The global crisis of 2007-2009 has strengthened the academic interest in examining resilience and its interdependency with economic development. This focus is further underscored by the protracted economic slowdown in Europe and increasing regional and global geopolitical instability. International organizations pay also a central attention to resilience in their visions of development (OECD, 2014; World Bank, 2014; UNDP, 2014), suggesting that resilience gradually tends to replace sustainability as the ultimate goal of development, in this way confirming the fact that resilience is a priority in international research (Folke, 2006). For the European economies, the study of resilience gains further importance, given by the dynamics of changes induced by positive and negative integration processes. This is especially valid for central and eastern European economies that have been "forced" into a fast process of adjustment to a new economic, legislative and government system and they are still undergoing a difficult itinerary of restructuring and integration. Within these countries, the context of transformations induced by the international environment has consequently been associated to those generated by the integration process, thus rendering research on their resilience capacity even more necessary (Bristow and Healy, 2014).

Academic literature proposes two approaches to resilience and its relation to the long-term development (regional, local, urban). The first approach (used in environmental and engineering sciences) offers a static vision of resilience: it refers to an economy's capacity to resist to shocks, thus integrating the changes implied by these shocks within its system and consequently returning to equilibrium. The equilibrium in turn, can either be the initial one or a new one with maintaining functions, structures and growth model (adaptability and recoverability). According to this approach, the system may resist, adapt, and return to functional balance while keeping the pre-shock development model (Davoudi et al., 2012). The second approach, developed by social sciences over the last years, suggests a dynamic vision of resilience: the economies affected by the shock do not just return to the initial balance or move to a new equilibrium but also transform themselves (in terms of structure and functions) affecting the operation of a new growth and development model (Haukkala, 2011; Bene et al., 2014; Martin and Sunley, 2014).

Interest in the study of resilience became manifest as early as the 1960s, but it has reached a critical mass in academic research relatively recently (Duval and Vogel, 2008; Martin, 2012; Modica and Reggiani, 2015), the concept being neither clarified nor integrated in growth and development models. Beyond the diversity of approaches, resilience is considered "a system's ability to resist, to recover or to adjust to the effects of shock or of change" (Mitchell and Harris, 2012: 2). Therefore, states (systems, in general) differ in their degree of adjusting to disturbances from the external (economic, politic, cultural) context, depending on their resilience

capacity. Thus, could be understood why the current global crisis has a growing interest, at international level, in the study of resilience and of its interdependences with economic growth. This interest is all the more justified if it is considered that the economic crisis persists and that the global and regional challenges are increasing. For instance, as a result of some natural disasters (earthquakes, floods, tsunami, explosions etc.), the academic world has taken a special concern in the study of a country's resilience capacity, after being affected by such a danger (Cutter et al., 2008; Manyena et al., 2011). Thus, resilience has become a vocal word in a wide range of disciplines, of which each has introduced its own working definition of the term. The basic concept was developed in ecological sciences but it has also been adopted by economics, social sciences, organisation, administration and management sciences, engineering, and medicine. In the sphere of economics strictly, a country's resilience means its capacity to adjust to change in macroeconomic contexts, to withstand sudden shocks and disturbance and to return to the desired equilibrium, be it the previous one or a new one. Considering that the conceptual framework of resilience integrates a variety of components from different domains it can be stated that, in time, it was created a new transdisciplinary discipline.

2. Theoretical and empirical limits on resilience capacity analysis

The resilience has recently become a key concept in designing the development policies at European level (cohesion policy, regional policy, environmental policy, etc.), some experts (Law et al., 2013; Boschma, 2014; Sensier et al., 2016) arguing that states should constantly seek to find tools to generate a stronger resilience capacity. Nevertheless, there are a number of limits regarding the resilience capacity analysis, which entail different risks (Bene et al., 2014: 615): first, it cannot always appreciate the extent to which resilience involves beneficial effects (the effect can be patchy, positive, with some countries/regions/cities, but negative for others); secondly, positivist vision could divert attention from the risks or negative effects that resilience can induce; thirdly, there is the risk of manipulation by abusive use of the term or by its improper use/misuse. Therefore, before setting resilience as the ultimate goal for development, one should distinguish between components of resilience that converge with development and components that undermine development. For instance, a system with reduced growth and with modest results may be very resilient at the same time (constrained by the need to survive). Therefore, these systems require providing opportunities that allow them to escape from poverty or avoid marginalization, in addition to strengthening resilience.

Referring to the main theoretical and empirical limits on resilience capacity analysis, these are given below:

a). The existing studies highlight analyses at the individual or household levels (Kurtz and Langworthy, 2013), or at the community level (Cutter et al., 2008); others focus on regions in Europe (NUTS2 level, according to the Nomenclature of Territorial Units for Statistics) or some states (Boorman et al., 2013). Based on a single level analysis, the determinants of the resilience process cannot be accurately reflected, and therefore, no appropriate policies can be drawn so that regional action can absorb shocks. Starting from this limitation in the literature, it is necessary to develop a comprehensive and multidisciplinary approach, which to combine several levels of analysis (multi-scale analysis): NUTS2 (regions), NUTS3 (counties), and LAU2

(Local Administrative Units: municipalities/cities). For example, at European level, there are no papers that address, in an integrated manner, LAU2 level. Placing the analysis at these levels may more precisely reflect the diversity of situations faced by territorial units in adapting to change.

b). One of the most essential limit of the existing empirical analyses which assess resilience in relation to long-term development refers to the fact that the current models do not reflect social dynamics, the role of the individual and of social organization in determining the systems' capacity to adapt and transform. The latest trends in literature have established that the major determining factors in the high-resilience regions are social capital and, implicitly, the strong relations/networks at the civil society level (Baliamoune-Lutz, 2011; Boyd and Folke, 2012; Putterman, 2013; Huggins and Thompson, 2015; Brooks et al., 2016; Östh et al., 2018). Many regional communities have shown flexibility, inventiveness and innovation in confronting, adapting and preventing the impact of the problems they were facing by developing their own institutional solutions, even in the absence of governmental support or of a functional social policy. Resilience must capture both individual behaviour and interaction with the other actors of the system (at micro level) as well as the impact they generate at the level of the whole system (the macro level).

c). Strongly related to the social capital, another fundamental role in development is played by institutions, which define the general framework, shape behaviours and business environments, the governance system, as well as government effectiveness. Formal and informal institutions define a system and determine the way it efficiently manages the processes within the economy, the way it is able to expand the sources of innovation and development on the long-term, to absorb shocks, fill gaps and overcome path dependence. So far, studies related to resilience have paid little attention to the role of institutions and of the governance system, thus significantly diminishing the explanatory power of resilience theory (Kramer, 2010; Efendic et al., 2011; Beyer and Fening, 2012; Neyapti, 2013; Siddiqui and Ahmed, 2013).

d). In the existing patterns of resilience, geopolitical determinants are generally left out. In this context, it is required to have included in the econometric models a specific element referring to the security component, especially on the background of an unstable geopolitical environment.

e). Current models of analysis do not provide a perspective that integrates the development and resilience issues into a core-periphery approach. One of the major problems faced by the EU and which directly targets Romania is that of intra-EU gaps. The peripheral nature of the eastern economies associates, in fact, the economic and spatial peripherality, inducing a series of specific aspects of the resilience capacity of these states. Therefore, it is necessary to identify those economic, social, institutional and spatial components that differentiate the resilience capacity of the emerging peripheral economies from the developed central ones. The inclusion of some measures able to determine a reduction of their peripheral character can essentially contribute to improved governance, economic and social resilience (stimulating their economic integration and convergence), as well as to a reconsideration of the core-periphery relations in the pan-European area (for instance, by reducing the marginality of EU's eastern members and reinforcing cross-border cooperation, a new "centre" for the eastern part of the EU could emerge), consequently strengthening the stability and security at EU's borders. However, the current resilience studies do not include aspects related to a territory's

connectivity and accessibility, which could otherwise be extremely relevant for the region (an analysis from the New Economic Geography perspective).

f). The concept itself entails a series of clarifications, particularly regarding the calculation methodology (its components and their integration, measurement, levels of analysis), and the incorporation of resilience capacity within the regional development and growth models. The main inconsistency in literature resides in the fact that the existent research in resilience theories is limited to one field (economic, social or ecological) (Bene, 2013).

g). Although composite indexes, integrating various components, are used, they fail to address the crucial aspects in the countries' analysis. For example, The Centennial Resilience Index (one of the most complex methodology adapted to emergent and developing economies) includes fifty-two variables grouped into ten sub-indexes (Boorman et al., 2013), but does not include variables with high relevance for the eastern European countries challenges, such as: liberty index, democracy index, macroeconomic stability index, human security index, energetic security index, and others.

h). In Romania, the resilience concept is far from being used to multi-dimensional and multi-scale levels, existing some references, with other semantic value, only in certain sciences (medicine and physics) and in socio-human disciplines such as psychology or sociology. As a result, researches in this direction would fill the theoretical and empirical gaps in our country and would contribute to the adoption of opportune and focused public policy measures (in the field of regional development, education, research, transport, etc.).

3. Methodological approach on measuring the resilience capacity of the EU countries

Starting from the limits mentioned above with reference to the resilience capacity analysis, there is a need that studies to integrate, into a comprehensive model, the most relevant economic, social, institutional, geopolitical and spatial/territorial determinants of resilience, at various levels (bottom-up analysis of the concept), in order to capture the reality more precisely and to act properly as a result of the intervention of an internal or external shock. Even if resilience has an exhaustive capacity to explain the dynamics of the economies, some determinants can have different effects in different places and/or for different actors.

In selecting the indicators that should be included in the resilience analysis, it would be advisable to take into account the so-called "methodology for determining resilience cost", one of the most complex aspects of resilience analyses (Bene, 2013). In this regard, it appears the use of the "non-resilience" opportunity cost, which, practically, entails that the costs should comprise the potential losses that may occur, at all levels, if the countries fail to generate the transformative processes necessary to reinforce long-term resilience capacity in order to converge towards the European development model (i.e., it will comprise deviations from European standards/increases of disparities/deviation from target and the necessary time to recover, all being generated by a shock).

Methodological developments on the resilience capacity analysis from a multidisciplinary perspective are difficult to put into practice, but they can reflect a trend that should be considered in the decision-making process and in outlining the medium and long-term development scenarios. A first difficulty in measuring

resilience is given by the multiplicity and diversity of meanings which tend to define the concept. Resilience has become “a moving target that is constantly redefined” (Bene et al., 2014: 600), going from small, static forms, derived from the theory of systems, to dynamic forms with a high degree of complexity. Another difficulty stems from inductive, bottom-up analysis of the concept, based on certain features such as education level, economic status, quality of governance, infrastructure, etc.), regarded as pillars of resilience capacity. This approach, which uses a particular combination of elements identified a priori and used as a proxy for measuring resilience, gives the analysis a circular, recursive character, manifesting the risk of generating a too narrow view on the issue of resilience. To meet this problem, should be offered an integrated approach in terms of the determinants of growth and development, reported at the strategic vision of the EU and at the conditionalities generated by the core-periphery pattern in the European space. Another element of difficulty in measuring resilience is selecting the most appropriate indicators to capture resilience at NUTS2, NUTS3, LAU levels, taking into account the availability of data. Measuring the resilience capacity of a country at the moment T1 is made by reference to a T0 moment, preceding the occurrence of a shock (such as economic crisis). According to an ESPON study (2014), the recovery starts from the C₁ point, and through the transformation capacity of the state (generated by proper responses to crisis situations), the point C₂ is reached, which corresponds to a maximum level of the recovery (P₂). The time for the downturn/recovery is given by $D = D_1 + D_2$ (Figure 1a).

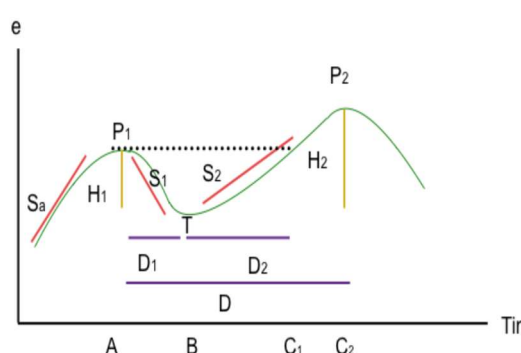


Figure 1 a: Resilience capacity of a country
Source: ESPON, 2014: 5
S=slope of growth path (decline/recovery);
P=peak; T=trough; H=height of economic
peak/trough; D=duration of
downturn/recovery

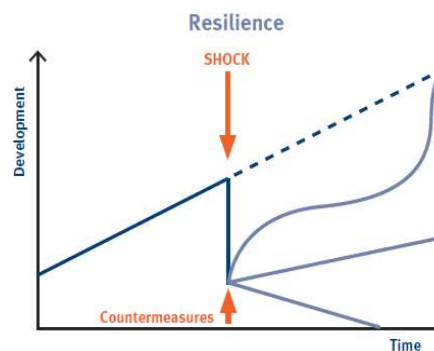


Figure 1 b: The influence of a shock
on economic development
Source: Mitchell and Harris, 2012: 1

Therefore, some states may achieve higher levels of growth after the emergence of a shock, through coherent development strategies/appropriate countermeasures tailored to country's specificities: Figure 1b.

As it was already stated, the current indexes reflect partly aspects related to the assessment of resilience capacity due to a small number of dimensions that are combined in the analysis and, consequently, there is a need for an integrated methodological approach to evaluate simultaneously several components, which to

have a greater relevance in designing the development policies. Key issues/indicators that could be included into various econometric models, on various dimensions, could be:

- *Economic and social dimensions*: GDP per capita, trade flows, FDI, inflation, fiscal pressure, income level, government tax debt, innovative capacity, creativity, human capital indicators, migration flows, material deprivation, productivity, access to finance, open markets, private-public partnership, economic structure, urban development, specialization patterns, informal economy, labour market stability, etc.;

- *Institutional (formal and informal) dimension*: governance indicators, European Quality of Government Index (EQI), Economic Freedom Index, Europeanisation Index, management crises structures, limited government, values and social norms (morality, trust, responsibility, tolerance, saving, diligence, perseverance, desire for self-realization), social capital, discrimination and cultural stereotypes, religion, traditions, customs, entrepreneurial activity, contract / law compliance, etc.;

- *Spatial dimension*: accessibility indicators, specific to the New Economic Geography (distance, time, transport network density, transport costs, transaction costs, etc.);

- *Geopolitical dimension*: human security, food security, health security, energy security, organized crime, military capacity, information security, international and regional agreements, resources availability.

From a methodological perspective, the elaboration of an index is not just about measuring the historical information, but also to be used in forecasting resilience fluctuations. To ensure scientific rigour of its composition, in a first stage, it should be realized the selection of data and imputation of missing data. The risk of missing certain data can be removed by estimating their average value between periods or by adding data from other sources. Secondly, the normalization of data is required. Data normalization is accomplished by providing a maximum value (could be considered 1) in the area recorded as having the best performance in the corresponding indicator. This can be done starting from the calculation formula:

$$RI_{ij} = \frac{X_{ij} - \min X_i}{\max X_i - \min X_i}; RI_{ij} = \frac{\max X_i - X_{ij}}{\max X_i - \min X_i}$$

where RI_{ij} represents the resilience index, X_{ij} the value of the variable i in country j ($j=1,2,\dots,N$), $\max X_i$ and $\min X_i$ the maximum and minimum values of the variables considered. RI will be a weighted average of the indicators that form each dimension of resilience, the results being measured on a scale from 0 to 1, where 0 denotes the inability of a country to resist to shocks and the closer the values to 1, the resilience is higher. Subsequently, by calculating the standard deviation (z score), they can be transformed into a more attractive form, higher than average values being translated into positive values and the ones below average into negative values.

Regarding the weight given to the index sub-components, there are several methodological approaches to the construction of the index. If some studies use analysis of main components to allocate specific components weight (Bănică and Muntele, 2015), others have decided to give equal weight (Briguglio et al., 2008; Boorman et al., 2013). To get aggregated indicators that characterize the level of resilience in the EU countries it might resort to the factor analysis. Within the

empirical approach, the resilience is a latent variable and it should be find the proper proxies for its assessment.

In order to estimate the contribution of the index to the variation of variables that are specific to resilience capacity, such as GDP per capita or unemployment, and given the need for time series to measure resilience, panel analysis can be used. As the EU member states know differences in the development level, some econometric models can be estimated using the DOLS (Dynamic Ordinary Least Squares) method for heterogeneous entities. Additionally, to determine the stationary character of some time series, the ADF (Augmented Dickey-Fuller)/unit root tests can be applied. The equations of the model may have the following forms:

$$a). \quad GDP_{i,t}/UNE_{i,t} = \alpha_0 + \alpha_1 GDP_{i,t-1}/UNE_{i,t-1} + \alpha_2 RI_{i,t} + \alpha_3 CV_{i,t} + \alpha_4 TE_{i,t} + \alpha_5 SC_{i,t} + \varepsilon_{i,t}$$

where i represents the country, t time, GDP real gross domestic product per capita, UNE unemployment level, RI resilience index, CV other control variables influencing the dependent variable, TE a series of specific effects over time, SC specificity of countries, and ε represents stochastic error.

$$b). \quad \ln RC_{i,t} = \beta_0 + \beta_1 \ln GDP_{i,t} + \beta_2 \ln ECO_{i,t} + \beta_3 \ln SOC_{i,t} + \beta_4 \ln INS_{i,t} + \beta_5 \ln GEO_{i,t} + \mu_{i,t}$$

where RC is the resilience capacity, GDP is the real gross domestic product per capita, ECO is the economic dimension, SOC is the social dimension, INS is the institutional dimension, GEO is the geopolitical dimension, t time period, i is the country, μ_{it} is the residual term. All variables are expressed in natural logarithm.

In order to analyze the relevance of certain determinants of resilience, it may be used the logit/probit methods, which may confirm the correctness of the choice of dimensions included in the index.

$$c). \quad \text{logit} [p(x)] = \log \left[\frac{p(x)}{1-p(x)} \right] = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_n X_n + \varepsilon$$

where $p(x)$ = probability of shock; β = regression coefficient; x = independent (exogenous, explanatory) variables.

Checking robustness and sensitivity is another stage in elaborating an index, which is mainly designed for eliminating the risk of distortion of results and the risk of the index to hold little relevance in explaining the recovery after certain shocks. To eliminate these risks, the econometric analysis could be based on multiple regressions or on the analysis of SEM (Structural Equations Model). After the assessment of resilience capacity, its mapping using GIS- Geographical Information Systems could be realized. The ranking and categorization of analyzed units according to the results achieved will be performed by ranking them as predefined units: e.g. according to ESPON (2014), the country division is: resistant, recovered, not recovered but in upturn, not recovered and no upturn.

Table 1: EU's countries resilience after the occurrence of 2007-2009 crisis

Country division	GDP resilience	Employment resilience
Resistant	Poland	Luxembourg, Germany, Poland
Recovered	Germany, Sweden, Austria, France, Malta, Slovakia	Sweden, Malta, Austria, Belgium
Not recovered but in upturn	Finland, Luxembourg, UK*, Ireland, Netherlands, Portugal, Spain, Italy, Denmark, Estonia, Latvia, Lithuania, Czech Republic, Slovenia, Hungary, Romania, Bulgaria, Cyprus	UK*, France, Netherlands, Italy, Finland, Lithuania, Estonia, Cyprus, Czech Republic, Slovakia, Hungary
Not recovered and no upturn	Croatia, Greece	Ireland, Portugal, Spain, Denmark, Latvia, Slovenia, Croatia, Romania, Bulgaria, Greece

Source: after ESPON, 2014: 22. * When the ESPON study was conducted, UK was an EU member

The application of an index at different administrative levels and studying resilience in relation to various types of shocks will generate the possibility of extrapolating the analysis, increasing the comparability of measurements carried out in order to develop appropriate development policies.

4. Conclusions

The current context of the economic crisis, the multitude of structural changes, accompanied by the on-going need for adaptability to market dynamics, determine the paramount importance of strengthening the resilience capacity of EU countries to support the long-term development.

The methodological approach based on which the resilience capacity can be measured at EU level must involve a combination of qualitative and quantitative analysis, taking into account a complex of research methods. To highlight the adaptive versus non-adaptive character of countries as a result of the emergence of a shock, either internally or externally, several analysis tools can be used to allow: temporal and spatial comparison of data, construction of econometric models, multi-stage measurement/simulations, elimination of errors and inaccuracies methods, interpretation of research results.

Empirical studies in the field can have a normative value by elaborating policy recommendations to enhance the resilience capacity among EU countries. For this, to overcome the scientific limits in the field, an integrative approach is needed that should include the specific internal and external determinants which reflect the ability of a country to resist, to adapt, to recover and to transform from shocks. By assessing resilience capacity from a transdisciplinary perspective (e.g., macroeconomic stability, human security, social capital, business environment, quality of governance, other), combined with multi-level analysis (NUTS0, NUTS1, NUTS2, NUTS 3, LAU1, LAU2), could provide deep knowledge of specific weaknesses and risks in EU countries regarding their transformative power and the creation

of a stable and prosperous economy, in order to adopt the most suitable policies and actions necessary at the structural level of the economy and society and to adapt to global challenges. Policy-makers must take into account the specificity of their country and the existing realities. In the long run, only those countries that have made the transformation at the economic, social, institutional, political, levels will be able to achieve the well-being of the developed countries. Contrary, those that have abandoned reforms or opted for partial reform will be doomed to stagnation.

The research results related to the application of some methods by which resilience can be measured form the basis for the development of analytical and predictive simulations regarding the capacity of a country to recover from shocks by using different scenarios. Based on these simulations, three scenarios can be highlighted: optimist scenario (within the system there will not intervene major internal nor external shocks); realistic scenario (internal and external shocks will occur but countries will develop their resilience capacity through appropriate policies at European, national, regional and local levels) and pessimist scenario (there will intervene shocks and the countries will not develop their resilience capacity, with a risk for accelerated instability and pronounced gaps).

The researches in the field should aims precisely at highlighting the subtle mechanisms by which resilience and development can be correlated.

In the last decade, the crisis showed that there are huge differences between countries in their vulnerability to shocks and their ability to adapt and recover from the economic disruptions. Although the most recent economic crises have been widespread, proving a strong contagious effect, the geographical display of the effects was highly uneven. Concerning the resilience of the EU's eastern states, these have much to recover in terms of development, due to their different institutional environments, with various types of governance, which led to have different capacities to resist to shocks. Structural adjustments produced over time in Eastern Europe were conducted essentially on the background of an unstable institutional framework, the change being usually associated with a high level of uncertainty resulting from the disappearance of a certain order and the creation of an institutional vacuum. The perspective of development in the EU's eastern countries is directly dependent on their capacity to assume and implement reforms according to their own specificities.

References

1. Balamoune-Lutz, M. (2011) "Trust-Based Social Capital, Institutions, and Development", *The Journal of Socio-Economics*, Vol. 40, Issue 4, pp. 335–346.
2. Bănică, A. and Muntele, I. (2015), *Resilience and Territory. Conceptual Operating and Methodological Perspectives*, Iași: Terra Nostra Press.
3. Bene, C., Newsham, A., Davies, M., Ulrichs, M. and Godfrey-Wood, R. (2014) "Review Article: Resilience, Poverty and Development", *Journal of International Development*, Vol. 26, Issue 5, pp. 598–623.
4. Bene, C. (2013) "Towards a Quantifiable Measure of Resilience", *Institute of Development Studies Working Paper*, Vol. 2013, No. 434, pp. 3–27.
5. Beyer, H. and Fening, F. (2012) "The Impact of Formal Institutions on Global Strategy in Developed vs. Emerging Economies", *International Journal of Business and Social Science*, Vol. 3, No. 15, pp. 30–36.
6. Boorman, J., Fajgenbaum, J., Ferhani, H., Bhaskharan, M., Arnold, D. and Kohli, H.A. (2013) "The Centennial Resilience Index: Measuring Countries' Resilience to Shock", *Global Journal of Emerging Market Economies*, Vol. 5, No. 2, pp. 57–98.

7. Boschma, R. (2014) "Towards an Evolutionary Perspective on Regional Resilience", *Regional Studies*, Vol. 49, Issue 5, pp. 733–751.
8. Boyd, E. and Folke, C. (2012), *Adapting Institutions: Governance, Complexity, and Social-Ecological Resilience*, Cambridge: Cambridge University Press.
9. Briguglio, L., Cordina, G., Farrugia, N. and Vella, S. (2008) "Economic Vulnerability and Resilience: Concepts and Measurements", *The World Institute for Development Economics Research (WIDER)*, Research Paper No. 2008/55.
10. Bristow, G. and Healy, A. (2014) "Regional Resilience: An Agency Perspective", *Regional Studies*, Vol. 48, Issue 5, pp. 923–935.
11. Brooks, C., Vorley, T. and Williams, N. (2016) "The Role of Civic Leadership in Fostering Economic Resilience in City Regions", *Policy Studies*, Vol. 37, No 1, pp. 1–16.
12. Cutter, S., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E. and Webb, J. (2008) "A Place-based Model for Understanding Community Resilience to Natural Disasters", *Global Environmental Change*, Vol. 18, Issue 4, pp. 598–606.
13. Davoudi, S., Shaw, K., Haider, L.J., Quinlan, A.E., Peterson, G.D., Wilkinson, C., Fünfgeld, H., McEvoy, D. and Porter, L. (2012) "Resilience: A Bridging Concept or a Dead End?", *Planning Theory & Practice*, Vol. 13, No. 2, pp. 299–333.
14. Duval, R. And Vogel, L. (2008) "Economic Resilience to Shocks. The Role of Structural Policies", *OECD Journal: Economic Studies*, Vol. 2008, Issue 1, pp. 1–38.
15. Efendic, A., Pugh, G. and Adnett, N. (2011) "Institutions and Economic Performance: A Meta-Regression Analysis", *European Journal of Political Economy*, Vol. 27, Issue 3, pp. 586–599.
16. ESPON (2014), *ECR2 Economic Crisis: Resilience of Regions*, [online], Available: <https://www.espon.eu/topics-policy/publications/territorial-observations/economic-crisis-and-resilience-regions>.
17. Folke, C. (2006) "Resilience: The Emergence of a Perspective for Social–Ecological Systems Analyses", *Global Environmental Change*, Vol. 16, Issue 3, August 2006, pp. 253–267.
18. Haukkala, H. (2011) "The European Union as a Regional Normative Hegemon: The Case of European Neighbourhood Policy", in Whitman, R.G. (ed.) *Normative Power Europe: Empirical and Theoretical Perspectives*, UK: Palgrave Macmillan, pp. 45–64.
19. Huggins, R. and Thompson, P. (2015) "Local Entrepreneurial Resilience and Culture: the Role of Social Values in Fostering Economic Recovery", *Cambridge Journal of Regions, Economy and Society*, Vol. 8, Issue 2, pp. 313–330.
20. Kramer, M. (2010) *The Stress of Change: Testing the Resilience of Institutions*, San Francisco, Calif: Jossey-Bass.
21. Kurz, J. and Langworthy M. (2013), Identifying Reliable Determinant of Resilience, paper presented to the Expert Consultation on Resilience Measurement Related to Food Security, Rome, February 19–21.
22. Law, S.H., Lim, T.C. and Ismail, N.W. (2013) "Institutions and Economic Development: A Granger Causality Analysis of Panel Data Evidence", *Economic Systems*, Vol. 37, Issue 4, pp. 610–624.
23. Manyena, S. B., O'Brien, G., O'Keefe, P. and Rose, J. (2011) "Disaster Resilience: a Bounce back or Bounce forward Ability?", *Local Environment*, Vol. 16, No. 5, pp. 417–424.
24. Martin, R. (2012) "Regional Economic Resilience, Hysteresis and Recessionary Shocks", *Journal of Economic Geography*, Vol. 12, Issue 1, pp. 1–32.

25. Martin, R. and Sunley, P. (2014) "On the Notion of Regional Economic Resilience: Conceptualization and Explanation", *Journal of Economic Geography*, Vol. 15, Issue 1, pp. 1–42.
26. Mitchell, T. and Harris, K. (2012), *Resilience: A Risk Management Approach*, Overseas Development Institute, UK, [online], Available: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7552.pdf>.
27. Modica, M. and Reggiani, A. (2015), "Spatial Economic Resilience: Overview and Perspectives", *Networks and Spatial Economics*, Vol.15, No. 2, pp. 211–233.
28. Neyapti, B. (2013) "Modeling Institutional Evolution", *Economic Systems*, Vol. 37, Issue 1, pp. 1–16.
29. Östh, J., Dolciotti, M., Reggiani, A. and Nijkamp P. (2018) "Social Capital, Resilience and Accessibility in Urban Systems: A Study on Sweden", *Networks and Spatial Economics*, Vol.18, Issue 2, pp. 313–336.
30. OECD (2014), *Guidelines for Resilience Systems Analysis*, OECD Publishing, [online], Available:<http://www.oecd.org/dac/Resilience%20Systems%20Analysis%20FINAL.pdf>.
31. Putterman, L. (2013) "Institutions, Social Capability, and Economic Growth", *Economic Systems*, Vol. 37, Issue 3, pp. 345–353.
32. Sensier, M., Bristow, G.I. and Healy, A. (2016) "Measuring Regional Economic Resilience across Europe: Operationalising a Complex Concept", *Spatial Economic Analysis*, Vol. 11, Issue 2, pp. 128–151.
33. Siddiqui, D.A. and Ahmed, Q.M. (2013) "The Effect of Institutions on Economic Growth: A Global Analysis Based on GMM Dynamic Panel Estimation", *Structural Change and Economic Dynamics*, Vol. 24, pp. 18–33.
34. United Nations Development Programme (UNDP) 2014, Human Development Report 2014, *Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*, [online], Available: <http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf>.
35. World Bank (2014), The World Bank Annual Report 2014: *Main report*, [online], Available:<http://documents.worldbank.org/curated/en/111781468170952958/Main-report>.