

## ECONOMIC RESILIENCE VS. ENTERPRISE ROBUSTNESS: CONCEPTUAL DIFFERENCES AND THEIR IMPORTANCE IN THE FACE OF CRISES

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**Purpose:** The aim of the article is to theoretically analyze and explain the differences between the concepts of economic resilience and business robustness, as well as the reasons for these differences, and to examine their significance in the face of crises. Specifically, the aim of the paper is to:

- clearly distinguish the concepts of resilience and robustness,
- indicate how both concepts influence the ability of businesses to cope with crises,
- analyze how the methods of measuring resilience and robustness in businesses can contribute to the conflation of these terms,
- propose an exemplary research methodology for business robustness and resilience, depending on their definitional characteristics.

Research problem: What differences and similarities exist in the way resilience and robustness are perceived? How can the application of the same research methods lead to the conflation of these terms? What is their application in the context of crises?

**Design/methodology/approach:** The objectives of the article were achieved through the application of a literature review method, which includes the analysis of existing studies on the concept of economic resilience and enterprise robustness. The article focuses on presenting the origins of these concepts, comparing their definitions, and analyzing the conceptual differences and their causes. The use of economic resilience and enterprise robustness in the face of crises is also discussed. Additionally, methods for measuring resilience and robustness in enterprises, depending on the definitional characteristics of these concepts, are presented, along with examples of economic indicators that allow their measurement. The theoretical framework of the article is based on an interdisciplinary approach to the concepts of resilience and robustness.

**Findings:** As a result of the literature analysis, it has been demonstrated that the concepts of economic resilience and enterprise robustness are often used interchangeably, despite having different meanings. The article discusses the conceptual differences and their causes.

**Originality/value:** The article presents a critical distinction between the concepts of economic resilience and enterprise robustness, which are often confused and incorrectly used as synonyms in the literature, as well as in other non-scientific publications. The article not only describes the differences between these concepts but also analyzes the causes of these differences and their practical significance in relation to the functioning of enterprises during disruptions and crises. Additionally, it offers proposals for economic indicators that can be helpful in measuring resilience and robustness in enterprises. The article is particularly valuable for researchers and

business practitioners who are interested in the functioning of enterprises in the face of crises, as well as in strengthening robustness and resilience in an unstable environment.

**Keywords:** economic resilience, enterprise robustness, economic crisis.

**Category of the paper:** literature review, viewpoint.

## 1. Introduction

In the face of increasingly frequent economic crises, which are an integral part of business operations, and global disruptions such as the COVID-19 pandemic, armed conflicts (e.g., the Russian invasion of Ukraine in February 2022), as well as non-economic crises (e.g., climate change, natural disasters, industrial catastrophes), the ability of enterprises to effectively respond to unexpected events has become a key factor in their long-term survival, and even their sustainability. In addition to surviving the crisis and returning to the pre-disruption state (robustness), increasing importance is placed on factors that enable businesses to adapt to a changing environment and continue developing (resilience).

In the literature, terms such as *economic resilience* and *enterprise robustness* are often mistakenly used as synonyms. However, it is important to emphasize that robustness is just one element of resilience, but not the only one. The aim of this article is to provide a detailed analysis of these two concepts in the context of the functioning and development of businesses in the face of crises and environmental disruptions. The article presents the origins of the concepts of resilience and robustness, as well as their interdisciplinary nature. It identifies the definitional differences between these terms and discusses the causes of these differences. Furthermore, a research methodology based on the definitional characteristics of these concepts is proposed, and the significance of resilience and robustness in the context of crises is highlighted.

This research may serve as a foundation for future academic studies by introducing a new approach to assessing the ability of businesses to survive, adapt, and grow in a turbulent economic environment.

The article consists of six parts. The first part discusses the origins, essence, and definitions of resilience, highlighting its interdisciplinary nature. The second part presents the definitions of economic resilience in enterprises, while the third part addresses the concept of enterprise robustness. The fourth part outlines the conceptual differences between economic resilience and enterprise robustness, as well as their causes. The fifth part describes the significance of economic resilience and robustness in the context of crises. The final part presents the research methodology related to resilience and robustness in enterprises.

## 2. Origins, essence, and definitions of resilience

The English term *resilience* is derived from the Latin verb *salire*, which can be translated as "to leap," "to rise," and *resilire*, meaning "to jump back" or "to return to a previous state" (Boczkowska, 2019, p. 130). The concept of *resilience* originates from the physical sciences, where it refers to a physical property of solid objects, specifically the ability of an object to regain its original shape after being deformed by an external force (Boczkowska, 2019). The borrowing of this term into social sciences was a result of the lack of an equivalent term that fully captured the essence of the phenomenon (Junik, 2016). In social sciences, the concept of resilience refers to the ability of an individual or social groups to function properly under challenging conditions (Czech-Włodarczyk, 2018). Meanwhile, the literal translation of *resilience* includes terms like "resistance", "flexibility", "elasticity", "springiness", "durability", and "the ability to recover" (Majchrzak, 2020, pp. 33-34). It should be noted that there is no single Polish word that fully conveys the comprehensive meaning of the English term *resilience* (Borucka, Ostaszewski, 2008).

In the 20th century, the idea of *resilience* emerged simultaneously in two fields of science: ecology and psychology (Błąd, 2022). The contemporary interpretation of resilience has been largely shaped by ecology and studies related to the balance and stability of ecosystems (Lucini, 2014, as cited in Stępką, 2021). The term *resilience* was first used in the context of ecological systems by C.S. Holling in 1973 in his work titled *Resilience and Stability of Ecological Systems* (Holling, 1973, as cited in Guzal-Dec, Zwolińska-Ligaj, 2023). C.S. Holling defined resilience as "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (Holling, 1973, p. 14). In the ecological approach to resilience, two perspectives can be distinguished. The first approach focuses on the ability of systems to adapt to changes and survive after a shock resulting from external change. The second approach examines resilience in the context of disturbances and the speed of return to the original equilibrium (Annarelli, Nonino, 2016, as cited in Otola, Knop, 2023). C.S. Holling's work laid the foundation for future research on resilience in the ecological dimension and its various applications in other sciences (Piórkowska, 2015). Since then, resilience has spread to scientific disciplines such as psychology, engineering sciences, management sciences, and economics, incorporating a range of subdisciplines (Otola et al., 2024, as cited in Otola, Knop, 2023). It is worth noting that as the concept of resilience has evolved, so has its definition in relation to organizations. More specifically, a resilient organization, including its specific case – the enterprise – can not only survive a crisis but also emerge stronger and grow in the future as a result (Koronis, Ponis, 2018, as cited in Otola, Knop, 2023).

In addition to ecology, the origins of the concept of resilience should also be sought in another discipline – psychology (Majchrzak, 2020). In the psychological context, the concept of resilience has its roots in studies on the development of children and adolescents who grew up in difficult living conditions (Werner, 1994; Garmezy, 1985; Rutter, 1987, as cited in Borucka, Ostaszewski, 2012). Here, the notion of resilience serves as a metaphor for phenomena responsible for the proper psychosocial functioning of children and adolescents, even despite objectively unfavorable life circumstances (Borucka, Ostaszewski, 2012). These phenomena are explained by the concept of resilience, which primarily focuses on explaining processes related to balancing or mitigating adverse conditions (Garmezy, 1985, as cited in Borucka, Ostaszewski, 2012). It is worth noting that the pioneering research on resilience conducted by Garmezy, Werner, and Rutter revolutionized the understanding of this phenomenon – from an individual trait to a complex process in which personality, family, and non-family variables are interconnected in a feedback loop (Boczkowska, 2019). As a result, the literature distinguishes two terms:

- resiliency – a personality trait or a relatively stable resource of an individual,
- resilience – related to the process of effectively overcoming adverse conditions and life events (Ogińska-Bulik, Juczyński, 2011).

The term *resilience* is an interdisciplinary concept. It has multiple meanings and interpretations and is used in various scientific disciplines, such as psychology, medicine, natural sciences (ecology, physics, biology), engineering, economics, management sciences (crisis management, supply chain management, human resource management, strategic management), spatial planning, political and security sciences, public administration, sociology, and pedagogy (Otoła, Knop, 2023; Błasiak, Dybowska, 2021; Stępka, 2021). The interdisciplinary nature of the term resilience and the broad interest of researchers in this concept create a need for the development of scientific research and analyses, expanding both theoretical and practical reflections on the essence and application of resilience, as well as the creation of measurement tools (Kołodziej-Zaleska, Przybyła-Basista, 2018).

Various scientific fields use resilience as a multifaceted approach to studying systems' responses to events that disrupt their functional equilibrium. However, the meaning of resilience remains relatively unclear and imprecise. Indeed, as a hybrid concept, resilience is a conglomerate of descriptive and normative aspects. Moreover, its application is often ambiguous and varies depending on the purpose of its use (Ajili, Slimene, 2021).

**Table 1.**  
*Selected Definitions of Resilience in an Interdisciplinary Perspective*

| No. | Date | Author                    | Context           | Definition   |
|-----|------|---------------------------|-------------------|--|
| 1.  | 1973 | Holling                   | ecological        | „a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables”   |
| 2.  | 2012 | Wysocka                   | psychological     | "refers to the processes and mechanisms that promote the proper (positive) functioning of an individual, despite the adversities in their life history, risk factors, vulnerability factors, and realized developmental threats or traumatic experiences, representing a phenomenon of good adjustment — positive adaptation that occurs despite unfavorable developmental conditions" (own translation) |
| 3.  | 1998 | Masten, Coatsworth        | psychological     | „Resilience also has had varied meanings, but it generally refers to manifested competence in the context of significant challenges to adaptation or development”  |
| 4.  | 2000 | Luthar, Cicchetti, Becker | psychological     | „Resilience refers to a dynamic process encompassing positive adaptation within the context of significant adversity. Implicit within this notion are two critical conditions: (1) exposure to significant threat or severe adversity; and (2) the achievement of positive adaptation despite major assaults on the developmental proces”  |
| 5.  | 2003 | Hamel, Valikangas         | organizational    | „resilience refers to the capacity to continuous reconstruction”   |
| 6.  | 2003 | Starr et al.              | organizational    | "The ability of an organization to withstand systematic disruptions and adapt to risks in the environment in order to formulate strategies aimed at mitigating the risks of operating in uncertain environmental conditions" (own translation)   |
| 7.  | 2020 | Walker                    | multidisciplinary | „resilience is the ability to cope with shocks and to keep functioning in much the same kind of way. It is a measure of how much an ecosystem, a business, a society can change before it crosses a tipping point into some other kind of state that it then tends to stay in”   |
| 8.  | 2020 | Martin, Sunley            | multidisciplinary | "The ability of a system (understood, for example, as a state, region, sector, city, company, or local community) to: <ul style="list-style-type: none"> <li>• withstand,</li> <li>• recover,</li> <li>• adapt,</li> <li>• reorganize and reconfigure" (own translation)</li> </ul>  |

Source: based on: (Holling, 1973, p. 14; Wysocka, 2012, p. 288; Masten, Coatsworth, 1998, p. 206; Luthar, Cicchetti, Becker, 2000, p. 543; Bhamra, Dani, Burnard, 2011, p. 5379; Piórkowska, 2015, p. 812; Walker, 2020, p. 10; Drobniak, 2022).

### 3. Definitions of Economic Resilience in Enterprises

In economics, the concept of resilience is considered in various contexts, including the economy, communities, enterprises, organizations, or business models (Otola, Knop, 2023). Economic resilience can also be studied in areas such as:

- the goal of new macroeconomic policies (e.g., sustainable development),
- microeconomic issues (e.g., supply chains, logistics),
- cities and regions,
- organizations (e.g., crisis management, risk management, corporate social responsibility),
- specific cases of micro, small, and medium-sized enterprises (SMEs) and corporations,
- sectors and industries,
- the workplace (e.g., in relation to managerial traits, education, and skills development),
- healthcare systems,
- the labor market,
- the financial market (Ajili, Slimene, 2021).

The application of resilience in the economic context dates back to the concept of sustainable development (1987), which integrated resilience with the topics of climate change and external shocks (Simme, Martin, 2009). “Since the nineties, global financial institutions such as the International Monetary Fund (IMF, 1996, 2005), the World Bank (WB, 2006), and the Bank for International Settlements (BIS, 2002, 2008), have increasingly incorporated strategies of ‘resilience’ into their logistics of crisis management, financial (de)regulation and development economics” (as cited in Walker, Cooper, 2011). An initiative related to the introduction of the concept of resilience into economic sciences was undertaken in 2006 by Ch. Perrings, who connected it with the concept of sustainable development. According to Perrings, resilience is “the ability of a system to cope with disturbances without losing its functionality. It is the ability to withstand market or environmental shocks without losing the capacity for efficient resource allocation (the functionality of markets and supporting institutions) or the provision of essential basic services (the functionality of the production system)” (own translation, Perrings, 2006, pp. 417-427, as cited in Majchrzak, 2020, p. 34). While considering the origins of the term resilience and its previous interpretations in the economic context, M. Majchrzak argues that resilience should be analyzed as “the robustness, flexibility, and ability for strategic revitalization (regeneration) of an organization in the face of extraordinary threats” (Majchrzak, 2020, p. 35).

Enterprise resilience requires continuous development, robustness to disruptions, and the ability to adapt, create value, and maintain a competitive advantage. It is important to note, however, that a conflict may arise between resilience and agility. Balancing these two competing demands can prove to be a challenging task. The key elements of enterprise resilience include:

- strategic resilience – the ability to continuously develop and create an agile organization,
- operational resilience – the ability to maintain essential operational activities during a crisis,
- financial resilience – the ability to sustain an optimal level of capital and cash flow during a crisis (PwC, 2023).

It is worth emphasizing that resilience is not just a single concept but rather a broader framework for the functioning of enterprises (Majchrzak, 2020). The most important component of enterprise resilience is robustness, which can be defined as "the ability of a company to return to its pre-stress state" (Bishop, Hydoski, 2010, p. 23, as cited in Majchrzak, 2020, p. 35). The robustness of an organization, and in particular a company, can be ensured by four complementary elements:

- risk assessment – it is crucial to identify, classify, and assess risk factors, as well as to develop appropriate strategies for minimizing them,
- risk prevention – appropriate preventive strategies should be implemented with the aim of predicting and eliminating specific threats,
- detection of irregularities based on previously established risk areas, e.g., through periodic audits or continuous monitoring,
- response to irregularities – it is necessary to develop action plans in the event of irregularities to reduce their negative impact on the business entity (Majchrzak, 2020).

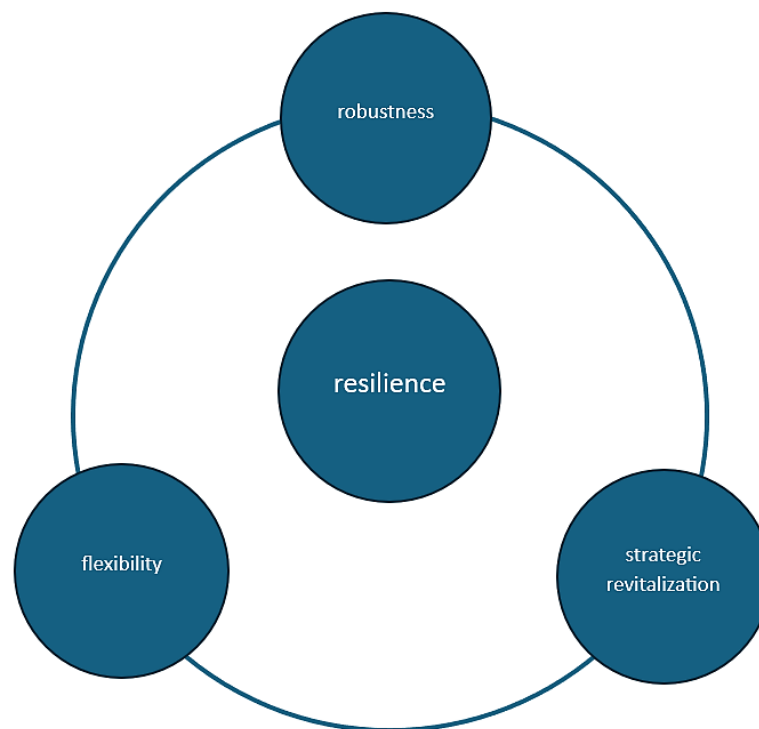
The second element of the concept of enterprise resilience is flexibility, which can be defined as "the ability of an organization to adapt to conditions in its environment" (Majchrzak, 2020, p. 35). Given that flexibility is not a clearly defined concept in the literature, it is possible to either attempt to define it or, based on selected literature, continue research into its essence. However, challenges arise in measuring the categories that form the basis of these definitions (a significant portion of flexibility definitions refers to adaptation time and the dynamics of responding to changes, primarily in the environment). An alternative approach is to adopt only a general, fairly broad definition of flexibility, which encompasses various specific aspects. The basis of this approach is to focus on the factors shaping flexibility (Krupski, 2005). Seeking a common denominator across different concepts, flexibility can be understood as the ability of an enterprise to adapt to changing environmental conditions. The term "adapting" is deliberately used as an equivalent to "adjusting" due to the widespread use of the term "adaptiveness" in the English-language literature when describing this phenomenon (Gibson, Ivancevich, Donnelly, 1998, p. 38; Strategor, 1996, p. 277, as cited in Majchrzak, 2020, p. 35). Adaptation can be external – referring to the ability of an enterprise to influence its environment – or internal, relating to the implementation of adaptive changes within the enterprise. Flexibility can refer to various functional areas of the enterprise, such as the use of machinery, labor, material logistics, product assortment, operational activities, development, scale of operations, and the implementation (or modification) of new products (Ziębicki, 2010). Furthermore, flexibility is often analyzed in the context of the "organizational subsystems: financial, informational, production, market, and strategic management" (Krupski, 2008, p. 22, as cited in Ziębicki, 2010, p. 388). It is important to note that each of these areas is assessed according to different criteria (Ziębicki, 2010).

The third component of the concept of enterprise resilience is strategic revitalization (Majchrzak, 2020). Revitalization can be defined as "a change of fundamental character and significant impact on the organization's efficiency, affecting relationships with the environment (customers, suppliers), transformational processes (technology configuration), structures, systems, and routines (decision-making, information, human resources), as well as financial results and individual and organizational behaviors" (Hart, Berger, 1994, as cited in Walas-Trębacz, 2008). Another definition indicates that the process of strategic revitalization can be described as "a shift in the enterprise's direction, which requires a new approach to human resource management and the organization's structure (renewing)" (Nogalski, Marcinkiewicz, 2004, p. 49, as cited in Majchrzak, 2020, p. 34). Consequently, the revitalization process is identified as a strategic change (Floyd, Lane, 2000, p. 155, as cited in Walas-Trębacz, 2008, p. 96). Considering two criteria simultaneously – the continuity (or discontinuity) of changes and the type of changes in the enterprise in relation to changes in the environment – the concept of renewal can be expanded into two situations, namely, strategic turnaround and strategic revitalization. The renewal process occurs in two scenarios: when a strategic gap arises, or when it is anticipated between the enterprise's capabilities and environmental demands. A successfully implemented strategic revitalization should not only result in increased efficiency but also strengthen the enterprise's competitive market position, improve and tighten relationships with customers, introduce organizational structure modifications that support response flexibility, increase the delegation of tasks, responsibilities, and duties, align activities (processes) with customer needs, develop new capabilities and key competencies, enhance the value chain efficiency, and provide other benefits (Walas-Trębacz, 2008). Thus, there are close connections between enterprise robustness, flexibility, and the ability for strategic revitalization (renewal). These three elements together shape the concept of economic resilience in enterprises (Majchrzak, 2020). Figure 1 graphically illustrates the components of the concept of economic resilience in enterprises.

The concept of resilience presented in Figure 1 can be applied to various levels:

- **mega** (*megaeconomic resilience*) – in the context of groups of countries, e.g., the EU or G-20,
- **macro** (*macroeconomic resilience*) – in the context of the economies of specific countries,
- **mezo** (*mezo-economic resilience*) – in the context of regions, sectors, and branches of the economy,
- **micro** (*microeconomic resilience*) – in the context of specific economic units, such as enterprises, financial entities, and households (Majchrzak, 2020).





**Figure 1.** The Concept of Economic Resilience in Enterprises

Source: based on: (Majchrzak, 2020, p. 36).

In this study, the focus of the analysis is specifically on microeconomic resilience in the context of enterprises. Table 2 presents general definitions of economic resilience, followed by more detailed definitions of economic resilience in enterprises.

**Table 2.**

*Sample Definitions of Economic Resilience and Economic Resilience in Enterprises*

| No. | Date | Author                 | Context  | Definition  |
|-----|------|------------------------|----------|---|
| 1.  | 2014 | Gilly, Kechidi, Talbot | economic | „Double capacity of resistance and adaptation opening the way for new pathways. These pathways indicate the capacity of an organisation to find novel responses to new questions and not simply to reproduce previously used organisational responses”  |
| 2.  | 2012 | Biggs, Hall, Stoeckl   | economic | „Ability of a system to maintain and adapt its essential structure and function in the face of disturbance while maintaining its identity”  |
| 3.  | 2017 | European Commission    | economic | „Economic resilience refers to the ability of the country to withstand a shock and recover quickly to potential after it falls into recession. Resilient economic structures herewith prevent that economic shocks have significant and persistent effects on income and employment levels and thus they can reduce economic fluctuations”  |
| 4.  | 2017 | Brinkmann et al.       | economic | „the capability of an national economy to take preparatory crisis-management measures, mitigate the direct consequences of crises, and adapt to changing circumstances. In this regard, the degree of resilience will be determined by how well the actions and interplay of the political, economic and societal spheres can safeguard the performance of the economy – as measured against the societal objective function – also after a crisis” |

Cont. table 2.

|     |      |                            |                             |   |
|-----|------|----------------------------|-----------------------------|---|
| 5.  | 2022 | Tsiotas                    | economic                    | „the capability of an economic system to respond to disturbances (shocks) and is defined about a shock, in terms of either recovering to the previous state of functionality or moving into a new one”  |
| 6.  | 2022 | Banaszyk                   | enterprise                  | "Resilience is a fundamental competence for effectively responding to significant changes that disrupt the achievement of established plans without falling into prolonged periods of crisis. Resilience should include three main components: productivity, safety, and agility. Productivity refers to the relationship between the volume of goods sold and the amount of resources needed to produce them. Safety, on the other hand, pertains to sanitary protection and stable working conditions. Finally, agility represents the flexibility in adjusting to changing demand requirements" (own translation)" |
| 7.  | 2021 | Ajili, Slimene             | enterprise                  | „Business resilience refers to the ability of companies to emerge from a crisis with the lowest economic and social costs and the ability to better cope with future crises (e.g., infectious diseases, financial shocks, mental changes, digital disruptions, political instability, and social tensions)”   |
| 8.  | 2017 | Bogodistov, Wohlgemuth     | enterprise                  | „A resilient enterprise is one that is able to remain in a stable state, maintaining or growing its income and employee numbers despite disturbance”  |
| 9.  | 2009 | Moore, Manring,            | enterprise                  | „Capacity of an enterprise to survive, adapt, and grow in face of turbulent change”   |
| 10. | 2015 | Edgeman                    | enterprise                  | „Enterprise ability to self-renew through innovation, changing and reinventing itself by adapting its responses to political, social, economic and other competitive shocks or challenges”  |
| 11. | 2016 | Tognazzo, Gubitta, Favaron | organization/<br>enterprise | „Organization’s capacity to adjust to challenging conditions like environmental shocks and emerge from them strengthened and more resourceful”  |
| 12. | 2013 | Marwa, Milner              | enterprise                  | „Continuously anticipating and adjusting to deep secular trends that can permanently impair the earning power of a core business. It is having the capability to change before the case for change becomes painfully clear”.  |
| 13. | 2023 | Fu et al.                  | enterprise                  | „Enterprise resilience is an important indicator reflecting the performance of enterprises during the crisis, reflecting the ability of enterprises to withstand the impact of the external environment and sustainable development”  |
| 14. | 2011 | Walas-Trębacz, Ziarko      | enterprise                  | "The capacity for regeneration (resilience) should be understood as the ability for continuous reconstruction and renewal in terms of strategy and business model. It will not exist in a company if its organizational culture, values, and processes are focused on maintaining the status quo rather than fostering innovation" (own translation)  |

Source: based on: (Conz, Magnani, 2018, pp. 34-38; European Commission, 2017, p. 2; Brinkmann et al., 2017, p. 11; Tsiotas, 2022, p. 2; Banaszyk, 2022, p. 34; Ajili, Slimene, 2021, p. 3; Fu et al., 2023, p. 4; Walas-Trębacz, Ziarko, 2011, p. 272).

The above reflections on the essence and definitions of economic resilience, and more specifically – enterprise resilience, confirm its multidimensional nature. The analysis of definitions of economic resilience in enterprises, from both Polish and international researchers, indicates several key similarities in their interpretation. Economic resilience in enterprises encompasses not only the ability to survive (which is characteristic of robustness) but also the ability to adapt to challenging environmental conditions and to grow, even in the face of adverse

conditions such as disruptions or crises. Furthermore, resilience also refers to better handling of future shocks and crises. A resilient enterprise, in the face of a crisis, is able not only to overcome difficulties but also to emerge stronger.

The presented definitions (Table 2) highlight several characteristics of economic resilience in enterprises, including the ability to survive, robustness, adaptation, growth (also in the context of sustainable development), flexibility (or agility), the ability to transition to a new functional state (e.g., adapting the enterprise to changing market conditions), productivity, security, as well as the capacity for regeneration and innovation. It is also worth mentioning the ability to improve economic indicators, such as increased income and employment levels, and efficiency in crisis management with minimal costs.

One of the key elements of economic resilience in enterprises is robustness, which makes resilience a broader concept. Economic resilience in enterprises is not limited to surviving a crisis and returning to the pre-disruption state (robustness), but also includes the ability to adapt, undergo strategic revitalization, and continue growing. Thanks to these characteristics, an enterprise can not only overcome a crisis but also strengthen its competitive position in the future.

#### **4. Definitions of Enterprise Robustness**

The term "robustness" may originate from Latin (*resistere* – "to stop", "to resist"), late Latin (*resistentia*), or French (*resistance*), with both terms used in the context of "resistance, robustness" (Dictionary of the Polish Language and Foreign Phrases by W. Kopaliński, as cited in Zabłocka-Kluczka, 2012, p. 90). The concept of robustness is interdisciplinary. It can be defined in the context of "living organisms (humans, animals, plants), inanimate objects (e.g., products of human activity), social entities and systems (e.g., nations, regions, organizations, systems)" (Zabłocka-Kluczka, 2012, p. 90). The term is also used in the fields of social and economic sciences (Zabłocka-Kluczka, 2012). In general, robustness is defined in the literature as "the ability to take the necessary actions to minimize the harmful effects of events and to mobilize resources that accelerate the return to equilibrium" (Bishop, Hydoski, 2009, p. 63, as cited in Zabłocka-Kluczka, 2012, p. 91).

One of the approaches to analyzing the robustness of an enterprise during a crisis is to equate it with "the ability of the enterprise to survive for another year after the cessation of the negative stimulus" (own translation, Muller, 2022, p. 72). However, two approaches to analyzing enterprise robustness can be distinguished in the literature. The first is associated with equating robustness with the ability to return to a pre-disruption state. This is the classic understanding of robustness in relation to stability and the ability to maintain basic functions despite disruptions. It is related to endurance against disruptions without the need for radical changes.

The second approach is closer to the concept of resilience, which focuses not only on returning to equilibrium but also on adaptation and further development. Table 3 illustrates the multifaceted approach to organizational and enterprise robustness, which reflects these perspectives.

**Table 3.**  
*Definitions of Organizational Robustness and Enterprise Robustness*

| No. | Date | Author             | Context                        | Definition  |
|-----|------|--------------------|--------------------------------|---|
| 1.  | 2021 | Noviarto, Samputra | organizational                 | „The strength of an organization recovering from or being able to adapt to adverse events”  |
| 2.  | 2017 | ISO                | organizational                 | "It is the ability of an organization to absorb and adapt in a changing environment, enabling it to achieve its goals, survive, and grow. Robust organizations can anticipate threats and opportunities and respond to them due to sudden or gradual changes in both the internal and external context" (own translation) |
| 3.  | 2021 | Volkov et al.      | economic                       | „the capacity to withstand or recover from shocks maintaining the core performances and functionalities”  |
| 4.  | 2015 | Kramarz            | economic (of the supply chain) | "The return of a system to a state of equilibrium in response to disruptions" (own translation)   |
| 5.  | 2004 | Anderies et al.    | economic                       | „This concept (robustness) is defined as the capacity of a system to maintain a desired state despite fluctuations in the behaviour of its component parts or its environment”  |
| 6.  | 2019 | Accenture          | enterprise                     | "Operational robustness in enterprises is a broad category, encompassing: management, strategy, business services, information security, change management, process initiation, and recovery after a failure" (own translation)   |
| 7.  | 2019 | Accenture          | enterprise                     | “A robust enterprise has the ability to recover critical business services after significant, unplanned disruptions. In this way, it protects customers, shareholders, and other stakeholders” (own translation)  |
| 8.  | 2015 | Sopińska           | enterprise                     | “The robustness of a company to crises is the ability to sustain continuous growth despite an existing crisis in the macro environment, while simultaneously maintaining current economic performance at a good level" (own translation)  |
| 9.  | 2020 | Soliwoda           | micro/small enterprises        | “A robust micro/small enterprise can be defined as an entity that has not experienced a decline in gross revenues following a catastrophic event” (own translation)   |
| 10. | 2012 | Romanowska         | enterprise                     | “Long-term developmental capacity of a company, while simultaneously maintaining good economic performance despite the existence of a crisis in the economy" (own translation)  |

Source: based on: (Noviarto, Samputra, 2021, p. 2; Kos, 2023, p. 34; Volkov et al., 2021, p. 6; Kramarz, 2015, p. 183; Mafimisebi, Nkwunonwo, 2015, p. 1108; Soliwoda, 2020, pp. 40-42; Gregorczyk et al., 2016, p. 289; Romanowska, 2012, p. 8).

The definitions of enterprise robustness presented (Table 4) indicate certain discrepancies in defining this concept. On one hand, characteristics of enterprise robustness related to the protection of internal and external stakeholders have been distinguished, which is crucial for the survival of an economic entity in the market. Moreover, maintaining economic and financial indicators at a stable level has been emphasized, which can be reduced to maintaining the system's balance or its ability to return to equilibrium after disturbances while preserving basic

parameters and functions. In this context, a characteristic feature of robustness is the stability of the system in the face of disruptions – an enterprise is capable of maintaining its functionality without the need to adapt to the environment. On the other hand, a dynamic perspective on robustness has also been highlighted, which includes the ability to adapt to changing environments and long-term development despite the presence of a crisis in the economy, a concept typical of resilience. This discrepancy in definitions points to the need for a deeper analysis of the reasons for such a state, as the concepts of robustness and resilience, while related, are distinct concepts.

## **5. The conceptual differences between economic resilience and the robustness of enterprises and their causes**

The concept of resilience in Polish scientific literature is translated in various, often inconsistent ways, such as: "elasticity" (Szwajca, 2014), "psychological elasticity" (Kaczmarek, 2011), "robustness to injury" (Ryś, Trzęsowska-Greszta, 2018), "flexibility" (Ogińska-Bulik, Juczyński, 2011), "personal flexibility" (Uchnast, 1998), but also: resourcefulness, flexibility, pliability, robustness, psychological robustness, robustness to injury, plasticity, durability, resourcefulness, adaptability, or even the Polonized version – "resilience" (Junik, 2011)" (as cited in Boczkowska, 2019, p. 130). However, it should be noted that the aforementioned terms do not fully reflect the English term in a comprehensive manner (Boczkowska, 2019). The term resilience was borrowed from the field of physics, where it is used to describe certain characteristics of physical materials related to returning to their original shape after deformation due to pressure. Nevertheless, what in English-language literature in physics is defined with the single term "resilience," in Polish literature is referred to differently (Junik, 2011) (e.g., elasticity, flexibility, pliability, flexibility, pliancy, durability) (Wikipedia, as cited in Junik, 2011, p. 48). Therefore, many researchers – using physical sciences terminology – do not argue for adopting a specific term and do not refer to the analogy applied for their own research. It is worth noting that such clarification could help eliminate uncertainties related to terminology (Junik, 2011). Additional equivalents of the term resilience, which originally appeared in the psychological interpretation of the phenomenon but are now also used in economic and management sciences, include: "robustness, resourcefulness, the ability to recover strength, the ability to bounce back" (Junik, 2011, p. 48). Therefore, a current issue among resilience researchers and its derivatives remains the lack of consensus regarding scientific terminology. According to W. Junik, the challenge for resilience researchers is to identify which Polish term fully captures its essence. This challenge is also complicated by the lack of scientific discussion on whether it is possible to standardize Polish terminology in this area. One of the negative consequences of this situation is the difficulty in monitoring the academic output in the field of resilience research. It is likely that one of the reasons for the

problem in identifying a clear Polish term that comprehensively reflects the essence of resilience is the lack of consensus among both theorists and practitioners, who conduct research worldwide, regarding what resilience actually is. Some researchers identify it as an individual trait, others as a process, and still others as a specific outcome. In response to this problem, W. Junik proposes the use of the Polonized version of the term (resilience). This approach can be helpful in analyzing and searching for literature on the subject, as well as in popularizing knowledge about resilience (Junik, 2011). A similar proposal was also made by M. Stępką, who points out that the Polonized version of resilience is currently the optimal attempt to capture such a complex concept (Stępką, 2021). Another argument supporting the validity of this approach is the fact that it does not narrow the interpretation of the concept of resilience to popular translations, such as "robustness" or "elasticity," which unnecessarily limit its meaning and do not fully capture its internal complexity (Grzegorzewska, 2013, as cited in Stępką, 2021). Meanwhile, M. Boczkowska points out that in order to achieve a clear approach to whether to retain the English term resilience or use its Polonized version, empirical research should be conducted (Boczkowska, 2019).

The most likely way to solve the lexical difficulties discussed above is to directly refer to the definition of the term "resilience," which can be presented through the lens of four aspects, i.e., the ability of a system (e.g., country, region, sector, city, enterprise, or local community) to:

- robustness, understood as maintaining the most important components of the system and their values – for example: the number of employees, production volume, service diversity, and wage levels – at a stable level, regardless of the type and scale of shocks, disturbances, or disasters that have affected a given country, city, or enterprise;
- recovery, based on restoring the key components of the system and their values in a relatively short period after a shock occurs, e.g., despite an initial collapse caused by the economic crisis, the number of enterprises, jobs, production volume, and wage levels return to their pre-disruption state. Importantly, in the recovery concept, there is no change in the structure of production, technology, or required qualifications, and the system, after the shock, regains its original state and continues to develop;
- adaptation, focused on adapting the system's components to the situation resulting from the shock (the key is the positive adaptation of the existing system elements to the new situation, while maintaining the most important existing activities – for example, adapting educational services to be delivered online during the escalation of the COVID-19 pandemic or transferring previously on-site work to remote work. Adaptation refers to adjusting specific system elements (e.g., changing the way and place of work), but does not cause radical changes to the system itself, meaning that the same educational services are still provided, and the same subjects are taught at universities);

- reorganization and reconfiguration, which are the most complex aspects of resilience, based on the ability to implement a fundamental change in the main components of the system and their values as a result of disruptions – e.g., certain post-industrial cities, which, in response to the sudden closure of traditional industries (mining, metallurgy), successfully created conditions for business activities and jobs in new sectors. This form of resilience is particularly important in the context of the challenges of the energy transition and the shift to a zero-emission economy that will occur in the next decade; acquiring this important ability by countries, cities, sectors, and enterprises will be essential (Martin, Sunley, 2020, as cited in Drobniak, 2022).

All aspects of the term "resilience" are related to the response to difficult conditions; however, this response can take different forms, which is why it is probably more appropriate to use the term "resilience" rather than "robustness", which represents only one of its aspects (Drobniak, 2022). Robustness is usually interpreted as the ability to withstand disruptions without making changes, sometimes characterized as "engineering robustness" (Holling, 1996, as cited in Walker, 2020), which significantly differs from the concept of resilience understood as the ability of a system to change and adapt in response to perturbations and continue to develop. However, some researchers see only a slight difference and, as a result, equate these terms (Levin, Lubchenco 2008, as cited in Walker, 2020). In non-scientific literature, there is an approach that limits the issue of building resilience to making a given system "robust", meaning resistant to change or capable of maintaining its current state despite disruptions. Therefore, it is important to emphasize that this approach reduces the scope and practical dimension of resilience (Walker, 2020).

It is worth noting that the complexity of the modern economic reality in which enterprises operate means that traditional concepts, such as robustness, are no longer sufficient to describe the challenges businesses currently face. For this reason, the term "economic resilience of enterprises" increasingly appears in the literature, which more comprehensively reflects the multidimensional nature of contemporary economic problems and the range of challenges businesses face in order to stay in the market.

The research gap that exists in the literature concerns the interchangeable use of the terms robustness and economic resilience as synonyms. One of the identified reasons for this is the lexical problems related to the word "resilience". However, it should be reiterated that robustness is one element of resilience, but not its only component.

## 6. The significance of economic resilience and robustness in the face of crises

Resilience is a concept that has gained particular significance in the context of groundbreaking historical events affecting the world, countries, cities, regions, sectors, and enterprises. It is seen as a means of counteracting the negative effects of unexpected and rapid changes, which can lead to the closure of businesses, unemployment, loss of housing, a decrease in GDP, or inflation as a result of natural disasters or improper human activities. In the socio-economic sphere, the concept of resilience encourages reflection among many groups (scientists, economic practitioners, policymakers, local communities) about the reasons why certain countries, cities, regions, or business entities are able to cope with disruptions, turbulence, and crises more effectively than others. This raises another research question: how, for example, can a business be prepared to minimize the negative effects of crises? (Drobniak, 2022).

Crises are economic phenomena that cannot be completely excluded, but their undesirable effects can be reduced. The causes of crises are multidimensional, and their predictability is somewhat limited, which raises the question of how to model economic processes to achieve the highest possible robustness against the effects of crises, or more specifically – how to reduce the losses resulting from a crisis. The recent global economic crisis caused by the COVID-19 pandemic is one example that confirms the unpredictability of crises. Therefore, the literature suggests that the European Union funds allocated for the so-called recovery should focus on transforming the model of the European economy, as well as individual national economies, in terms of building robustness to crises or pandemics. Sectors in which robustness is of particular importance include the medical and pharmaceutical industries, the energy sector, agriculture, the food industry, as well as telecommunications and transportation (Krysiak, 2020). In the context of business activities, it is worth citing the results of an Accenture report analyzing the issue of enterprise robustness (Accenture, 2019, as cited in Soliwoda, p. 40):

- a robust enterprise has the ability to restore key business services after significant, unforeseen disruptions, thus protecting internal and external stakeholders,
- operational robustness of an enterprise is a multidimensional category concerning: management, strategy, business services, data and information protection, change management, process initiation, and recovery after failure,
- providing business services should also be a feature of robustness,
- a key role in shaping operational robustness is played by the human capital of the enterprise (an organizational culture that supports employee engagement in the company's operations),



- managing key risks, including their analysis, minimization, and control, should be a standard part of actions strengthening robustness,
- restructuring activities must be planned and identified in advance, and their implementation should result in building stronger foundations of robustness.

Extreme cases of enterprises affected by the crisis, such as international pioneers (e.g., Nokia or Kodak) and, on the other hand, the exceptional achievements of popular corporations (e.g., Google, Twitter, Facebook), point to the need to identify the characteristics that will determine the vulnerability of businesses to a crisis and its possible consequences, such as insolvency or bankruptcy. Analyzing the characteristics of companies that demonstrate a high level of robustness in crisis situations and difficulties, as well as those that have achieved success, can be helpful (Sochoń, 2017).

It is worth noting that the COVID-19 crisis impacted all businesses, regardless of industry, size, or location. However, scientific research shows that the effects varied depending on factors such as the size of the business or the industry. The manufacturing sector was the hardest hit by the crisis. Meanwhile, industries related to construction, information transfer, IT services, software, healthcare, and social work saw positive effects from the crisis. Additionally, private companies were more negatively impacted by the crisis than public and foreign companies. Regarding company size, small businesses felt the effects of the crisis more than large enterprises (Gu et al., 2020, as cited in Ajili, Slimene, 2021, p. 4).

HSBC (2020, as cited in Ajili, Slimene, 2021, p. 4) identified five key actions used by resilient businesses during the COVID-19 pandemic:

- prioritizing customer needs,
- maintaining good relationships with employees and ensuring their well-being,
- quickly adapting to changes in the environment,
- maintaining an appropriate balance sheet and stable cash flows,
- operating with sustainability principles in mind.

Business management is faced with the challenge of addressing difficulties arising from the immense scale of disruptions, turbulence, and unpredictability of the modern economic environment (PwC, 2023). The years 2020-2022 were a test of the robustness of entities conducting business activities. In March 2020, the World Health Organization declared the COVID-19 pandemic. After overcoming the difficulties caused by the coronavirus pandemic and related health, economic, social, political, educational, and migration crises, businesses began operating in a new reality of threats linked to Russia's invasion of Ukraine, which began in February 2022 (Dębowska, Kłosiewicz-Górecka, Szymańska, Zybertowicz, 2022). Companies must also contend with increased levels of internal complexity and diverse challenges, which amplify the frequency and scale of disruptions. This unrelenting cycle of changes and disruptions is a hallmark of the contemporary global economic environment. By functioning in a reality of permanent crisis, companies undergo significant organizational transformations to adapt to their surroundings, overcome new challenges, and ultimately

emerge stronger from crisis situations, continuing their long-term development. In this context, resilience has become one of the most important strategic goals in the business world (PwC, 2023).

Consequently, the task for all businesses and their internal and external stakeholders is to acquire the ability to function effectively in an economic environment where crises are a constant element. This ability requires acquiring and developing traits that enable maximum efficiency under certain conditions, maintaining a stable market position, and ensuring long-term growth. In the literature, this ability is defined as resilience, which is the key skill of effectively responding to significant changes that disrupt the execution of a planned strategy, while avoiding prolonged crisis situations (Banaszyk, 2021).

When analyzing the significance of economic resilience and robustness in the face of crises, it is also important to refer to their definitions. One definition of economic robustness suggests that it is "the capacity to withstand or recover from shocks while maintaining core performances and functionalities" (Volkov et al., 2021, p. 6). In this sense, the characteristic of business robustness in the context of a crisis is the ability to maintain system stability or recover equilibrium, despite the negative effects of the crisis. On the other hand, one definition of business resilience suggests that it is "the capacity of an enterprise to survive, adapt, and grow in the face of turbulent change" (Moore, Manring, 2009). This definition emphasizes a broader understanding of resilience compared to robustness in the face of a crisis, highlighting not only survival but also the ability to adapt and grow despite the emergence of sudden changes, such as a crisis.

## **7. Research methodology of resilience and robustness**

Economic resilience is a complex phenomenon that generates feedback loops, complicating its direct measurement. However, it seems that this phenomenon can be measured using two indicators:

- risk, which reflects the type and level of threat to the functioning of economic entities,
- positive adaptation, related to specific actions by economic entities that demonstrate effective overcoming of difficulties (Luthar, Zelazo, 2003, pp. 510-549, as cited in Majchrzak, 2020, p. 36).

The ability to measure economic resilience using the aforementioned indicators is largely determined by the predictability and types of threats encountered (Majchrzak, 2020). In the analysis of the resilience concept, a significant methodological gap is highlighted, which exists in the scientific literature on this phenomenon. This gap arises from the fact that there are few scientific publications on this topic. Existing research frequently points to the use of the case study method, particularly in the context of ecological systems (Piórkowska, 2015).

In the literature on the research methodology concerning the resilience concept – in addition to the case study method – other approaches include theory building, surveys, theoretical models (Bhamra, Dani, Burnard, 2011), and indicator analysis (e.g., risk indicators).

M. Romanowska points out that "in the literature, we do not find methods that allow us to measure the robustness of a company against a crisis. Researchers typically limit themselves to identifying the characteristics that an organization robust to a crisis should have (management), or they propose the use of one of the indicators measuring economic condition or the threat of bankruptcy (economics)" (Romanowska, 2012, p. 8). Therefore, in measuring the robustness of a company – just as in the case of economic resilience – it is possible to base the measurement on indicator analysis. By combining these two approaches, one of the possibilities for measuring economic resilience and business robustness may be the application of an appropriate methodology, depending on the definitional characteristics of these concepts. However, it is important to emphasize that this methodology has certain limitations related to the lack of universality, meaning that the method of measurement is shaped by the adopted definitions of resilience and robustness. Thus, the basis for analysis will be the definitional characteristics of these two concepts. An example of research methodology depending on the definitional characteristics of resilience and robustness is presented in Table 4 and Table 5, respectively.

**Table 4.**

*Example of research methodology depending on the definitional characteristics of resilience*

|   |   |   |
|---|---|---|
| Definicja rezyliencji ekonomicznej                  | "Resilience is the fundamental ability to efficiently respond to significant changes that disrupt the achievement of established plans without falling into prolonged periods of crisis. Resilience should encompass three main components: productivity, security, and agility. Productivity refers to the relationship between the volume of sold production and the amount of resources used to produce it. Security, on the other hand, relates to sanitary protection and stable working conditions. Finally, agility is the flexibility to adapt to changing demand requirements" (own translation) (Banaszyk, 2022, p. 34) |   |
| Definitional characteristics of economic resilience | Quantitative methods, indicator analysis (examples of indicators)   | Other methods   |
| Productivity  | <ul style="list-style-type: none"> <li>• production per employee indicator,</li> <li>• production per unit of capital indicator,</li> <li>• production per unit of time indicator,</li> <li>• production per unit of material indicator,</li> <li>• labor cost productivity indicator,</li> <li>• asset productivity indicator</li> </ul>   | <ul style="list-style-type: none"> <li>• comparative analysis,</li> <li>• case study,</li> <li>• surveys and qualitative interviews,</li> <li>• document and statistical data analysis,</li> <li>• risk assessment</li> </ul> |
| Security  | <ul style="list-style-type: none"> <li>• number of reported accidents/incidents,</li> <li>• number of machine breakdowns,</li> <li>• employee turnover rate</li> </ul>  |   |
| Agility (flexibility)                               | <ul style="list-style-type: none"> <li>• time to market for a new product/service,</li> <li>• ability to adapt to changes (e.g., number of changes implemented)</li> </ul>  |   |

Source: own elaboration.

**Table 5.**

*Example of research methodology depending on the definitional characteristics of enterprise robustness*

|   |   |   |
|---|---|---|
| Definition of enterprise robustness                   | "Maintaining key elements of the system and their values—such as the number of employees, production volume, diversity of service offerings, and wage levels—at a constant level regardless of the nature and scale of shocks, turbulence, or disasters that have affected a given country, city, or enterprise" (own translation) (Drobniak, 2022) |   |
| Definitional characteristics of enterprise robustness | Quantitative methods, indicator analysis (examples of indicators)   | Other methods   |
| Maintaining key elements of the system                | <ul style="list-style-type: none"> <li>• employee turnover rate,</li> <li>• staff fluctuation rate,</li> <li>• production volume,</li> <li>• average salary level,</li> <li>• percentage share of different types of products/services (all indicators analyzed based on the previous period)</li> </ul>  | <ul style="list-style-type: none"> <li>• comparative analysis,</li> <li>• case study,</li> <li>• surveys and qualitative interviews,</li> <li>• document and statistical data analysis,</li> <li>• risk assessment</li> </ul> |
| Stability of key indicator levels                     | <ul style="list-style-type: none"> <li>• current liquidity ratio,</li> <li>• debt ratio,</li> <li>• market share,</li> <li>• revenue stability ratio,</li> <li>• operating margin,</li> <li>• cash flow ratio (all indicators analyzed based on the previous period)</li> </ul>   |   |

Source: own elaboration.

In the earlier part of the study, potential reasons for the interchangeable use of the terms "resilience" and "robustness" were discussed. It is possible to identify another cause, namely: in some studies, the methods used to measure these two phenomena are similar, which could potentially lead to the incorrect treatment of them as synonyms. In Table 4 and Table 5, an example of research methodology is presented based on the definitional characteristics of resilience and robustness. Among other methods, indicator analysis was used – consistent with one of the research methods for resilience and robustness proposed in the literature. In these tables, it can be observed that similar research methods can be applied to both concepts. This relationship is not universal, as it is determined by the nature and characteristics of the studied definition. However, it is worth noting that another potential reason for equating the terms resilience and robustness could be the use of the same measurement methods. This hypothesis could serve as a starting point for further research into the causes of the conflation of these terms.

## 8. Conclusion

Resilience is one of the most popular research topics that has been analyzed in relation to the COVID-19 pandemic. The crisis resulting from the coronavirus pandemic likely disrupted the structures and processes related to global governance (Levy, 2021, as cited in Ajili, Slimene, 2021). Moreover, this crisis compelled management and economics researchers to seek new theories and research methodologies. During the pandemic, the organizational culture of enterprises shifted from exploration and creativity toward safety and resilience (Bansal et al., 2021, as cited in Ajili, Slimene, 2021). The literature suggests that the logic of economic efficiency and productivity at both the microeconomic and macroeconomic levels, which dominates organizations and their specific cases – enterprises and societies – should be transformed towards approaches based on the concept of resilience. As a result, this could serve as a form of antidote to the challenges posed by the increasingly unstable and unpredictable socio-economic environment of contemporary enterprises (Ajili, Slimene, 2021).

The aim of the article was achieved through the analysis of scientific literature, economic reports, research findings, and personal observations of the economic reality. The article examines the origins and essence of economic resilience and enterprise robustness, as well as the interdisciplinary nature of these concepts, while highlighting the differences between them and their causes. Attention was drawn to the fact that these differences stem from lexical issues related to the term resilience and the use of similar research methodologies, which may lead to the misidentification of these concepts. It was emphasized that robustness is one of the elements of resilience. Robustness focuses on returning to the pre-crisis state, whereas resilience emphasizes the ability to adapt and grow despite disruptions.

The analysis organized the knowledge about both concepts and indicated ways to distinguish robustness from resilience in enterprises. A sample research methodology for resilience and robustness, based on their definitional characteristics, was also presented. These findings can serve as a foundation for future research on strengthening robustness and resilience in enterprises.

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