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# *The Measuring Organisational Resilience of Companies Listed on the Warsaw Stock Exchange. Empirical Consideration*

**Keywords:** organisational resilience; measurement methods; risk management

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**Abstract**

**Theoretical background:** The literature review seeks that dynamic changes in the environment demand the implementation of resilience management, assessment, and measurement methods. This creates several management challenges. The ongoing debate over the most precise definition of organisational resilience (OR), coupled with the absence of a universally accepted standard for measuring and assessing OR, undoubtedly hinders its effective adoption and application within organisations. The present research addresses the need to juxtapose the existing body of knowledge with the realities of business practice and to assess decision-makers' awareness of the importance of OR measurement.
**Purpose of the article:** The purpose of this paper is to identify the key factors that differentiate companies listed on the Warsaw Stock Exchange in terms of the scale initiatives of OR measurement. The central focus is to determine whether factors such as company size, sector affiliation, stock exchange index membership, or access to financial resources influence managers' awareness of the role of OR measurement, which is consequently reflected, *inter alia*, in the regularity of measurement initiatives undertaken within companies.
**Research methods:** Based on the analysis and synthesis of the relevant literature, a survey was conducted to compare theoretical findings with the realities of economic practice. The research was based on the

surveying technique CAWI. The questionnaire survey was conducted in the first half of 2024 targeting managers of companies listed in the Warsaw Stock Exchange. A five-point Likert scale was used in the questionnaire to assess attitudes and initiatives related to the measurement and evaluation of companies' OR. **Main findings:** The theoretical concept of OR measurement was compared to the actual management practices. The findings indicate that, although managers recognise the importance of OR measurement, this awareness does not always translate into the implementation of specific corrective measures or concrete actions, particularly at the operational level. The employment size criterion used to assess the systematicity and significance of OR measurement initiatives did not confirm the expected relationship that company size differentiates decision-makers' awareness of the importance of such measures. Consequently, these considerations are significant from both theoretical and practical perspectives.

## Introduction

The literature review and analysis of current trends underscore the multifaceted challenges faced by management in contemporary organisations (digital transformation, economic crisis, climate emergency). Consequently, the role of management concepts and methods is becoming increasingly significant, as they facilitate daily operations, provide frameworks for addressing threats, enable a swift response to emerging uncertainties, and enhance the management of inherent and continuously evolving risks (Matos et al., 2022). At the same time, the growing multiplicity and complexity of crisis-like events reinforce decision-makers' expectations that scientific research will generate useful knowledge, providing established regularities and theories that explain specific domains of reality (see Sudoł, 2012). This provides a foundation for extensive research on organisational resilience (OR). At the same time, it becomes increasingly relevant to compare the widely discussed issue of OR measurement in the literature with its practical application in management. Despite growing interest in OR and valuable research in the field (Hillmann & Guenther 2021; Williams et al., 2017). There remains limited understanding of whether, and to what extent, organisational factors such as company size or financial constraints influence the scope and implementation of OR assessment and measurement in practice. Clear research gap persists regarding practical guidelines and empirical studies on the implementation of OR in real-world settings. The ongoing debate over the most precise definition of resilience (Podsakoff et al., 2016), coupled with the absence of a universally accepted standard for measuring and assessing OR, undoubtedly hinders its effective adoption and application within organisations. Furthermore, researchers themselves emphasise that a comprehensive assessment of OR is only possible during a watershed moment or retrospectively (Linnenluecke, 2017), once the full impact of a crisis has unfolded.

Based on the reviewed literature, the further dissemination of OR measurement methods depends on managers' awareness of its role within their organisation and its contribution to achieving business objectives. Simultaneously, the varying scale of disruptions that threaten organisational continuity influences both the theoretical development of the concept and the practical implementation of resilience solutions. Undoubtedly, the pandemic experience increased researchers' interest in the topic of

OR (Khan et al., 2024; Nielsen et al., 2023; Pradana & Ekowati, 2024; Rydzewski, 2024; Smuda-Kocoń, 2024).

The starting point of this analysis is the question: To what extent does the specificity of an organisation's functioning (its characteristics, e.g. company size) determine the choice of adopted solutions for OR measurement?

The purpose of this paper is to identify the key factors that differentiate companies listed on the Warsaw Stock Exchange (The Warsaw Stock Exchange Group, 2024) in terms of the scale of OR measurement and assessment. The central focus is to determine whether factors such as company size, sector affiliation, stock exchange index membership, or access to financial resources influence managers' awareness of the role of OR measurement, which is consequently reflected, *inter alia*, in the regularity of measurement initiatives undertaken within companies. The research problem is to identify crucial determinants conductive to the implementation of OR measurement. In the application dimension, the development of this concept can contribute to enhancing the ability of organisations to cope with changing environment.

Achieving the article's objective required both theoretical and cognitive research, based on a review of the literature, as well as empirical research. The insights presented contribute to the ongoing discourse among practitioners and theorists on the significance and validity of OR measurement. This remains a complex issue, as the solutions developed must balance methodological rigour (Czakon, 2014) with practical applicability, as well as ensure they are both academically sound and valuable in the decision-making process.

The paper consists of the following sections: literature review, research method assumptions, research results, discussion and conclusions.

## Literature review

The primary driver of the growing interest in the OR concept is the uncertainty faced by organisations, the volatility of customer preferences, and the need to respond to challenges arising from unforeseen environmental changes and unconventional competitive behaviour (Linnenluecke, 2017).

The foundations of the OR concept lie primarily in the field of strategic management. OR is broadly understood as an organisation's ability to cope with adversity (Weick, 1993). It can be conceptualised as a capability, a process, organisational and employee behaviour, a strategy, or a specific type of performance (Hillmann & Guenther, 2021).

As outlined in Table 1, the key characteristics that define OR are: (1) an organisation's preventive approach and its capacity to consciously manage undesirable yet unavoidable events, (2) the ability to withstand and adapt to disruptions in the business environment while restoring equilibrium, and (3) the capability to learn from experiences, minimise potential losses, and implement corrective actions effectively.

A review of the relevant literature and numerous empirical studies suggest that the OR concept has been adapted to the specificities of households (McKnight & Rucci, 2020), non-profit organisations (Searing et al., 2021), small and medium-sized enterprises (Zighan et al., 2022), family businesses (Conz et al., 2020; Ingram, 2023), banks (Gehrig et al., 2023) or business organisations (Dziadkiewicz & Jakubowski, 2022; Grego et al., 2024).

**Table 1.** Selected definitions of OR

| Author | Definition |
|---|---|
| (Alsaidi et al., 2024) | The ability of an organization to adapt and recover quickly in the face of disruptions and changes, thus ensuring operational continuity and long-term sustainability. |
| (Khan et al., 2024) | The ability to absorb stresses and sustain or enhance performance despite adversity. |
| (Pradana & Ekowati, 2024) | The anticipation capability, coping capability, adaptation capability, absorptive capability, confronting capability, sustainability capability. |
| (Sevilla et al., 2023) | The organisational resilience is a rather a dynamic process and therefore it cannot be measured or estimated in an ex-ante way. |
| (Su & Junge, 2023) | The ability to cope with and recover from sudden disruptions by adjusting and preserving (or improving) the firm's functions. |
| (Sajko et al., 2021) | The ability to anticipate, avoid, and adjust to shocks occurred from a crisis or a disruption. |
| (Conz & Magnani, 2020) | Characterized by two equally effective dynamic paths: the absorptive and the adaptive paths. |
| (Duchek, 2020) | A meta-capability consisting of a set of organizational capabilities that allow for a successful accomplishment of three resilience stages (anticipation, coping, and adaptation). |
| (Filimonau et al., 2020) | This capability may manifest itself in the ability to implement appropriate algorithms or predictive mechanisms for recovery. |
| (Papagiannidis et al., 2020) | Multifaceted concept that reflects businesses' ability to foresee, confront, and benefit from sudden disruptive change to survive, grow, and flourish. |
| (Denyer, 2017) | The ability to anticipate, prepare for, respond and adapt to incremental change and sudden disruptions in order to survive and prosper. |

Source: Author's own study based on the literature.

Given these considerations, the concept of corporate resilience (Roundy et al., 2017) warrants particular attention. Like OR, corporate resilience is a latent variable that cannot be directly observed, and no standardised methods for its measurement and assessment have been established. Existing measurement approaches typically consider an organisation's specific characteristics, performance, or recovery potential (e.g. speed of recovery). It has been suggested that corporate resilience / organisational resilience can be evaluated through indicators such as financial volatility, growth, and employment (Markman & Venzin, 2014; Ortiz-de-Mandojana & Bansal, 2016) or by analysing a firm's response to environmental shocks, such as the recovery of stock prices (Gittell et al., 2006; Sajko et al., 2021). Interestingly, researchers increasingly emphasise the importance of non-financial indicators and broader aspects of corporate performance in assessing resilience. Ding and team (2021) indicate that companies with stronger CSR policies and activities in place before the COVID-19 pandemic

demonstrated greater resilience. Levine and team (2018) focusing on banking crises, conclude that social trust can enhance corporate resilience. Moreover, it is widely recognised that sustainability provides relatively comprehensive conditions for ensuring OR (Rai et al., 2021). Crisis management, business continuity management, and OR are interrelated and complementary (Williams et al., 2017).

An analysis of the global body of work indicates that the COVID-19 experience, in particular, has heightened researchers' interest in OR and the reported need for measurement tools. However, the contextual nature of conceptual assumptions, the retrospective approach, and the subjectivity of the developed solutions continue to limit their practical applicability (Smuda-Kocoń, 2024; Williams et al., 2017).

A well-executed measurement should, on the one hand, facilitate the effective implementation of strategy and, on the other, provide meaningful support for decision-making at the operational level (Williams et al., 2017). Improved operational flexibility increases OR (Koh et al., 2023). Accordingly, resilience can be viewed from a strategic perspective, which focuses on long-term planning (over five years), or an operational perspective, which pertains to specific activities and actions within a timeframe of up to one year. The importance of the strategic management of OR has been written about by de Moura and Tomei (2021) among others. Thus, the OR activities should prioritise operational sustainability, minimising undesirable deviations through continuous positive adjustments (cf. Mehta et al., 2024). At the same time, OR represents an organisation's strategic capacity to anticipate turbulence and unforeseen events, while being linked to operationally focused actions that address both internal and external adversities (Shepherd & Williams, 2023). In the context of these theoretical considerations, the empirical part of the article examines how managers of listed companies perceive the strategic and operational potential of the OR concept. The subsequent analysis focuses on identifying the main constraints that hinder the implementation of OR measurement initiatives. Given that smaller companies face greater financial constraints, it would be expected that the scale of OR measurement activities would be relatively limited in such organisations. Securing financial resources for this purpose, along with obtaining approval from decision-makers, may present significant challenges. However, financial constraints are not the only limitation. Implementing the OR concept within an organisation requires competent employees, capable managers, and an organisational culture that embraces change. However, as Stephenson (2010), rightly argues, decision-makers primarily require an economic justification for the costs associated with building and measuring OR.

The issue of measuring OR has been the focus of numerous stock-taking studies in recent years. Efforts have been made to adapt tools such as the Benchmark Resilience Tool (Stephenson, 2010) to the operational contexts of family enterprises and public administration units. Notably, intensified research and implementation efforts in this area tend to arise in response to periods of destabilisation, such as pandemics, economic crises, or warfare, which occur at specific intervals.

**Research methods**

Based on the analysis and synthesis of the relevant literature, a survey was conducted to compare theoretical findings with the realities of economic practice. The survey was carried out as part of the broader research project "Organisational Resilience in a Sustainable Development Perspective" (Samborski, 2024) at the University of Economics (Department of Management) between 2023 and 2024.

The research tool used is a survey questionnaire (Department of Management, 2024), which enables the collection of opinions from company executives, primarily middle and senior management, while ensuring the anonymity of the respondents. The questionnaire, developed based on relevant literature and refined through discussions within the research team, consists of 15 closed-ended questions and five demographic questions. These metric questions address company size, primary business sector, and stock index membership, including WIG-20 and WIG-ESG. In the questionnaire's introduction, key concepts, including OR, were clarified to mitigate the risk of the so-called false assumption of familiarity (Mider, 2021). The questionnaire is structured into three sections. The first section focuses on the contexts of OR. The second addresses the role of resources in building OR. The final section explores the challenges associated with measuring OR.

The main survey was preceded by a conventional pilot study, during which feedback was gathered on the design of the questionnaire. The pilot study revealed that some questions were unclear due to the use of terminology specific to management and quality sciences. As a result, these questions had to be reformulated to better align with the respondents' level of understanding. All suggestions were carefully analysed and incorporated, resulting in the final version of the survey. The finalised tool was employed in the baseline survey, conducted in H1 2024 using the CAWI technique. This method allows for the efficient collection of responses from a large group of participants while operating within financial and organisational constraints. Given the wide range of participating entities and the potential for extended response times, Computer-Assisted Telephone Interviewing was also used as a supplementary method. The survey was commissioned to the Department of Research, Expertise, and Consulting (2024). The study population comprised 410 companies listed on the main market of the WSE. The questionnaire was distributed to all companies within this population (saturation survey). The overall response rate was 51.22% ($N$ = 210 complete responses). The respondents' background information and the characteristics of respondents are presented in Table 2.

According to respondents' declarations, the surveyed companies were predominantly large, accounting for 60% of the research sample. Medium-sized companies made up 34.8%, while the remaining group comprised small companies. For the analysis, company size was assessed based on the number of employees. The differentiation in company size among the surveyed firms was intended to identify potential variations in management practices related to OR measurement. On the one hand, it

can be expected that limited financial resources, particularly in smaller companies, may act as a barrier to the implementation of OR measurement initiatives. On the other hand, the complex organisational structures of larger companies, along with their potentially lower flexibility and responsiveness to dynamic environmental changes, may also contribute to a more limited implementation of OR measurement tools.

**Table 2.** Characteristics of respondents ($N = 210$)

| Items and category | Frequency | Percentage |
|---|---|---|
| Company size (employees) | | |
| • small | 11 | 5.2 |
| • medium | 73 | 34.8 |
| • large | 126 | 60.0 |
| Crisis management role | | |
| • direct participation | 110 | 52 |
| • indirect participation | 100 | 48 |
| Leading sector (WSE classification) | | |
| • finance | 12 | 5.7 |
| • fuel and energy | 13 | 6.2 |
| • chemistry and raw materials | 6 | 2.9 |
| • industrial production and construction | 44 | 21.0 |
| • consumer goods | 7 | 3.3 |
| • trade and services | 38 | 18.1 |
| • health care | 12 | 5.7 |
| • technology | 68 | 32.4 |
| • unclassified | 10 | 4.8 |
| WIG-ESG index | | |
| • yes | 53 | 25.2 |
| • no | 153 | 74.8 |

Source: Author's own study.

The majority of respondents (52%) were executives directly involved in their company's crisis management. The largest share of participants came from the technology, manufacturing, and trade and services sectors.

A five-point Likert scale (Table 3) was used in the questionnaire to assess attitudes and initiatives related to the measurement and evaluation of companies' OR. This scale captures respondents' opinions and perspectives through closed-ended questions designed to elicit structured responses (Dyduch, 2015).

**Table 3.** Likert rating scale used in the survey questionnaire

| | | | |
|---|---|---|---|
| Rating scale | 1 | *strongly disagree* | Completely disagree with the statement; this represents a firm and categorical position. |
| | 2 | *rather disagree* | Disagree with most aspects of the statement. |
| | 3 | *neutral / difficult to say* | No clear opinion; the statement may be true in some circumstances but not in others. |
| | 4 | *rather agree* | Agreement with most aspects of the statement. |
| | 5 | *strongly agree* | Complete agreement with the statement. |

Source: Author's own study.

Respondents were asked to indicate the extent to which they agreed with statements regarding the resilience of their organisation. After verifying the completeness of the questionnaires, the collected statistical data was analysed using IBM SPSS Statistics and Microsoft Excel.

As an initial step, the reliability of the survey instrument was assessed. The Cronbach's (1951) alpha coefficient was 0.85863, indicating a high level of internal consistency in responses within this section of the questionnaire (Section 3).

The questions addressed the systematic nature of OR measurement (SN), the strategic potential for measurement (SPM), the operational potential for measurement (OPM), and the financial constraints inhibiting OR measurement initiatives (FX).

In section 3 of the survey, respondents were asked to evaluate the following statements:

Q1: In our organisation, we systematically measure OR, using a variety of analytical tools to assess the impact of external disruptions (e.g. market changes or economic crises) and internal disruptions (e.g. organisational changes or technological problems).

Q2: A significant constraint inhibiting OR measurement initiatives in our company is the lack of funding for this purpose or the higher priority of other projects.

Q3: Measures for OR assessment are integrated into our risk management strategy and are key to sustainable development.

Q4: Measuring OR in our organisation is important for ongoing operational activities and provides the rationale for specific corrective actions.

In the subsequent step, the survey results were statistically processed. The analysis began with an examination of response frequencies, followed by the presentation of descriptive statistics and an assessment of the normality of each surveyed variable's distribution. This was followed by an analysis of variable relationships and the verification of the formulated hypotheses:

H1: Companies listed on the main market of the WSE systematically measure OR using a variety of analytical tools.

H2: Ratings of SN (the systematic nature of OR measurement), SPM (the strategic potential for measurement), OPM (the operational potential for measurement), and FX (the financial constraints inhibiting OR measurement initiatives) variables depend on company size.

H3: Ratings of SN, SPM, OPM and FX variables depend on WIG-ESG index affiliation.

To verify hypothesis H2, the Kruskal–Wallis test, a non-parametric alternative to one-way analysis of variance (ANOVA), was used. This approach was chosen because the assumptions of classical ANOVA were not met – specifically, the distributions of the variables did not follow a normal distribution, and the subgroup sizes were unequal.

To verify hypothesis H3, the Mann–Whitney *U*-test was used, as it is a non-parametric alternative to the Student's *t*-test for two independent samples (Bedyńska & Cypryańska, 2013; Malska, 2017).

The authors (Leoni, 2024; Liu et al., 2024; Mita et al., 2024; Wang et al., 2024; Wu et al., 2024; Xu et al., 2024) indicate that organisations adhering to ESG principles are less vulnerable to risk and tend to exhibit greater resilience. Consequently, the study analysed the systematicity of OR measurement in companies included in the WIG-ESG index. The survey results provided insights into how these organisations perceive the role of OR measurement. Given the potential of these large companies, their ability to develop and measure OR might be expected to be particularly pronounced.

However, it should be noted that the WIG-ESG index published from September 2019 to June 2024 and included stocks participating in WIG20 and mWIG40 (The Warsaw Stock Exchange Group, 2024). As a result, the largest entities were automatically included, regardless of whether or to what extent they adhered to ESG guidelines. This is despite the WSE (2024) authorities initially introducing the index in response to the growing importance of responsible investment among managers and investors.

## Results

Analysis of the collected empirical data enabled the verification of the research hypotheses. The findings indicate that, although managers recognise the importance of OR measurement, this awareness does not always translate into the implementation of specific corrective measures or concrete actions, particularly at the operational level. The distribution of responses to question Q1, concerning the systematic measurement of OR, is presented in Table 4.

**Table 4.** The systematic measurement of OR – the distribution of responses ($N = 210$) (in %)

| Company size | In our organisation, we systematically measure resilience, using a variety of analytical tools to assess the impact of external disruptions (e.g. market changes or economic crises) and internal disruptions (e.g. organisational changes or technological problems) | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Small | 9.1 | 18.2 | 9.1 | 54.5 | 9.1 |
| Medium | 0.0 | 5.5 | 23.3 | 54.8 | 16.4 |
| Large | 0.8 | 7.9 | 28.6 | 41.3 | 21.4 |
| Total | 1.0 | 7.6 | 25.7 | 46.7 | 19.0 |

Source: Author's own study.

Interestingly, 65.7% of respondents stated that OR is systematically measured using a variety of analytical tools. Meanwhile, 25.7% were uncertain, selecting *difficult to say.* In contrast, 8.6% disagreed with the statement that resilience is systematically measured in their company.

To identify differences in the systematic measurement of OR, responses were analysed based on companies from different sectors according to the WSE classification. This provided additional insights, with the technology and finance sectors

showing the highest percentage of respondents who agreed that OR is systematically measured within their company. However, an analysis considering both company size and sector affiliation revealed no significant differences between the surveyed entities.

Next, respondents evaluated the importance of financial resources in implementing OR measurement initiatives. Regardless of the benchmark used – whether company size (Table 5) or WIG-ESG index membership (Table 6) – more than 50% of respondents agreed that a key inhibiting factor for OR measurement initiatives was the lack of financial resources or the higher priority of other projects.

**Table 5.** The lack of financial resources – key inhibiting factor for OR measurement – the distribution of responses – company size ($N = 210$) (in %)

| Company size | A significant constraint inhibiting organisational resilience measurement initiatives in our company is the lack of funding for this purpose or the higher priority of other projects | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Small | 9.1 | 18.2 | 27.3 | 27.3 | 18.2 |
| Medium | 6.8 | 23.3 | 19.2 | 35.6 | 15.1 |
| Large | 10.3 | 19.8 | 15.9 | 36.5 | 17.5 |
| Total | 9.0 | 21.0 | 17.6 | 35.7 | 16.7 |

Source: Author's own study.

**Table 6.** The lack of financial resources – key inhibiting factor for OR measurement – the distribution of responses – WIG-ESG ($N = 210$) (in %)

| WIG-ESG | A significant constraint inhibiting organisational resilience measurement initiatives in our company is the lack of funding for this purpose or the higher priority of other projects | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Yes | 7.5 | 24.5 | 15.1 | 35.8 | 17.0 |
| No | 9.6 | 19.7 | 18.5 | 35.7 | 16.6 |
| Total | 9.0 | 21.0 | 17.6 | 35.7 | 16.7 |

Source: Author's own study.

Other priorities and limited financial resources were identified as important factors influencing OR measurement initiatives among representatives of both WIG-ESG and non-WIG-ESG companies. The existence of these constraints was particularly highlighted by respondents from the chemicals and raw materials, industrial production, and consumer goods sectors.

The distribution of responses to the question on factors inhibiting OR measurement initiatives suggests that respondents across different company groups shared a similar perspective, regardless of sector or company size. This indicates that the availability of financial resources plays a crucial role in both building OR and implementing OR measurement initiatives.

The averaged results of the analyses (Figure 1) indicate that respondents primarily associate OR measurement initiatives with the strategic dimension of business. This contrasts with the position of many authors in the literature, who argue that OR measurement should integrate both operational and strategic perspectives (Duchek, 2020).

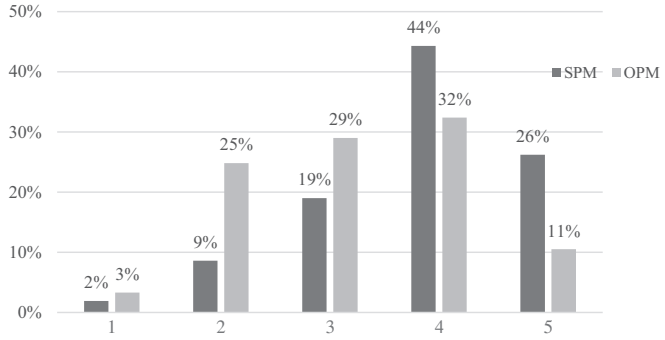


**Figure 1.** Empirical distribution regarding SPM – the strategic potential for measurement and OPM – the operational potential for measurement

Source: Author's own study.

Respondents confirm that OR measurement activities are largely integrated into strategy, with 70% indicating this, while to a lesser extent, 43% state that it serves as a basis for specific ongoing corrective actions. Just over 28% of respondents disagree with the statement that OR measurement is relevant to ongoing operational activities.

Based on the calculated measures of variability, the SPM variable exhibits the greatest dispersion around the mean. This lack of consensus among respondents is reflected in the dispersion coefficient (standard deviation = 1.23). In contrast, less variation was observed for the SN and OPM variables.

In the next step, the Shapiro–Wilk and Kolmogorov–Smirnov tests were applied. The Shapiro–Wilk test assesses the normality of a random variable's distribution by testing the null hypothesis that the sample comes from a normally distributed population. If the test result reaches statistical significance ($p < 0.05$), it indicates that the distribution deviates from normality (Bedyńska & Cypryańska, 2013).

The results of the Shapiro–Wilk test confirmed the rejection of the null hypothesis, indicating that the data do not follow a normal distribution. This finding influenced the decision to use non-parametric tests in subsequent stages of the analysis. The test results are presented in Table 7. While the Shapiro–Wilk test is particularly suitable for smaller samples ($N < 100$) (Bedyńska & Cypryańska, 2013), it is also applied to larger samples ($N < 2000$), where it has been shown to have greater statistical power than the Kolmogorov–Smirnov test (Razali & Yap, 2011).

**Table 7.** Selected descriptive statistics and results of analysis

| Variable | *N* | Dominant | Standard deviation | Kolmogorov–Smirnov | | | Shapiro–Wilk | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Statistics | *df* | *p* | Statistics | *df* | *p* |
| SN | 210 | 4.00 | 0.883 | .268 | 210 | <.001 | .869 | 210 | <.001 |
| FX | 210 | 3.00 | 1.040 | .239 | 210 | <.001 | .892 | 210 | <.001 |
| SPM | 210 | 4.00 | 1.230 | .269 | 210 | <.001 | .858 | 210 | <.001 |
| OPM | 210 | 4.00 | 0.973 | .202 | 210 | <.001 | .903 | 210 | <.001 |

Source: Author's own study.

The Kolmogorov–Smirnov test is also used to assess the normality of a random variable's distribution for a single sample. The results of this test are presented in Table 7; however, since the sample size does not exceed 2,000, the results of the Shapiro–Wilk test (Razali & Yap, 2011) are considered definitive. For each variable, the test was conducted at a significance level of $\alpha = 0.05$.

Next, the Mann–Whitney *U* test was used to verify hypothesis H2 (Table 8), which posited that continuous strengthening of OR and its systematic measurement are crucial for WIG-ESG company performance. However, the test results indicate no difference between companies indexed within and outside the WIG-ESG in their ratings of SN, FX, OPM, and SPM. In each case, the results of the Mann–Whitney *U* test indicate statistical insignificance, showing no differences between companies indexed within the WIG-ESG and those outside it. In other words, the findings indicate that the distribution of the analysed variables does not depend on a company's affiliation with the WIG-ESG index (*p*-values are greater than the adopted significance level, $\alpha = 0.05$). The distributions of the SN, OPM, SPM, and FX variables are the same across the two groups of companies.

**Table 8.** Results of the Mann–Whitney U test analysis

| Variable | *U* Mann–Whitney | Z | Asymptotic significance (bilateral) |
|---|---|---|---|
| SN | 4091.50 | -.193 | .847 |
| FX | 4157.50 | -.008 | .994 |
| SPN | 4111.50 | -.136 | .892 |
| OPM | 4056.50 | -.283 | .777 |

Source: Author's own study.

Hypothesis H4 was verified using the Kruskal–Wallis test, which compares observations against the median (Bedyńska & Cypryańska, 2013). In this case, the grouping variable was company size. As previous studies have indicated, the scale of disruptions affecting organisations can vary depending on the size of the entity. Consequently, this should also imply differences in awareness and systematic action related to OR measurement among companies of different sizes. However, at the 0.05 significance level, the test results indicate no statistically significant differences in SN, FX, SPM, and OPM assessments between companies of different sizes. In other words, the distributions of responses are the same across all groups, regardless of company size. The employment size criterion used to assess the systematicity and significance of OR measurement initiatives did not confirm the expected relationship that company size differentiates decision-makers' awareness of the importance of such measures.

**Discussion**

By synthesising the results obtained, several conclusions can be drawn. Firstly, literature studies indicate that an organisation's resilience is shaped by its development at both strategic and operational levels (Duchek, 2020). However, according to respondents, OR measurement is primarily seen as crucial for building a strategic perspective, while it is considered far less significant for ongoing operational activities.

The first part of the analysis examined the systematic OR measurement declared by respondents. The research results indicate that there are no grounds to reject hypothesis H1, which states that companies listed on the main market of the Warsaw Stock Exchange systematically measure OR using a variety of analytical tools. Nearly 67% of respondents reported engaging in systematic OR measurement practices. However, it should be noted that a significant proportion of respondents – just over 25% – did not provide a clear declaration on this matter. This may be due to the absence of a standardised method for measuring OR that can be effectively applied in business practice, as well as a lack of clear guidelines for companies. Interestingly, only 8% of respondents disagreed with the statement that systematic OR measurement takes place in their company. In conclusion, regardless of company size or WIG-ESG index membership, organisations generally declared that OR measurement is conducted systematically.

The literature review also identified the main barriers to implementing the OR concept and its measurement in business practice. A synthesis of findings on the evolution and application of OR assumptions indicates that the use of measurement tools requires investment commitments (cf. Hamid et al., 2023). The results of our research confirm that financial constraints are a key barrier to the implementation of resilience practices, as indicated by 52% of respondents. Notably, both large and small company representatives attributed the under-implementation of OR measurement activities to financial limitations or the higher priority of other projects. Thus, our findings align with previous literature on this issue.

This study has its limitations, stemming, for example, from the sample selection. A similar study conducted among companies not listed on the WSE or in different cultural or economic contexts would likely yield different results.

Furthermore, it is important to acknowledge that the results are declarative in nature. The process of drawing conclusions is further complicated by the tendency of many respondents to conflate the concept of OR with risk management, measurement, and reporting, as evidenced by the pilot study findings. While risk management is one of the foundations from which the OR concept has evolved (Ruiz-Martin et al., 2018), it does not fully encompass its scope. This issue is further compounded by the definitional ambiguity of resilience and the presence of many related concepts, such as financial control and Business Continuity Planning (Sahebjamnia et al., 2018). This may serve as a basis for future qualitative research aimed at more thoroughly assessing managers' understanding of the essence of the OR concept.

## Conclusions

The article synthesises existing knowledge and presents conclusions drawn from the conducted research, ultimately achieving the objective formulated in the introduction.

Since the simplicity of the research tool may affect inference accuracy, future qualitative research is warranted. Such research could focus on: (1) identifying the primary purpose of OR measurement initiatives within companies (e.g. identifying weaknesses, improving financial health, reducing operating costs, reinforcing positive attitudes towards change, meeting stakeholder expectations, etc.), (2) examining whether a relationship exists between OR measurement and an organisation's financial performance, and (3) exploring how decision-makers utilise OR measurement in practice. In conclusion, applying methodological triangulation can enhance the validity and reliability of the findings.

Resilient organizations (especially small and medium-sized) require planning and identifying the necessary resources. It is also important to consider that the challenge of using appropriate OR measurement tools is not confined to large corporations. Existing methodological solutions are not universally applicable, and OR is also a crucial tool in preventing the decline of SMEs. This presents further research challenges, particularly in refining the concept to better suit the needs of smaller organisations.

In spite of their limitations, the findings of this study juxtapose previous theoretical findings with the realities of business practice, providing insights into the level of awareness among decision-makers regarding the practical application of OR measurement in listed companies. These results can inform further research into OR measurement and provide a foundation for enhancing existing measurement instruments. As the literature review indicates, OR is a construct whose measurement may play a significant role in organisational control. In conclusion, a strong demand remains for tools that reduce uncertainty and support strategy implementation and operational decision-making. Therefore, decision-makers should actively advance resilience practices and work towards developing a standard in this area. An important implication for future research is the observed interdisciplinary nature of the problem, which extends beyond the boundaries of management and quality sciences.

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