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Management of Sustainable Development Goals as Indicators of Ecological Awareness: An Insight Through the 2030 Agenda

Predrag Tončev, Vladimir Tomašević, Jelena Raut * and Luka Latinović

School of Engineering Management, University "Union—Nikola Tesla", Bulevar vojvode Mišića 43, 11158 Belgrade, Serbia; predrag.toncev@fim.rs (P.T.); vladimir.tomasevic@fim.rs (V.T.); luka.latinovic@fim.rs (L.L.)
* Correspondence: jelena.raut@fim.rs; Tel.: +381-621952312

Abstract

This study investigates how enterprises in the service (tertiary) sector in Vojvodina, Serbia, integrate and prioritize Sustainable Development Goals (SDGs), with a focus on ecological sustainability, under crisis conditions. Based on a questionnaire survey and factor analysis of 150 respondents, which identified four key sustainability dimensions explained 59.75% of total variance, were identified: Education and Energy (including SDG4—Quality Education and SDG7—Affordable and Clean Energy), Health and Social Well-being (including SDG3—Good Health and Well-being and SDG2—Zero Hunger), Ecological Sustainability and Nature Protection (including SDG6—Clean Water and Sanitation and SDG14—Life Below Water), and Economy and Climate Change (including SDG8—Decent Work and Economic Growth, SDG13—Climate Action, and SDG17—Partnerships for the Goals). The findings emphasize the multidimensional and interconnected nature of these dimensions and their role in enhancing organizational resilience. By linking crisis management strategies with SDG integration, the study provides both theoretical contributions and practical insights for managers aiming to improve sustainability performance in turbulent environments.

Keywords: sustainable development goals (SDGS); ecological sustainability; crisis management; organizational resilience; water resource management

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1. Introduction

The concept of sustainable development was formally defined in 1987 by the Brundtland Commission report, which describes it as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [1,2]. Since then, the concept evolved through various global initiatives and milestones. The 1992 United Nations Conference on Environment and Development in Rio de Janeiro (the "Earth Summit") introduced Agenda 21, promoting integrated approaches to social, economic, and environmental sustainability [3]. In 2000, the Millennium Development Goals (MDGs) were adopted, targeting poverty reduction, education, and environmental sustainability [4]. Subsequent frameworks, including the 2012 Rio + 20 Conference and the 2015 Sustainable Development Goals (SDGs), further refined the sustainability agenda, emphasizing interconnections between economic growth, social equity, and environmental protection [5]. The 2030 Agenda for Sustainable Development now provides a comprehensive framework for coordinated actions by states, the private sector, and civil society to address challenges such as climate change, poverty, inequality, and resource degradation [6].

Sustainable development represents a key challenge of modern society, focusing on the integration of economic, social, and environmental dimensions to preserve natural resources and improve the quality of life for present and future generations [7]. Climate-related disasters, resource scarcity, and social inequalities highlight the urgent need for integrated sustainable strategies, especially in the private sector [8]. Within this context, the United Nations 2030 Agenda and SDGs offer guidance for coordinated efforts at multiple societal levels [8]. This study provides a regional perspective on enterprise sustainability practices under crisis conditions. Unlike previous studies that focus on global or national contexts, this study specifically examines how enterprises in Vojvodina operationalize SDGs during crises, providing insights unique to regional and sector-specific conditions. This study is innovative in several ways. First, it provides a context-specific empirical examination of how enterprises in Vojvodina operationalize SDGs under crisis conditions, addressing a gap in previous research that has largely focused on global or national analyses. Second, it integrates multiple dimensions of sustainability—economic, social, and environmental—demonstrating their interconnectedness and the adaptive strategies enterprises use to prioritize SDGs in turbulent environments. Third, by linking SDG implementation with crisis management practices, the study constructs a logical framework that illustrates how enterprises enhance organizational resilience while aligning with global sustainability objectives. This approach clarifies both the theoretical and practical contributions of the research, highlighting its value for scholars and managers seeking guidance on sustainability integration in specific regional contexts. Although global research on SDG implementation is increasing, there remains a limited understanding of how enterprises in specific regional and sectoral contexts operationalize sustainability goals during crisis [9]. By integrating local socio-economic and institutional factors, the research offers a nuanced perspective that bridges global SDG theory with regional business realities. Previous studies have mostly focused on broad, cross-country analyses or examined individual SDGs in isolation, leaving a gap regarding the integration of multiple sustainability dimensions within local enterprises facing complex challenges [10,11]. This study addresses this gap by conducting a context-specific empirical analysis of SDG management in the tertiary sector in Vojvodina. The study frames sustainability through the interaction of its economic, social, and environmental dimensions in crisis contexts. The study further contributes to theory by examining how crisis management shapes SDG implementation and supports organizational resilience.

Environmental sustainability is central to this framework, forming the foundation for long-term survival of ecosystems and societies [12,13]. Effective management of the SDG targets within enterprises is crucial, as the private sector plays a significant role in promoting sustainable practices, fostering innovation, and transforming economic models [14]. Recent studies demonstrate that educational and participatory initiatives can effectively raise awareness of SDGs among participants. For example, student-led ecological projects in higher education contexts, targeting SDGs 3, 4, 6, 7, 12, 13, 14, and 15, showed measurable improvements in participants' cognitive, social, and moral understanding of sustainability [15]. These findings support the idea that participatory initiatives can effectively increase ecological awareness, which is a crucial factor when assessing how enterprises operationalize SDGs under crisis conditions in Vojvodina. SDG targets also serve as operational indicators for monitoring sustainability performance, enabling organizations to adjust activities and evaluate their contribution to global goals. Quantitative models also provide insights into the interplay between economic development and ecological protection. For instance, studies applying coupling models and GM(1,1) principles demonstrated accurate predictions of coordinated development between economic growth and ecological sustainability in regional contexts, highlighting the need to adjust industrial structures and

strengthen environmental protection for long-term sustainable development [16]. Such quantitative approaches underline the importance of integrating environmental indicators into sustainability performance assessment, providing a methodological inspiration for evaluating enterprise practices in the present study.

However, implementing SDGs faces several challenges. The goals are complex and interdependent, and organizations often perceive their importance unevenly. This can lead to imbalanced resource allocation and reduced effectiveness of sustainability policies [17]. Understanding how companies prioritize environmental SDG targets is essential for aligning strategies with global standards and enhancing sustainable management. Despite growing theoretical discourse, empirical studies analyzing operationalization of SDGs in specific regional and sectoral contexts remain limited [10,18]. This research addresses this gap by focusing on the tertiary sector in Vojvodina, providing a detailed, context-specific analysis. By linking SDG operationalization with crisis management, this study extends theoretical frameworks that often treat sustainability as static, showing how local enterprises adapt global goals under specific contextual pressures. For this study, selected SDGs were chosen based on three criteria: relevance to enterprise practices in managing environmental resources, priority within the 2030 Agenda, and practical applicability for measuring corporate sustainability performance. The literature highlights that these goals significantly impact sustainable development. While some studies suggest the private sector drives innovation and sustainable transformation, others note that profit-oriented models can undermine environmental and social objectives [18,19]. Debates continue whether companies prioritize ecological sustainability goals (e.g., Sustainable Development Goal 13) or economic growth goals (e.g., Sustainable Development Goal 8), potentially creating imbalances in sustainability implementation [20]. These issues underline the need for further empirical research.

The aim of this paper is to demonstrate, through an empirical analysis of SDG management, their significance as indicators of ecological sustainability within enterprises. The study highlights grouping mechanisms and priorities within the 2030 Agenda. The subsequent sections present the methodology, results, and discussion, emphasizing context-specific patterns of SDG implementation observed in Vojvodina's tertiary sector enterprises.

2. Materials and Methods

This study is part of a broader research project investigating the interrelationships among three key dimensions: sustainability, crisis strategies, and the impact of crises (through measures taken and consequences for organizations). Data were collected regarding selected SGDs, using a specially developed questionnaire titled "Assessing the Impact of Crises on the Achievement of Sustainability Goals", designed in collaboration with experts from academic and business sectors. The questionnaire consisted of 106 questions, 28 of which focused on the sustainability dimension—the data from these 28 questions is the focus of this paper. The main questions from the sustainability section of the questionnaire, which form the core of the analysis presented in this paper, are summarized in in table below. These questions focus on tasks related to the achievement of SDGs and served as the basis for the factor analysis and subsequent interpretation of organizational priorities.

The study was conducted from October 1 to 1 December 2024, within the Republic of Serbia, specifically targeting the tertiary sector in Vojvodina. While the findings provide valuable context-specific insights into how enterprises in this region perceive and implement Sustainable Development Goals, they are not intended for generalization to other sectors or regions. The final sample consisted of 150 respondents from organizations of varying sizes and industries. The questionnaire was distributed electronically via Google

Forms, ensuring anonymity and voluntary participation, in accordance with ethical research principles. During the distribution and data collection process, the response rate was closely monitored, and participation was encouraged through reminders to ensure sample representativeness. A total of 260 questionnaires were sent to firms in the targeted sample, of which 183 responded, resulting in a response rate of approximately 70.38%. After reviewing the completeness of the responses, 33 questionnaires were excluded due to incomplete data, resulting in a final sample of 150 valid respondents. All responses were carefully reviewed and validated; missing data was handled through systematic checks and the exclusion of participants with incomplete responses, preserving the integrity and reliability of the dataset. This approach ensures transparency in the data collection process and confirms the high quality and consistency of the results obtained. The sensitivity analysis in this study was conducted descriptively. Firms were classified as "in crisis" based on respondents' perception thresholds (average score ≥ 3 on the five-point Likert scale). In this study, objective financial indicators such as revenue or profit growth were not used for classification, and no subgroup analysis based on these indicators was performed. Future research could expand this analysis by exploring alternative thresholds or integrating additional criteria, such as financial indicators.

The reliability of the instrument was assessed using Cronbach's alpha coefficient, and the data were processed using Python software (version 3.12). Before the main survey, the questionnaire was pre-tested in a small pilot study with 15 respondents from organizations like those in the target sample. The pilot aimed to evaluate the clarity, relevance, and comprehensibility of the items, as well as the estimated time required to complete the survey. Feedback obtained during this pre-test led to minor adjustments in question wording and response formatting, ensuring that the instrument was suitable for the main study. A sample question from the questionnaire is provided in Appendix A, illustrating the type and format of items included, particularly those related to SDGs. This process strengthened the validity and usability of the questionnaire before full-scale data collection. Previous studies highlight the significant link between crisis management and sustainable development. For example, there are authors that explore long-term challenges in crisis management and their impact on sustainable development, while anothers analyze how crises can serve as catalysts for transformative change towards sustainability [21]. These insights provide a theoretical foundation for formulating the study's hypotheses:

H_0. *There is no statistically significant relationship between different aspects of sustainability in companies facing a crisis.*

H_1. *There is a statistically significant relationship between different aspects of sustainability in companies facing a crisis.*

The hypotheses are formulated to formally test the relationships between different dimensions of sustainability in the context of enterprises facing crises, thereby directly contributing to the empirical analysis of the study. To strengthen the analytical methodology, this study integrates relevant theoretical foundations on crisis management and sustainable development, highlighting how crises can influence organizational practices toward SDG implementation [22,23]. Additionally, comparative and context-specific perspectives are considered by situating enterprise sustainability within the regional setting of Vojvodina, linking global SDG theory with local business realities [24]. This approach provides a structured, conceptually grounded framework for analyzing patterns of SDG operationalization and interpreting the observed factor structure.

3. Results

Table 1 summarizes the key characteristics of the surveyed sample, including company age, size, financial indicators, and demographic attribute of respondents.

Table 1. Descriptive characteristics of the sample (n = 150).

Category	Subcategory	% of Respondents
Company age	2011—present	47%
	2001–2010	30%
	Before 2000	23%
Company size	Micro-enterprises	62%
	Small enterprises	23%
	Medium-sized enterprises	15%
Revenue	Below €2 million	51%
	Between €2 and €10 million	35%
	Between €11 and €50 million	9%
	More than €50 million	5%
Revenue growth (2018–2023)	Growth reported	67%
Profit growth (2018–2023)	Growth reported	69%
Manager age	Less than 30 years	0%
	31–40 years	52%
	41–50 years	39%
	51–65 years	8%
	Over 65 years	1%
Manager experience	Up to 10 years	37%
	Between 11 and 30 years	34%
	Over 30 years	29%
Gender	Male	59%
	Female	41%

Firms were classified as "in crisis" based on respondents' perceptions of whether their company experienced a crisis during 2018–2023. This perception-based, post hoc classification allows for exploratory analysis and provides insight into the subjective experience of crises. It should be emphasized that the results of this study focus on perceived crisis and its potential relationship with different dimensions of sustainability, rather than on strictly objectively defined financial criteria. Time frame for classification was set to the period from 2018 to 2023, in accordance with the available data on company revenues and profits. Respondents were asked in the survey whether their companies had experienced crisis situations during this period, allowing for an exploratory investigation of perceived crises and their potential impact on different dimensions of sustainability. The classification of firms as "in crisis" is based on respondents' perceptions obtained through the survey. Participants rated the extent to which their business was affected by crises during the period 2018–2023. In addition to perception-based measures, available financial indicators were considered, including total revenue, profit, and revenue/profit growth over the observed period. The combination of these data allows for an exploratory and descriptive analysis of how crises influence different dimensions of sustainability in enterprises. Firms were classified as 'in crisis' based on respondents' perceptions, specifically their answers to survey questions regarding the impact of the crisis on business operations. The classification threshold was set so that firms with an average crisis impact score ≥ 3 on a five-point Likert scale were considered 'in crisis.' Financial indicators, such as revenue and profit, were used solely for descriptive analysis and additional context, but were not included in the classification

criterion. It should be noted that the results presented here are specific to the tertiary sector in Vojvodina and may not be directly generalizable to other sectors or regions. Nevertheless, they provide valuable insights into how enterprises in this context perceive and implement Sustainable Development Goals.

Data suitability for factor analysis was verified using the Kaiser-Meyer-Olkin (KMO) test (0.557) and Bartlett's test of sphericity ($p < 0.001$), confirming adequate correlation among variables. Although the KMO value (0.557) indicates only a moderate level of sampling adequacy, it remains within the acceptable threshold for exploratory factor analysis in social and management research, particularly in studies with a limited number of variables and heterogeneous samples. This result suggests that correlations among variables are sufficient for factor extraction, but future research could benefit from expanding the sample or refining variable selection to enhance model robustness. Furthermore, one of the variables—SDG17—showed a relatively low factor loading (0.286). Despite this, it was retained due to its conceptual significance in linking organizational sustainability efforts with collaborative crisis responses. However, its lower statistical weight suggests the need for additional validation in future studies, potentially through confirmatory factor analysis or a larger, sector-diverse sample. Factor analysis was performed using the principal component method, extracting four latent factors that together explain 59.75% of the total variance ($\lambda_1 = 1.862$; $\lambda_2 = 1.288$; $\lambda_3 = 1.212$; $\lambda_4 = 1.015$). Factor loadings and corresponding variables are presented in Tables 2 and 3. The choice of four factors is supported both statistically and conceptually, reflecting distinct dimensions of sustainability tasks relevant to enterprise practices. Factor loadings and corresponding variables are presented in Tables 1 and 2. Varimax rotation, an orthogonal rotation method, was applied to maximize variance of factor loadings across factors, facilitating clearer interpretation of dominant variables. Since Varimax assumes factor independence ($\Phi = I$), the factors are considered statistically uncorrelated, aligning with the conceptual model where different sustainability dimensions are treated as distinct but conceptually related. Rotated factor loadings and matrices are presented in Table 2, ensuring transparency and replicability.

Table 2. Eigenvalues and Explained Variance for Extracted Factors (Sustainability).

Components	Initial Eigenvalues			Sum of Squared Loadings (Extractions)			Rotation Sum of Squared Loadings
	Total	% of Explained Variance	Cumulative %	Total	% of Explained Variance	Cumulative %	Total
1	1.862	20.693	20.693	1.231	13.678	13.678	0.946
2	1.288	14.314	35.007	0.661	7.341	21.020	0.845
3	1.212	13.462	48.469	0.566	6.294	27.313	0.808
4	1.015	11.279	59.748	0.396	4.401	31.714	0.661
5	0.914	10.457	70.204				
6	0.802	8.908	79.112				
7	0.679	7.549	86.662				
8	0.623	6.918	93.580				
9	0.578	6.420	100.000				

Table 3. Component Matrix (Sustainability): Factor loadings for items related to specific SDGs.

Task Importance Related to SDGs (Agenda 2030)	Factors				Communality (Extraction)
	1	2	3	4	
How important do you consider tasks tha should contribute to achieving the Sustainable Development Goals according to the United Nations 2030 Agenda—contribution to ending hunger (SDG2)?	0.205	0.456	0.099	−0.194	0.298
How important do you consider tasks that should contribute to achieving the Sustainable Development Goals according to the United Nations 2030 Agenda—health and well-being (SDG3)?	−0.091	0.708	−0.049	0.158	0.531
How important do you consider tasks that should contribute to achieving the Sustainable Development Goals according to the United Nations 2030 Agenda—quality education (SDG4)?	0.742	−0.014	−0.112	0.113	0.574
How important do you consider tasks that should contribute to achieving the Sustainable Development Goals according to the United Nations 2030 Agenda—water usage reduction, clean water, and sanitation (SDG6)?	0.020	0.025	0.339	0.289	0.197
How important do you consider tasks that should contribute to achieving the Sustainable Development Goals according to the United Nations 2030 Agenda—energy consumption reduction, affordable and clean energy (SDG7)?	0.455	0.029	0.115	−0.072	0.220
How important do you consider tasks that should contribute to achieving sustainable development according to the United Nations 2030 Agenda—decent work and economic growth (SDG8)?	−0.016	0.014	−0.021	0.404	0.167
How important do you consider tasks that should contribute to achieving sustainable development according to the United Nations 2030 Agenda—action against climate change (SDG13)?	0.065	−0.093	0.130	0.372	0.167
How important do you consider tasks that should contribute to achieving sustainable development according to the United Nations 2030 Agenda—protection of oceans and seas (SDG14)?	−0.016	0.004	0.726	−0.026	0.527
How important do you consider tasks that should contribute to achieving sustainable development according to the United Nations 2030 Agenda—partnerships for the goals (SDG17)?	0.021	0.134	−0.043	0.286	0.094

Overall, the factor analysis confirmed the presence of four distinct latent dimensions of sustainability, providing a structured basis for the subsequent interpretation and discussion of SDG operationalization in enterprises. These dimensions serve as the foundation for analyzing patterns of SDG prioritization and organizational practices in Vojvodina's tertiary sector.

Table 2 presents the factors extracted from the data, which represent the main patterns and enable the reduction of many variables to a smaller number of latent dimensions. Factor analysis identified four latent factors that together explain 59.75% of the total variance, indicating good consistency and representativeness of the model:

- Factor 1 explains 20.693% of the variance (λ = 1.862);
- Factor 2 explains 14.314% of the variance (λ = 1.288);
- Factor 3 explains 13.462% of the variance (λ = 1.212);
- Factor 4 explains 11.279% of the variance (λ = 1.015).

The four extracted factors together explain 59.75% of the total variance, which is considered sufficient for social and environmental research contexts and indicates a good level of homogeneity and coherence among the variables. According to established guidelines in factor analysis, an explained variance above 50% is generally considered acceptable, especially in studies involving human perceptions or sustainability assessments [25]. This method was chosen as an appropriate method to reduce dimensionality and identify latent constructs of sustainability, allowing for a structured interpretation of SDG-related variables.

The determination of the number of factors was further supported by the scree plot (Figure 1), which indicated an inflection point at the fourth eigenvalue, suggesting a four-factor solution consistent with the results presented in Table 2.

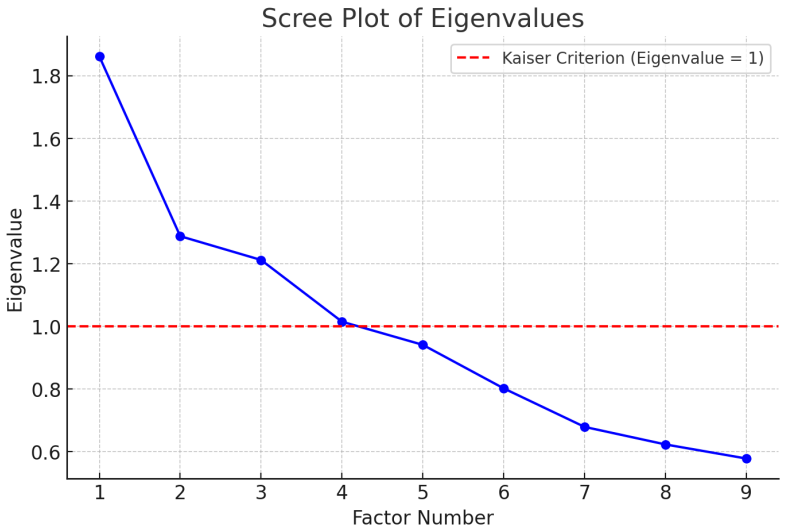


Figure 1. Scree Plot of Eigenvalues.

The scree plot (Figure 1) supports the four-factor solution, showing a clear inflection point at the fourth eigenvalue. According to established guidelines in social and environmental research, a cumulative variance above 50% is generally acceptable and indicates a good level of homogeneity among the variables. These factors allow for structured interpretation of SDG-related variables and reduce dimensionality while retaining the main patterns in the data.

Table 3 presents the factor loadings of the extracted variables, which enabled the identification and grouping of sustainability-related dimensions into four distinct factors. While some items show low communalities (e.g., SDG6 = 0.197, SDG8 = 0.167, SDG13 = 0.167, SDG17 = 0.094) and the KMO value is marginal (0.557), this analysis is conducted for exploratory purposes. The scree plot (Figure 1) and the total explained variance of 59.75% support the adoption of a four-factor solution. Overall, the factors provide a meaningful framework for understanding the latent dimensions of tasks related to SDGs in the context of enterprises in Vojvodina. The low communalities for certain items likely reflect heterogeneity in respondents' perceptions, which is typical in social and environmental research. Despite these limitations, the analysis captures the main patterns in the data and allows for structured interpretation of sustainability-related variables.

The first factor, labeled Education and Energy Sustainability, is represented by SDG4, which achieved the highest factor loading of 0.742 with an average respondent score od 4.17, and SDG7, with a loading of 0.455 and average score of 4.20. The second factor, Health and Social Well-being, encompasses SDG3, which had a factor loading of 0.708 and an average score of 4.20, as well as SDG2, with a loading of 0.456 and an average score of 4.06. The third factor, titled Ecological Sustainability and Nature Protection, groups SDG14, which obtained the strongest loading of 0.726 and the highest average score of 4.26, together with SDG6, which showed a lower loading of 0.339 and an average score of 3.97. Finally, the fourth factor, Economy and Climate Change, consists of SDG8, with a factor loading 0.404 and the highest average score across all variables (4.53), SDG13, with a loading of 0.372 and an average score of 4.23, and SDG17, which recorded the lowest loading of 0.286 but still achieved a relatively high average score of 4.13. Table 3 presents the component matrix obtained through factor analysis, where each variable corresponds to a specific SDG—for example, SDG3 or SDG4—illustrating their respective factor loadings across four identified components.

The analysis of identified factors reveals the interconnected nature of sustainability dimensions within companies. Each factor encompasses conceptually and statistically related variables, confirming that sustainability aspects operate as integrated components rather than isolated elements. Notably, factors three and four include variables relevant to ecological sustainability, emphasizing the strategic importance of environmental considerations in companies' responses to crisis situations. Accordingly, the results confirm hypothesis H1 for the surveyed sample in the tertiary sector in Vojvodina, indicating statistically significant relationships among different dimensions of sustainability in this specific context.

4. Discussion

This study's discussion focuses on the analysis of four sustainable development factors within enterprises facing crisis challenges, with particular attention to their interconnections and perceived importance. These four dimensions collectively form a multidimensional framework through which Organizational Resilience Theory (ORT) and Institutional Theory (IT) can be applied to understand how enterprises adapt to crises while responding to local institutional pressures. By strategically investing in these four dimensions—Education and Energy, Health and Social Well-being, Environmental Sustainability, and Economic Development with Partnerships—enterprises systematically enhance their intrinsic capacity to anticipate, adapt, and recover from crises. This demonstrates multidimensional organizational resilience, showing that SDG prioritization is not merely descriptive but operationally and strategically integral to enterprise survival and adaptability. Rather than asserting that the study provides a comprehensive analysis, we aim to highlight that it offers a unique insight into the perception of SDGs within the specific socio-economic and institutional context of Vojvodina, thereby emphasizing the study's contribution through a unique and nuanced perspective. From a theoretical perspective, the discussion can be framed through ORT [26] and IT [27], providing a foundation for interpreting how enterprises in the tertiary sector of Vojvodina respond to crises while pursuing sustainability. This study not only describes SDG prioritization but advances theoretical understanding of how enterprises operationalize sustainability in crisis contexts, bridging global frameworks with localized practice. ORT posits that organizations develop adaptive capacity by building multidimensional capabilities that enable them to adjust to crises, maintain operations, and recover from disruptions. In this study, the four identified dimensions of sustainable development—Education and Energy, Health and Social Well-being, Environmental Sustainability, and Economic Development with Climate Partnerships—collectively

form a multidimensional capability framework for organizational resilience. Specifically, investments in education and energy efficiency (SDG4 and SDG7) enhance "cognitive and innovative resilience," while initiatives targeting health and social well-being (SDG3 and SDG8) strengthen "human and social resilience." These interconnected capabilities demonstrate that sustainability practices are not merely descriptive of SDG priorities, but actively contribute to enterprises' capacity to adapt, sustain operations, and recover from crises. This interpretation highlights the practical significance of integrating sustainability initiatives as strategic levers for building organizational resilience. These findings provide empirical support for ORT, showing that educational and social initiatives are not only operational tools but also reinforce multidimensional resilience capacities theoretically described in the framework. It should be noted that the discussion and interpretations presented here are specific to enterprises operating in the tertiary sector in Vojvodina and may not be directly generalized to other sectors or regions. However, these findings provide valuable insight into local practices and perceptions of SDG implementation. By focusing on this regional context, the study extends ORT and IT by demonstrating how local institutional pressures and crisis dynamics shape resilience strategies. Although the findings of this study are grounded in the specific socio-economic and institutional context of Vojvodina, they offer valuable insights for enterprises in other regions and countries facing similar crisis conditions. The integrated approach to SDG prioritization, combining education, social welfare, environmental management, and economic resilience, can be adapted to different regional contexts by considering local institutional frameworks, economic structures, and sectoral compositions. This suggests that the multidimensional resilience framework proposed here can inform theoretical models of enterprise sustainability beyond the studied region. For instance, in regions with greater exposure to water scarcity or coastal ecosystems, SDG6 and SDG14 could assume higher operational importance, whereas education and employee well-being may require context-specific adaptation depending on local workforce characteristics and training infrastructure. Policymakers and managers in other regions can benefit from the conceptual framework presented in this study as a flexible guide to align sustainability strategies with local challenges, regulatory environments, and crisis dynamics. This perspective underscores the potential for cross-regional learning, where best practices in integrating SDGs into enterprise operations can be transferred and adapted while respecting local constraints and opportunities. By grounding the analysis in a regional context often overlooked in prior literature, this study fills a significant empirical and theoretical gap. Previous research has primarily examined SDG implementation at national or global scales, frequently neglecting how local enterprises in smaller economies operationalize sustainability under crisis conditions. The observed prioritization of certain Sustainable Development Goals, particularly SDG6 (water management), SDG14 (life below water), and SDG17 (partnerships), can be further interpreted through the lens of ORT [28]. Enterprises in Vojvodina's tertiary sector appear to respond adaptively to crisis-induced pressures, balancing short-term operational challenges with long-term sustainability goals. The high engagement with SDG17, for instance, reflects the role of inter-organizational collaboration as a resilience mechanism, enabling firms to access critical resources, knowledge, and support networks that buffer against environmental and economic uncertainties. Similarly, the integration of educational and social welfare initiatives (SDG4, SDG3) illustrates the strategic development of human capital as a resilience-building process, aligning with research that emphasizes learning, adaptability, and proactive risk management as core components of organizational resilience [29]. By situating the investigation within the tertiary sector of Vojvodina, the paper contributes to theory by extending the understanding of localized sustainability frameworks and their role in enterprise resilience. This theoretical contribution lies in redefining sustainability

as a context-dependent construction shaped by crisis dynamics, thus extending existing frameworks that predominantly treat sustainability as a static and universal concept.

When interpreting the results, it is important to consider the specific socio-economic and institutional context of the tertiary sector in Vojvodina, where all respondents operate their businesses. IT helps explain why enterprises exhibit specific SDG prioritization patterns in the Vojvodina region. Local regulatory frameworks, access to EU funds, and social norms shape organizational behavior, creating institutional pressures that guide sustainability practices [30]. For example, the relatively lower prioritization of SDG6 and SDG14 may be linked to limited regulatory enforcement or the absence of direct economic incentives for inland enterprises. Conversely, strong emphasis on SDG17 reflects both mimetic and normative pressures: enterprises follow the best sectoral practices and societal expectations to collaborate for sustainable development. These patterns illustrate how institutional pressures co-construct enterprise resilience, extending the practical applicability of IT in regional crisis contexts. From an institutional perspective, the observed emphasis on certain SDGs (e.g., SDG17—Partnerships) and the relative neglect of others (e.g., SDG14—Life Below Water) by enterprises in Vojvodina can be interpreted not only as a reflection of business priorities but also as a response to local institutional pressures. The observed patterns indicate that resilience and sustainability are co-constructed: internal adaptive capabilities interact with external institutional pressures, such as local regulations and EU funding mechanisms, which explains the regional specificity of SDG prioritization in Vojvodina. These pressures include regional regulations, access to EU funding, and societal expectations, which shape organizational behavior and sustainability practices. This perspective highlights the regional specificity of the findings, illustrating how global sustainability norms, such as the SDGs, are filtered and reshaped within the local institutional environment. In this way, enterprises' SDG prioritization is influenced both by internal strategic objectives and by external institutional expectations, providing a deeper theoretical explanation for the patterns observed in the study. This perspective illustrates that sustainability actions are not purely voluntary but are mediated by the institutional environment, reinforcing the importance of context-specific strategies for implementing global SDGs [31]. The tertiary sector in this region predominantly includes services, trade, IT, and tourism, with micro and small enterprises being the most represented, while medium and large enterprises are less frequent. The regional economy is characterized by relatively stable revenue growth, but also faces challenges such as seasonal fluctuations, market competition, and changing macroeconomic conditions. Regulatory frameworks and institutional factors further shape the business environment—entrepreneurs deal with taxation, environmental protection regulations, and social standards, while also having access to support from local development agencies and European Union funds. In this context, the perception of the importance of certain Sustainable Development Goals (e.g., SDG6, SDG14, SDG17) can be interpreted as a response to local economic and regulatory challenges. This regional and sectoral specificity makes the contribution of our study unique, as it demonstrates how global SDGs can be applied and interpreted within a local business environment. The integration of local institutional characteristics into SDG analysis advances existing theoretical models that often treat sustainability as a uniform construct. Moreover, by focusing on enterprises in Vojvodina's tertiary sector, this study provides a novel empirical perspective that bridges global SDG frameworks with local business realities. Previous research has predominantly examined SDG implementation at national or international levels, often overlooking how local socio-economic and institutional contexts shape the interpretation and operationalization of sustainability goals. By highlighting these localized dynamics, our findings demonstrate that sustainability is not a universal or static construct, but a context-dependent process influenced by regional economic conditions,

sector-specific characteristics, and institutional support mechanisms. This localized focus not only enriches empirical understanding but also contributes theoretically by extending current frameworks, emphasizing the need for more granular, region-specific approaches in sustainability research. By combining insights from organizational resilience and IT, the study demonstrates that enterprises' sustainability practices are shaped by both internal adaptive capacities and external institutional pressures [32]. The interaction of education, social welfare, environmental management, and economic goals suggests that resilience and sustainability are co-constructed: enterprises develop capabilities internally while simultaneously responding to institutional expectations [33]. This theoretical framing provides a more nuanced explanation for the observed empirical patterns, showing that local contextual factors and crisis dynamics jointly influence SDG prioritization, rather than these patterns being arbitrary or solely descriptive.

Here, sustainability is reconceptualized as a context-dependent and adaptive process, aligning with recent scholarly calls for more granular, region-specific sustainability research. Based on these findings, several actionable steps can be proposed for managers and policymakers. First, companies should develop integrated water management strategies that combine investment in efficient technologies, employee training, and monitoring systems to reduce water-related risks. Policymakers can support these initiatives by offering incentives, establishing clear regulatory frameworks, and including water usage indicators in ESG reporting standards. Second, educational institutions should incorporate practical modules on sustainable water management and climate adaptation into curricula, equipping future professionals with skills to implement innovative solutions. Third, enterprises should foster cross-sector partnerships (SDG17) to facilitate knowledge exchange, co-develop best practices, and pool resources for water conservation and ecosystem protection. These collaborative approaches can enhance the effectiveness and scalability of sustainability initiatives, ensuring that water management is addressed in both local and broader environmental contexts. Finally, regular evaluation of these strategies through internal audits, stakeholder feedback, and alignment with global SDGs will help ensure continuous improvement and responsiveness to emerging crisis conditions.

A key insight from this research is the observed need to improve the integration of water resource management (SDG6) within the surveyed context, which represents a critical area within ecological sustainability but is often overlooked compared to other goals. Additionally, this work aims to provide insights into how different aspects of sustainability—from education and social welfare to economic and climate factors—synergistically combine to build enterprise resilience in crisis situations. Compared to previous studies, which have mostly focused on individual dimensions of sustainability or specific sectors [34–37], this research provides a context-specific integrated perspective, highlighting potential practical and theoretical implications strengthening sustainability management under complex business conditions. By empirically demonstrating the interplay between educational, social, environmental, and economic factors, this study contributes a holistic conceptual model of sustainability in crisis contexts. This multidimensional perspective complements and extends previous theoretical approaches, which have often examined these dimensions in isolation. The results confirm the complexity and multidimensionality of sustainability, where education, social welfare, ecological challenges, and economic factors intertwine in creating resilience and long-term strategies. The following sections will discuss individual factors in more detail within the context of relevant theoretical frameworks and prior empirical research, with special emphasis on identified challenges and opportunities for improvement.

Table 4 presents the four sustainable development factors identified in the study, along with the included SDGs, average respondent ratings, key aspects of each factor, and

relevant contextual or institutional specificities. This tabular presentation allows for a clear overview of the main findings and the relationships between the factors, while detailed discussion and theoretical context are provided below the table.

Table 4. Sustainable development factors, SDGs, and average ratings.

Factor	Included SDGs	Average Rating	Key Aspects of the Factor	Contextual/Institutional Specificities
Education and Energy Efficiency	SDG4, SDG7	4.17 (SDG4), 4.20 (SDG7)	Education as a strategic resource, human resource development, innovation, strategic decision-making, energy efficiency in business practices	Institutional pressures, investments in education and energy as a response to societal expectations and regulatory norms, crucial during crisis periods.
Health and Social Responsibility	SDG2, SDG3	4.06 (SDG2), 4.20 (SDG3)	Employee health preservation, ending hunger, multidimensional sustainability	Institutional norms and sector-specific expectations, pandemics, energy instability, supply chain disruptions, ethical and strategic responsibiliby of companies.
Environmental Sustainability	SDG6, SDG14	3.97 (SDG6), relatively higher importance (SDG14)	Water resource management, ocean and sea protection, integrated environmental approach	Geographical specificity (inland regions), economic constraints, regulatory pressures, education, and awareness of global consequences of local practices.
Economy, Climate Challenges, and Collaboration	SDG8, SDG13, SDG17	4.53 (SDG8), 4.23 (SDG13), 4.13 (SDG17)	Economic stability, awareness of climate risks, multisectoral and inter-institutional collaboration	Regulatory and societal expectations, synergy between economy, climate, and collaboration strengthens resilience and long-term sustainability

The first factor of the study clearly highlights the importance of education as a key element in developing enterprises' capacity to face sustainability challenges, especially under crisis conditions. The high factor loading for SDG4 and the relatively high average respondent rating (4.17) confirm that education is perceived not only as a social responsibility but also as a strategic resource that enables organizations to effectively implement sustainable practices. The role of education in modern enterprises, particularly through the development of human resources, innovative solutions, and strategic thinking, becomes crucial. This is especially true during crisis periods when adaptability, flexibility, and informed decision-making are key factors of organizational resilience. Scientific studies, such as those conducted by Garrido-Yserte and Gallo-Rivera (2020), confirm that higher education institutions increasingly serve as platforms for synergy between academic knowledge, industry needs, and societal demands, fostering the development of practical competencies focused on sustainability [38]. In addition to education, this factor also includes SDG7, which received an average rating of 4.20, reflecting a high level of awareness among enterprises about the importance of energy efficiency. Business strategies increasingly incorporate initiatives aimed at reducing energy consumption, which contribute both to cost reduction

and enhanced ecological resilience. Foroudi et al. (2025) emphasize that project-based learning about renewable energy sources is one of the effective approaches to developing a positive attitude toward sustainability, which is then transferred into workplace practices through qualified personnel [10]. This synergy between education and energy sustainability demonstrates a holistic approach in modern organizations, where knowledge serves as the foundation for developing sustainable business models and responsible resource management. In crisis situations, where uncertainty and complexity become more pronounced, this connection becomes even more significant, as it enables timely decision-making based on professional expertise and innovation [39]. Therefore, investing in education and continuous employee development represents not only an ethical imperative but also a key strategic investment for the long-term resilience and competitiveness of enterprises. This supports ORT by demonstrating that cognitive and social resilience is operationalized through targeted SDG initiatives. Moreover, the prioritization of education and energy goals reflects institutional pressures, as enterprises align their strategic investments with societal expectations and regulatory norms, illustrating how resilience and sustainability are co-shaped by institutional context.

The second factor, which encompasses health and well-being (SDG3) and the contribution to ending hunger (SDG2), clearly shows that companies recognize employee health as a key component of sustainability, especially under crisis conditions such as pandemics, energy instability, or supply chain disruptions. The factor loading of 0.708 and the high average rating (4.20) indicate an increasing prevalence of corporate initiatives aimed at preserving the health and well-being of workers. These findings align with recent studies, such as those by Alonso-Nuez et al. (2022), who, through a systematic literature review, confirmed that corporate social responsibility (CSR) focused on employee health significantly contributes to reducing burnout syndrome and strengthening the sense of purpose and engagement in the workplace [40]. Conversely, the contribution to the goal of ending hunger (SDG2) has a somewhat lower average score (4.06), which may suggest the perception that this goal is not an immediate responsibility of most companies, especially those outside the food sector. Nonetheless, its presence within this factor suggests a basic awareness of social responsibility and solidarity. This is consistent with the findings of Rodolfo and Chiara (2024), who emphasize that transparent and inclusive reporting by companies on their social practices increases their commitment to social inclusion and achieving broader social impact [41]. The integration of environmental and economic dimensions shows how multidimensional resilience is co-constructed, extending theoretical models of ORT. Additionally, the differential weighting of SDG2 and SDG3 demonstrates that organizational priorities are influenced by institutional norms and sector-specific expectations, supporting theoretical insights from IT. Overall, the combination of these two goals within a single factor underscores the need for an integrated and holistic approach to social sustainability, where employee health and social justice together form the foundation of stable, responsible, and resilient enterprises. Especially during crisis periods, such initiatives are not only an ethical obligation but also a strategic resource that can contribute to business sustainability and long-term competitiveness.

The third factor—environmental sustainability and nature protection—particularly highlights the importance of water resource management and the protection of oceans and seas. SDG6—with an average score of 3.97, although lower compared to other goals, indicates recognition of the importance of responsible water management as a key resource in corporate business practices. The relatively lower prioritization of SDG6 compared to other sustainability goals may be explained by several contextual factors. Economic constraints, such as the high costs of implementing advanced water management systems, can limit companies' immediate engagement. Institutional factors, including limited regulatory

pressure or the absence of incentives for sustainable water practices, may further reduce perceived urgency. Additionally, knowledge gaps and insufficient training of personnel in water stewardship contribute to lower engagement. In the case of SDG14, enterprises in inland regions such as Vojvodina may not perceive a direct connection between their operations and marine ecosystems, leading to a weaker prioritization of ocean protection. This geographic and contextual specificity underscores the importance of designing sustainability initiatives that are adapted to both local environmental conditions and enterprise capacities. This finding aligns with global trends presented in the CDP Global Water Report (2018), which emphasizes that companies are becoming increasingly ambitious in reporting water-related risks, yet practical measures remain far from the level required for transformation [42]. On the other hand, SDG14 –was perceived as relatively more important among respondents, indicating a general awareness of ecological issues, likely due to the geographical distribution of most respondents from inland regions, who do not feel the direct impact of their operations on marine ecosystems. Similar perceptual limitations have been identified in earlier studies [43], where less than half of companies acknowledge impacts on oceans, and awareness of complex pressures such as eutrophication and degradation of marine habitats remain low. These findings clearly indicate the need to intensify education and raise awareness of the global consequences of local business practices, as well as to integrate principles of responsible water ecosystem management into business strategies and supply chains. Bajrović et al. (2025) also emphasize that despite growing awareness of the importance of water, the perception of responsibility toward marine ecosystems remains significantly weaker, which may present a major challenge for comprehensive natural resource protection [44]. Nevertheless, these two goals together form a coherent and integrated environmental framework that highlights the need for a holistic approach to natural resource protection, increasingly promoted in modern business practices through corporate water management initiatives and transparency regarding water risks. Additional crosstab analysis showed that respondents who rated SDG6 as "very important" or "important" simultaneously exhibit a high level of awareness of other related sustainability goals, such as quality education (SDG4), innovation and infrastructure development (SDG9), sustainable cities and communities (SDG11), and climate action (SDG13). This correlation points to an integrated and multidimensional approach to sustainability in corporate perception, where water resource management is inextricably linked to education, technological advancement, and climate challenges. However, a greater difference is noticeable in the perception of the importance of SDG14 compared to SDG6, with respondents rating SDG6 highly showing somewhat lower awareness of the importance of protecting oceans and seas. This dissonance may be caused by the geographic location of the companies and a weaker direct connection to marine ecosystems, which further confirms the results of the factor analysis and underscores the need for a contextually adapted approach to implementing sustainable development goals within the environmental dimension. Similar trends are observed in previous research, which shows that SDG14 remains among the least prioritized goals in corporate sustainability reporting, with only about 7% of companies explicitly addressing it in their strategies, while goals such as SDG6, SDG13, and SDG4 receive significantly more attention [45]. Even in the ocean economy, organizational awareness of marine pressures is often declarative, with only 44% of companies undertaking concrete actions despite 51% acknowledging the issue [46]. Moreover, valuation studies of marine ecosystem services reveal a high theoretical appreciation of oceans and seas, but this rarely translates into practical measures, especially in regions without direct geographic or economic ties to marine environments [47]. These findings align with the argument that a geographically and sectorally adapted approach is essential for the effective integration of SDG14 into business practices, particularly inland regions such as Vojvodina, where direct interaction

with marine ecosystems is limited. This emphasizes that environmental resilience is operationalized in a context-sensitive manner, supporting ORT by showing that adaptive capacity varies with local environmental and institutional conditions. It further explains why inland enterprises perceive marine protection as less urgent, reflecting normative and regulative pressures.

The fourth factor highlights the synergy between economic development, climate challenges, and the importance of collaboration as key elements of sustainability in enterprises. The high average score for SDG8 (4.53)—clearly indicates that maintaining economic stability and market position is one of the priority goals for companies, especially in crisis conditions. At the same time, the relatively high score for SDG13 (4.23)—reflects growing awareness of the risks that climate change poses to business operations. This confirms the transformation of sustainable development from a concept once considered a "right" or "trend" into an indispensable economic necessity for the companies in this study. The inclusion of SDG17 (4.13)—signals increasing recognition of the importance of multisectoral and inter-institutional collaborations as drivers for implementing sustainable and scalable solutions. Research by Bulmer and Yanez-Araque (2023) emphasizes that such partnerships are crucial for innovation and effective climate change mitigation [48], while Latinović et al. (2020) highlight that collaboration contributes to fairer and more efficient development [49]. This factor confirms that the economy, climate goals, and partnerships are not mutually competing but complementary and integral aspects that together enable enterprises to achieve resilience and long-term sustainability. Similar patterns have been identified in broader empirical research, where the integration of SDG8, SDG13, and SDG17 has been shown to create a reinforcing loop that strengthens both business competitiveness and societal resilience. For instance, Leal Filho et al. (2022) found that enterprises adopting joint economic–climate–partnership strategies reported higher innovation capacity and adaptability to market disruptions, especially under crisis conditions [50]. Likewise, Kanie and Biermann (2020) emphasize that partnerships facilitate the cross-sector exchange of knowledge and resources, which accelerates climate action while maintaining economic growth trajectories [51]. In a multi-country study, Bansal et al. (2023) demonstrate that collaborative approaches to climate challenges not only reduce operational risks but also improve stakeholder trust, thereby contributing to long-term sustainability [52]. These findings reinforce the argument that linking economic performance, environmental responsibility, and partnerships is essential for building resilient enterprises in an increasingly uncertain global environment. Institutional pressures explain differential prioritization, showing that resilience and sustainability are mediated by regulatory and societal expectations. This demonstrates that economic, environmental, and collaborative dimensions form a reinforcing loop of resilience, consistent with ORT's concept of multidimensional capabilities.

The findings of this study not only confirm previous research on the multidimensional nature of sustainability but also contribute theoretically by demonstrating how education, health, environmental, economic, and partnership dimensions interact within enterprises facing crises. In summary, this study not only enriches empirical understanding but also contributes to theory by proposing an integrated framework linking SDG prioritization, crisis management, and enterprise resilience. This conceptual advancement provides a new analytical perspective that connects global sustainability theory with regionally grounded business realities. This integrated framework addresses a critical gap in sustainability literature—the lack of empirical evidence on how crisis dynamics reshape SDG prioritization in local business environments. The theoretical contribution thus lies in showing that enterprise-level resilience can be interpreted as a function of multidimensional SDG integration, a relationship rarely captured in prior studies. This integrated perspective provides novel insights into the operationalization of SDGs in a regional context, highlight-

ing the importance of considering local socio-economic and institutional conditions when interpreting sustainability strategies. By linking empirical patterns with theoretical frameworks, this research strengthens understanding of how enterprises can enhance resilience and sustainable development simultaneously. Therefore, beyond its empirical relevance, the study offers a theoretical advancement by bridging global SDG theory and localized practice-based models of sustainability, suggesting a new analytical lens for understanding how regional enterprises operationalize global sustainability norms.

The results indicate the need for company management, as well as policymakers, to recognize water as a critical resource requiring strategic management, especially in crisis situations that further deplete resources. Educational institutions should expand curricula to integrate practical knowledge on sustainable water use and climate change, in order to develop experts ready to implement innovative solutions. Additionally, regulations promoting transparency and the inclusion of water as an indicator in ESG (Environmental, Social, Governance) reports could contribute to better integration of SDG6. Managers should encourage cross-sector collaboration and partnerships (SDG17) that enable knowledge and resource exchange for the preservation of aquatic ecosystems.

Future research should employ longitudinal designs to monitor how awareness of SDG6 and other goals changes over an extended period, particularly under various crisis shocks such as droughts or supply chain disruptions. Expanding the sample to different sectors and geographic areas, including coastal regions, would allow for a deeper analysis of the impact of location on the perception of goals like SDG14. Qualitative approaches, such as interviews with managers and regulators, could further elucidate barriers and opportunities for implementing sustainable strategies. Future research could consider employing Structural Equation Modeling (SEM) to explore the complex relationships among different Sustainable Development Goals within enterprises in more detail. While the current study identified four latent factors through PCA, SEM would allow testing the direct and indirect relationships between sustainability dimensions, providing a deeper understanding of how educational, social, environmental, and economic factors interact to shape organizational resilience. This approach could also help quantify the strength of interdependence among SDGs, offering insights into which goals act as key drivers for others, thus enabling more targeted managerial and policy interventions. Future studies should consider larger and more diverse samples across different sectors and regions to verify whether the observed patterns hold in broader contexts and to strengthen the generalizability of the findings. Future research could test the multidimensional resilience framework quantitatively, further validating the theoretical generalizability of ORT and IT, and exploring how organizational capabilities and institutional pressures jointly shape SDG prioritization over time.

The study's findings demonstrate that crises further emphasize the importance of integrating sustainable practices, particularly water resource management, which can become important factor influencing operational resilience. This observation is consistent with enterprise resilience theories that underline the importance of agility and adaptability in conditions of uncertainty [53]. The perception and practice of sustainability during crises should be seen as part of a broader resilience strategy, where sustainable resource management and social responsibility are not only long-term goals but also short-term imperatives.

Recognizing SDG6 as an area for improvement points to the existence of potential barriers, which may be economic (high costs of implementation), institutional (lack of regulatory frameworks), or knowledge-based (insufficiently trained personnel). Implementing cross-sector partnerships (SDG17) exemplifies ORT in practice, showing how collaborative capabilities enhance resilience under crisis conditions, while IT explains why such partnerships are more easily adopted in regions with supportive regulatory frameworks and

societal norms. Managers and decision-makers should be aware of these challenges and strive to develop integrated strategies that include training, investment, and cooperation with relevant stakeholders.

In summary, this study highlights that sustainability in enterprises facing crisis conditions is inherently multidimensional. The four identified factors—education and energy sustainability, health and social welfare, environmental sustainability with a focus on water resource management, and economic development combined with climate action and partnerships interact to build organizational resilience and long-term competitiveness. Education and employee development emerge as strategic resources, while health initiatives reinforce social sustainability. Environmental practices, particularly water resource management, remain an area requiring further improvement, and the synergy between economic stability, climate action, and partnerships emphasizes the importance of integrated strategies. These findings align with and extend previous research. While our results generally confirm these trends, they also reveal context-specific differences, such as the lower prioritization of SDG6 and SDG14 in inland enterprises, indicating that geographic and sectoral factors shape perceptions of sustainability goals. In summary, this study demonstrates that SDG prioritization in Vojvodina's tertiary sector is shaped by the co-construction of internal resilience capabilities and external institutional pressures. ORT explains how enterprises leverage education, social welfare, environmental management, and economic partnerships to enhance their adaptive and recovery capacities in crisis contexts. IT complements this by showing that regional regulatory frameworks, access to funding, and societal norms guide which SDGs receive attention, providing a deeper understanding of the observed local specificity. Together, these frameworks reveal that sustainability practices are neither static nor universally uniform; they are context-dependent and strategically adaptive, reflecting the interplay of crisis dynamics, organizational capacity, and institutional influence. By explicitly integrating ORT and IT, this study moves beyond descriptive comparison, offering a theoretical contribution that links global sustainability frameworks with regionally grounded enterprise behavior and resilience-building strategies. By explicitly integrating ORT and IT, the study not only synthesizes empirical findings but also proposes a novel theoretical lens for understanding how local enterprises operationalize SDGs to build resilience, contributing to both theory and practice. This perspective underscores the value of tailoring sustainability initiatives to local conditions while simultaneously reinforcing broader organizational resilience. Overall, this study moves beyond descriptive comparison, offering a theoretical contribution by linking global sustainability frameworks with regionally grounded enterprise behavior and resilience-building strategies, thereby providing a more nuanced understanding of how enterprises operate SDGs under crisis conditions.

Overall, this discussion emphasizes that integrating sustainable practices is not only a long-term strategic imperative but also a short-term necessity for enterprises operating under uncertainty. Managers, policymakers, and educational institutions are encouraged to adopt holistic approaches, including practical training, cross-sector collaboration, and supportive regulatory frameworks, to enhance resilience and promote sustainability in dynamic and unpredictable environments. Overall, this study not only confirms existing empirical patterns but also advances theory by providing an integrated framework linking SDG prioritization, crisis management, and enterprise resilience. This framework highlights how local context, sector characteristics, and crisis dynamics interact to shape sustainability strategies, offering a new analytical lens for understanding enterprise-level resilience in regional settings.

5. Conclusions and Research Limitations

This section presents both the limitations of the study and the main conclusions, providing a comprehensive overview of the findings and their implications. This study has several important limitations. First, the sample is restricted to tertiary-sector firms in Vojvodina (n = 150), which limits the generalizability of the findings to other sectors or geographic regions. Second, although factor analysis identified four latent sustainability factors, some loadings fell below conventional thresholds (e.g., SDG17 at 0.286), which reduces the reliability of interpretations and highlights the need for confirmatory analyses (CFA/SEM) to further assess factor stability. In addition, the Kaiser-Meyer-Olkin (KMO) value of 0.557, while above the minimum acceptable threshold (0.50), remains below the recommended level of 0.60, indicating limited adequacy of the sample correlations for factor analysis. Third, claims about inter-factor correlations should be treated cautiously, as Varimax rotation assumes factor independence and the Φ matrix was not reported. Finally, the definition of crisis status was based solely on the criteria applied in this study, and subgroup or severity analyses were not conducted, which may affect the interpretation of results. It should be noted that this crisis classification is based solely on respondents' subjective perception (Likert score ≥ 3), which, while providing useful managerial insights, may introduce bias as it does not integrate objective financial indicators. Furthermore, as the study relies on self-reported data, potential self-reporting bias cannot be fully excluded, since respondents' answers may be influenced by social desirability or individual interpretation of questions. Future research could enhance the robustness of crisis classification by combining subjective assessments with objective financial metrics, enabling a more comprehensive understanding of how enterprises perceive and respond to crisis situations.

These limitations should be considered when interpreting the findings. Nevertheless, the study provides valuable insights into how enterprises perceive and integrate SDGs in the context of crises and lays the groundwork for future research with broader samples, diverse sectors, longitudinal designs, and more robust statistical approaches.

Building on the above, this research has confirmed the complexity and multidimensionality of sustainability in modern enterprises, especially under crisis challenges. The identification of key factors—education, health and social responsibility, environmental sustainability with a special focus on water resource management, as well as economic development in synergy with climate challenges and partnerships—demonstrates that sustainability cannot be viewed in isolation but rather as an integrated system of interdependent elements. The need to improve water resource management, which is an important resource influencing enterprise resilience in the context surveyed. Furthermore, investments in education, employee health, and partnership development are key strategic factors for long-term competitiveness and resilience. The findings of this study provide actionable insights for both business practice and policy development. For industry, investing in employee education and development, prioritizing health and well-being initiatives, strategically managing water resources, and fostering cross-sector partnerships can enhance resilience and long-term competitiveness, particularly in crisis situations. For policymakers, promoting regulatory frameworks that incentivize sustainable practices, integrating water management and climate awareness into ESG reporting standards, and supporting educational programs aimed at developing sustainability competencies can strengthen the capacity of enterprises to implement effective sustainable strategies. These measures highlight the critical role of coordinated action between enterprises, regulators, and educational institutions in achieving integrated sustainability outcomes. Specifically, SME managers are encouraged to adopt targeted actions such as implementing staff training programs, developing efficient water management practices, and engaging in cross-sector partnerships to improve resilience. Policymakers are advised to provide incentives, establish clear

regulations, and support educational initiatives that build local sustainability competencies. It is recommended that enterprise management, policymakers, and educational institutions direct their efforts toward integrated approaches that include practical training, regulatory frameworks, and cross-sector collaboration. Future research should deepen the understanding of changes in sustainability awareness and practices through longitudinal studies and expanded samples, particularly to verify whether patterns observed in the tertiary sector of Vojvodina hold in broader contexts. The empirical findings of this study are specific to the tertiary sector in Vojvodina and cannot be automatically generalized to all sectors or regions, which should be considered when interpreting the results. Thus, while the study provides detailed insights into SDG management practices in a specific sector and region, its contribution should be interpreted as an illustrative example rather than a comprehensive generalization of sustainable management practices. Finally, the integration of sustainable practices into business models is not only a moral obligation but also a key condition for successful operation in an unpredictable and dynamic environment.

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Appendix A. Sample Questions from the Sustainability Section of the Questionnaire

The questionnaire consisted of 106 items covering demographics, sustainability practices, crisis management, and impact assessment. Since this study focuses on sustainability, only items related to this dimension (questions 15–42) are presented here. Respondents rated the importance of tasks using a 3- or 5-point scale or indicated applicability.

Sample Questions from the Sustainability Section (Questions 15–42):

General Sustainability Goals

- Q15: Reduction of environmental impact (less important/important/very important)
- Q16: Addressing social inequalities (less important/important/very important)
- Q17: Stable business and economic stability (less important/important/very important)

Planned Sustainability Tasks

- Q18: Does your company have specific tasks for the next 12 months to improve sustainability? (yes/no)

Importance of Tasks Contributing to Sustainable Development Goals (SDGs).

Respondents rated the importance of tasks on a 5-point scale (1 = not important, 5 = extremely important) for the following SDGs:

- Q19: Ending poverty
- Q20: Ending hunger
- Q21: Health and well-being
- Q22: Quality education
- Q23: Gender equality

- Q24: Clean water and sanitation
- Q25: Affordable and clean energy
- Q26: Decent work and economic growth
- Q27: Industry, innovation, and infrastructure
- Q28: Reduced inequalities
- Q29: Sustainable cities and communities
- Q30: Responsible consumption and production
- Q31: Climate action
- Q32: Life below water
- Q33: Life on land
- Q34: Peace, justice, and strong institutions
- Q35: Partnerships for the goals

Future-Oriented Sustainability Practices

- Q36: Realistic implementation of circular economy in the next 5 years (not realistic/initial steps/developing circular business models/transition to circular economy)
- Q37: Realistic use of AI tools in the next 5 years (never used/considering/few projects/integrated/key role)

Sustainability Reporting

- Q38: Do you prepare a sustainability report, and if yes, how difficult is it to prepare? (no/high effort/easy/partially automated)
- Q39: Dedicated unit for sustainability report? (yes/no)
- Q40: Which organizational unit prepares the report? (open response)
- Q41: Position of the person responsible (open response)
- Q42: Functions providing information for the report (top management, marketing/sales, production, services, supply chain, finance, quality, IT, HR)

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