

The subjective and objective resilience of the SME sector during the post-Covid era

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Abstract

This study investigates the relationship between objective and subjective operational resilience in the Hungarian SME sector during and after the pandemic period. The ESG survey on Hungarian SMEs (n=369) included questions on subjective resilience which were compared with objective metrics. Our research shows a significant association between subjective and objective resilience. More resilient SMEs with shorter recovery times adjusted their supply chain to protect the labor force. Less resilient SMEs were forced to adjust both their supply chain and labor costs. The implication for the management of SMEs is to increase crisis preparedness and to build crisis scenarios for potential future negative events.

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Review of Literature

Resilience means bouncing back from adverse events, flexible adaptation, and effective stress management. Operational resilience is the capacity to respond and recover from negative events that might impact the corporate operating activities while serving customers, providing

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products, protecting the workforce, and maintaining IT resilience. The multidimensional framework of financial resilience covers economic resources, financial resources, and social capital, which assure a high response capacity [1]. In the context of risk management strategies, strengthened human capital, including limited layoffs, flextime, or paid sick leave; quick adaptation in supply chains like securing core materials or strong supplier relationships; and flexible redirection of operations to meet current market needs are resilience signals to the stakeholders [2]. Broadening operational, business, and geographic scope are resilience strategies [3]. There are several methods how resilience is measures. The initial loss due to the disruption, the maximum loss, and the total loss over time are resilience metrics [4]. Recovery time is important in assessing system resilience after a shock [5].

Subjective Resilience

Personal judgement and self-evaluation of individual resilience belong to the notion of subjective resilience. Subjective resilience is the ability to anticipate, buffer, and adapt to shocks [6]. There is a link between entrepreneurial psychological resilience and organizational resilience in the SME sector [7]. Resilience is an entrepreneurial mindset.

SMEs during the COVID-19 pandemic and objective resilience

The COVID-19 shock was a resilience momentum for SMEs. Demand shock in goods and services, supply chain disruptions, and financial strain caused challenges worldwide for SMEs during the pandemic. Building operational and financial flexibility was an adaptation mechanism for SMEs to cope with adversities. Optimizing business models, developing marketing channels, investing in technological innovation, diversifying into new business areas, and integrating the supply chain were crisis response strategies of SMEs to increase business flexibility during the COVID-19 period [8]. Both human capital value and heterogeneity facilitate bounce-forward resilience [9]. Revenue, reliable supply chain, management adaptability, governmental subsidies, risk management, innovation, firm size, and the staff's efficiency are the major determining factors of financial resilience [10]. The mobilization of potential slack of no-debt SMEs to raise financial resources during COVID-19 is positively associated with profitability [11].

Research Gap

In the SMEs' literature, there is a research gap in assessing subjective and objective resilience simultaneously. Our study applies the perception and personal judgement of adaptability to external challenges as subjective resilience.

Two aspects were measured as usage and importance. The objective resilience measures in this study include the recovery time of total revenue, operating profit, material costs, labor costs, net income, and related financial ratios.

Research Hypotheses

H1: There is a link between the perception of the SMEs' managers about business recovery after the pandemic as subjective resilience and the recovery time type of objective resilience measures based on financial statement data.

H2: Subjective resilience measures are in relationship with basic SME characteristics, such as years in business, total assets, and the number of employees.

H3: Objective resilience measures are in relationship with basic SME characteristics, such as years in business, total assets, and the number of employees.

Research Methodology

To examine the importance and application of sustainability criteria, we surveyed randomly selected small and medium-sized enterprises (SMEs) in Hungary. The comprehensive questionnaire consisted of 62 questions. The data collection took place in May 2023 and in July 2024. The target group consisted of active SMEs employing at least 1 and at most 250 people. After data cleaning, the final sample included 462 companies out of which total of 369 businesses remained in the analysis due to missing values or outliers. The Chi-square test shows that the distributions by economic activity and number of employees of the original and the reduced sample can be assumed as identical ($\chi^2=4.89$, $df=16$, $p=0.996$; $\chi^2=2.19$, $df=4$, $p=0.700$). Hence, the smaller subsample is appropriate for further analysis.

Variable description

As shown in the Table 1, subjective resilience is assessed using two sets of questions. The first set, consisting of nine items, evaluates the implementation of measures that enhance business resilience, while the second set, comprising eight items, examines the perceived importance of these measures. Each item is rated on a five-point Likert scale. A score of 1 indicates “not at all...”, whereas a score of 5 signifies “highly...”. Both item sets are aggregated into a single indicator. As Cronbach’s alpha indicates values greater than 0.75 (usage=0.801, importance=0.763) in both cases, we assumed that the item sets have the necessary internal consistency. As an aggregation method, we applied the sum of the items (unweighted aggregations), which correlates strongly with the results of the first principal component.

Table 1
Descriptive statistics of the item sets

	Items	1	2	3	4	5	mean
Usage	Crisis resilience	9	7	30	82	236	4.453
	Financial monitoring	3	1	10	61	291	4.738
	Key activities awareness	4	1	13	62	289	4.710
	Supplier diversification	13	15	46	95	196	4.222
	Cybersecurity preparedness	59	39	95	76	96	3.304
	Technology adoption	25	14	79	124	124	3.842
	Scenarios for crisis	27	25	105	105	104	3.639
	Employee engagement	11	8	45	128	175	4.221
	Customer base expansion	17	10	69	112	158	4.049
Importance	Liquidity assurance	2	1	18	60	284	4.707
	Cost reduction	6	5	44	101	212	4.380
	Digital payments	19	17	68	98	163	4.011
	Supplier & partner expansion	20	15	80	114	136	3.907
	Employee commitment	15	6	23	97	225	4.396
	Customer growth	11	13	42	114	187	4.234
	Cybersecurity enhancement	27	23	80	92	144	3.828
	Crisis preparedness	32	34	85	104	111	3.623

The resilience-related factors in the ESG questionnaire were selected from the literature survey above: instant payment and liquidity management [11], decreasing operating expenses constantly, increasing the use of digital payments, increasing the number of suppliers and other stakeholders for maintaining operations, lowering the risk of value chain disruptions [10, 2], long-term commitment of employees to the corporation [2, 9], increasing the number of customers, covering new customer segments and geographical diversification [3], increasing cybersecurity (the protection of internal IT, website, and data privacy of customers and internal data against hackers) [12], and the preparation of crisis scenarios and action plans during periods of operations as usual to manage potential crisis situations [2].

Table 2
Descriptive statistics of the objective resilience measures

Financial indicators	Relative frequencies (%) by recovery time codes				
	0	1	2	3	3+
Total assets	62.1	14.9	5.4	4.3	13.3
Net profit	48.0	22.2	10.0	3.3	16.5
Total revenue	46.6	19.8	13.6	4.6	15.4
Labor costs	55.8	11.1	13.0	7.0	13.0
Material costs	43.6	22.8	11.1	4.6	17.9
EBIT	47.7	21.1	12.2	3.3	15.7

Objective resilience is assessed based on the recovery time of various financial indicators. The 2019 performance of SMEs serves as the baseline, representing the last full year before the COVID-19 pandemic. This baseline is compared to the 2020 performance levels. If an SME's financial indicators in 2020 are equal to or exceed those of 2019, the firm is classified as resilient (coded as 0), indicating that the crisis did not result in a setback. Recovery codes of 1, 2, 3, and 3+ signify how many years it took to regain performance after the crisis. (Table 2) The metrics used do not account for any declines occurring after 2020. The majority of small and medium-sized enterprises managed to recover from the pandemic within one year, as indicated by metrics such as total assets, total revenue, or net profit. These businesses more frequently adjusted material costs than labor costs. Approximately one-third of the less resilient SMEs were unable to restore their pre-pandemic labor costs within three years.

Discussion

To evaluate the relationships between the variables, different methodological approaches are employed.

Table 3

P-values of the relationship analyses between subjective and objective resilience measures¹

Objective measures (recovery time)	Subjective measures	
	Resilience – usage score	Resilience – importance score
Total assets	0.517	0.092
Net profit	0.454	0.771
Total revenue	0.169	0.056
Labor costs	0.528	0.762
Material costs	0.441	0.053
EBIT	0.292	0.638

Concerning our first hypothesis (H1), our research identified a significant association between subjective and objective resilience only in a few cases. Specifically in terms of total revenue and material costs with perceived importance. However, all other recovery time indicators did not demonstrate a relationship with subjective resilience measures (see Table 3).

Table 4

P-values of the relationship analyses between resilience measures and basic firm characteristics²

Resilience measures*	Years in business	Employees	Total assets	Economic activity	Location
Resilience – usage score*	0.934	<0.001	<0.001	0.848	0.123
Resilience – importance score*	0.843	<0.001	<0.001	0.658	0.222

Contd...

- 1 All p-values refer to the F-test of one-way ANOVA. Homogeneity of variances can be assumed in all cases of ANOVA. The level of significance is 0.10.
- 2 The natural logarithm is applied in the case of employees and total assets in correlation with subjective resilience scores to ensure linear relationships. Dark grey cells indicate the t-test of correlation, light grey cells indicate the chi-square test of independence, and white cells refer to the F-test of one-way ANOVA. Homogeneity of variances can be assumed in all cases of ANOVA. The level of significance is 0.10.

Total assets**	0.136	0.143	0.011	0.745	0.534
Net profit**	0.850	0.938	0.149	0.843	0.484
Total revenue**	<0.001	0.126	0.062	0.546	0.481
Labor costs**	0.466	0.033	0.023	0.335	0.739
Material costs**	0.011	0.520	0.030	0.465	0.557
EBIT**	0.459	0.889	0.149	0.307	0.611

Note: * subjective measures, ** objective measures (recovery time)

Both dimensions of subjective resilience exhibit a significant relationship with business size, whether measured by the number of employees or total assets (H2). However, the year of establishment, economic activities, and location (whether in the capital city or not) do not show any association with subjective resilience measures. Most objective resilience measures do not exhibit associations with the general characteristics of businesses (H3), with a few exceptions. The recovery time of total assets is significantly related to business size. The recovery time of total revenue and material costs is associated with business age and total revenue. The recovery time of labor costs shows significant associations with both size related measures (employees and total assets. (Table 4)

Limitations of the Present Study

This study focused on the subjective and objective aspects of operational resilience. More subjective resilience metrics could be integrated into the research in the future. A complex approach would open new research possibilities, scrutinizing financial resilience, organizational resilience, digital resilience, or the importance of government subsidies.

Conclusion

Our research found a significant association between subjective and objective resilience in terms of total revenue, material costs, and the labor cost to revenue ratio. Both dimensions of subjective resilience exhibit a significant relationship with business size. Most objective resilience measures are not associated with the general characteristics of businesses. More resilient SMEs with shorter recovery times were able to protect the labor force via rebuilding market share faster, and supply chain risk

adjustments. Their subjective perception of business resilience is closer to objective resilience. Less resilient SMEs with longer recovery times were forced to adjust both the supply chain and the labor costs. The crisis preparedness, crisis scenarios and cybersecurity management are of moderate importance for SMEs as a strategic approach.

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