



Building the resilience of logistics companies through selected stakeholder groups

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Abstract

Motivation: Logistics companies are a vital link in most global supply chains and improve the performance of their partners by optimising costs, increasing delivery reliability and flexibility of operations, and improving logistics organisation. It is important to note that the logistics industry, through its role in serving other sectors of the economy, is susceptible to any disruption that causes the slowdown in those sectors. The topic of organisational resilience is addressed in the context of the logistics industry but in a particularised and fragmentary way. Stakeholders' involvement in creating logistic companies' resilience is rarely mentioned or researched.

Aim: This article is the Authors' attempt to fill the identified gap and aims to examine organisational resilience implications for logistics industry stakeholders. This article focuses on both internal and external stakeholders. The analysis was conducted on data from a survey study based on an original questionnaire, carried out among managers and workers of logistics companies. Methods dedicated to examining dependencies between qualitative variables were used, in particular: the Kruskal-Wallis test, and Spearman's rank correlation coefficient.

Results: It was possible to confirm and clarify the identified research gap: that the awareness and declarations of the need to engage stakeholders in building the resilience of logistics companies do not always translate into real actions in this direction. Further actions are necessary to encourage companies to really engage their stakeholders in activities that build resilience. Further research should be focused on exploring the differences in existing relations with different stakeholders in order to boost the resilience of logistics companies.

Keywords: resilience, logistics, transport, stakeholders, cooperation

JEL: L29, L91

1. Introduction

The unpredictability of changes in the environment has led to increased interest among researchers and decision-makers in the resilience of entities and systems to disturbances resulting from difficult-to-predict global and local events. Resilience can be considered from various perspectives—individual organizations, economic sectors, or systems - and is also of interest to various fields, including economics, management sciences, engineering, psychology, and many others. The logistics sector and the entities operating within it play an important role in supporting other sectors of the economy by ensuring the smooth flow of raw materials, semi-finished products, and finished goods. Companies in the logistics sector are just as vulnerable as other sectors to disturbances resulting from unpredictable events in their environment. In addition, these companies are indirectly affected by the disturbances arising in the sectors of the economy they serve. Research on the resilience of companies in the logistics industry, although increasingly

popular, does not address all the issues identified as important by research on resilience in other industries. One such gap, identified by León-Mateos et al. (2021) and Nguyen et al. (2023b), is the lack of a comprehensive approach to the importance of stakeholders in building resilience in the logistics sector. On June 17, 2025, the Council of Ministers adopted a deregulation measure concerning Environmental, Social, and Governance (ESG) reporting for companies. This obligation for small and medium-sized enterprises (SMEs) listed on the stock exchange was postponed from the original date of 2027 (for the 2026 financial year) to 2029 (for the 2028 financial year). From the perspective of the present study, the most compelling issues pertain to the Social (S) component, which focuses on the relationship between the enterprise and its employees and communities.

In order to fill the identified research gap, the authors undertook to examine organizational resilience implications for logistics industry stakeholders. Based on a literature review, it was decided to examine the level of involvement of the most frequently mentioned internal (employees) and external (suppliers and customers) stakeholder groups in the activities of logistics companies, especially in the area of resilience building. The following research questions were posed:

1. Do companies in the logistics sector involve their stakeholders in their activities?
2. Are declarations regarding the involvement of selected stakeholder groups in building the resilience of companies in the logistics industry reflected in the actions actually taken?
3. Are there any differences between the management and workers in terms of the actions declared and taken to involve stakeholders?

In addition to a systematic literature review, the article also draws on the results of primary research conducted among managers and workers of logistics companies in Poland. Statistical methods and tests were used to analyse the data, in particular the Kruskal-Wallis test and Spearman's rank correlation coefficient.

A review of the literature on stakeholder engagement and the identification of research gap in this regard in the logistics sector is described in section 2. Section 3 presents a brief description of the research conducted, as well as the variables representing the questions in the survey questionnaire, which relate to both declared and actual activities aimed at building the company's resilience. This section also indicates the statistical methods used in the analyses. Section 4 describes the results of the analyses, which are then referred to in section 5 in relation to other authors' studies on stakeholder engagement. Section 6 summarizes the results and presents conclusions.

2. Literature review

The starting point for the discussion in this section of the article is a systematic review of scientific articles on stakeholder involvement in building business resilience. The literature review draws on scientific articles from two journal databases, Scopus and Web of Science, covering the years 2019-2024.

First, the research problem was presented in various industries and sectors, and only then did we focus directly on the logistics industry. Among the 60 articles found, attention should be paid to those that take into account, on the one hand, the creation of resilience and, on the other hand, the participation of stakeholders in activities or recommendations for their actions.

Kazancoglu, Sezer et al. (2024) point out that one of the most important factors in coping with increasing supply chain resilience in the manufacturing industry is cooperation with stakeholders. In their article, they indicate that closer cooperation with stakeholders in supply chains results in quality assurance through increased security.

Odonkor and Urefe (2024), on the other hand, studying the SME sector, conclude that relationship management and stakeholder engagement are key to building resilience. Strong links with stakeholders are crucial. An important aspect is listening to customers to reduce dropouts and engaging employees by creating a positive working environment.

Using a comparison of cooperative enterprises, Billiet, Bruneel, and Dufays (2023) show that stakeholder engagement facilitates long-term organizational resilience and stakeholder protection in times of crisis. In addition, they point to the need for further research on the reasons why organizations engage in stakeholder relationships.

Guisse and co-authors (2024) identified and categorized healthcare system stakeholders that influence resilience in healthcare and mapped stakeholder relationships that are important for the functioning of the healthcare system.

Another area where research on resilience has been conducted is the tourism industry. Williams, You, and Joshua (2020) used Instrumental Stakeholder Theory (IST), which is the basis for analysing value creation and competitive advantage through stakeholder relationships.

The aim of the study by Qazi, Appolloni, and Shaikh (2024) was to examine the impact of stakeholders on supply chain resilience (SCR) and organizational performance (OP) using stakeholder theory in manufacturing and the service industry. It was pointed out that close coordination and cooperation contribute to the development of resilient supply chains and positive business performance. It was noted that close cooperation with suppliers can help build SCR. On the other hand, information exchange increases customer involvement at an early stage of product development.

Interestingly, Nguyen et al. (2023a) noted that, to date, few studies have focused exclusively on responding to the influence of external stakeholders in project management. Strategies that companies can adopt include adaptation, compromise, avoidance, rejection, and influence. The authors focused their research on external stakeholders and found that negotiation or concession approaches are used by managers in situations where stakeholders have critical input and use restraint or compromise strategies.

In some industries, it is very difficult to analyse stakeholder involvement in building resilience. One such example is the pharmaceutical industry. Vann Yaroson et al. (2023) stated that given the complexity of the PSC (pharmaceutical supply chain), research on resilience has been limited. One of the interesting conclusions from the article is that reactive strategies are less effective due to power-based behaviours and the complexity of the PSC. They also found that power-based behaviours increase partner dissatisfaction.

As already mentioned, the literature review on stakeholder engagement in resilience building was supplemented with an analysis of works on the topic of resilience in the logistic industry. The analysis covered 43 articles published in the last five years (2019–2024), indexed in the Scopus and Web of Science scientific journal databases. A full-text analysis of the articles showed that, as in the pharmaceutical industry (Vann Yaroson et al., 2023), there is also a lack of a clear approach to stakeholder engagement in resilience building in the logistics industry. Stakeholders in resilience research in the logistics industry appear as factors supporting resilience, factors reducing resilience, or as a component of measures and indicators determining the resilience of companies or supply chains.

Research by Azam et al. (2023) points to cooperation and information sharing with other links in the supply chain as critical success factors in ensuring supply chain resilience. Competencies in obtaining information and learning from partners and competitors in the market were important for the resilience of logistics service providers during the COVID-19 pandemic (Dovbischuk, 2022). This was also the case for other disturbances – Orengo-Serra and Sánchez-Jauregui (2021) pointed to the crucial importance of communicating with customers as a factor increasing the resilience of companies.

The results of research by Asafo-Adjei et al. (2023) on the complexity of dependency networks for companies in the logistics industry pointed to the importance of strong relationships with suppliers and customers as factors mitigating the risk of disturbances and creating network resilience. Monitoring and predicting customer needs and behaviors can help to avoid or respond more effectively to emerging disturbances. Zarbakhshnia and Karimi (2024) also point to collaboration with customers of logistics companies as a factor influencing supply chain resilience. Sundarakani and Onyia (2021), studying the disturbances caused by the COVID-19 pandemic and their impact on the resilience of the logistics industry in the UAE, emphasized the

importance of customer satisfaction as a factor in maintaining resilience, which is also perceived as a measure of a company's resilience.

Stakeholders (suppliers and customers) can both support resilience in the logistics industry and be a risk factor, as indicated by Pahwa and Jaller's (2023) research on last-mile deliveries. Research on disturbances in the logistics sector has highlighted the importance of employees as a factor in building business resilience both before (McVeigh and MacLachlan, 2019) and during the COVID-19 pandemic (Pauksztat et al., 2022; Garola et al., 2023). In the case of autonomous maritime transport, suppliers and employees were clearly identified as a factor limiting resilience (Fjørtoft et al., 2023).

The lack of a comprehensive approach to involving stakeholders in resilience-building activities in the logistics industry reported by some researchers (León-Mateos et al. 2021; Nguyen et al., 2023b) was the premise for undertaking research on stakeholder engagement in building resilience in logistics companies. Stakeholder groups most frequently identified in previous studies, both internal (employees) and external (suppliers and customers), were selected for the study.

3. Methods

The analysis conducted for the purposes of this article used data from a diagnostic survey, which employed a proprietary questionnaire developed as part of an interdisciplinary research project entitled "The role of an inclusive approach in building organizational resilience on the example of the TSL sector (2023–2025)." The research instrument consisted of 16 core closed-ended questions for all respondents (employees and managers) and 9 demographic questions (closed and semi-open). Given their expertise, managers answered a further 8 questions of a closed and semi-open nature. The pilot research was carried out from late June to early August 2024. The survey was conducted using CAWI and CATI techniques from October 2024 to January 2025 among 303 workers and 109 managers of companies in the logistics industry. The surveyed sample was quota-based and reflects the population structure in terms of enterprise size. Small enterprises were the most numerous (65.3%), followed by medium enterprises (18%), micro enterprises (9.2%), and large enterprises (7.5%). A significant majority of the companies (71.1%) operate on a national scale. Furthermore, 87.1% of the analysed enterprises have been active in the market for more than 5 years, with 52.7% operating for over 10 years and 22.1% for over 20 years. Due to the specific nature of the subject matter addressed in the article, it was decided to further divide the workers into those working in micro and small enterprises (226 people) and in medium and large enterprises (77 people). Therefore, most of the results presented in the article, are divided into these three groups of respondents.

It should be recalled that one of the research tasks of the article was to show the relationship between declarations and actual actions aimed at building company resilience through the involvement of selected stakeholder groups. For this reason, the study used two groups of questions relating to declarations (Q1.1, Q1.2, Q1.3 and Q5, Table 1) and the actual actions of respondents (Q2.1, Q2.2, Q3.1, Q3.2, Q4.1, Q4.2 and Q4.3, Table 1). Furthermore, as the respondents' answers to each question were expressed on a 5-point Likert scale, aggregated variables were constructed to show the average opinion of the respondents on the aspects under study. The reliability analysis confirmed the possibility of constructing such variables, which will be referred to as indices in the further part of the article (Table 2). In this way, the following were obtained:

- Index 1: declared commitment to the company's activities by selected stakeholders: customers, employees, and suppliers (Q1.1, Q1.2, Q1.3);
- Index 2: actions to engage customers in building the company's resilience (Q2.1 and Q2.2);
- Index 3: actions to engage employees in building the company's resilience (Q3.1 and Q3.2);
- Index 4: effectiveness of measures to build the company's resilience in times of crisis (Q4.1, Q4.2, and Q4.3).

In the first part of the analysis, the Kruskal-Wallis test and post-hoc analysis (Kruskal, Wallis, 1952) were used to show whether managers and workers differ in terms of their declared activities involving selected stakeholder groups. In the next part, the relationships between declarations and actual actions aimed at engaging stakeholders in building the company's resilience were examined. Due to the ordinal scale of the variables, Spearman's rank correlation coefficient (Spearman, 1904) was used, which allowed not only to identify a significant relationship, but also to determine its strength and direction.

All calculations and statistical analyses were conducted using IBM SPSS Statistics version 29 (IBM Corp., Armonk, NY, USA).

4. Results

In response to the research questions, a study was conducted to determine: (1) whether companies in the logistics industry engage internal and external stakeholders in building their own resilience, (2) to what extent the involvement of employees, customers, and suppliers is merely a declaration and to what extent it is an actual activity of companies, and (3) how these declarations and activities are perceived by people in managerial positions and by employees. For this reason, most of the research was divided into three groups of respondents: managers, workers in medium-sized and large com-

panies, and workers in micro and small companies, as the specific nature of the position held and the size of the company can significantly influence the perception of the aspects under study. The analysis used respondents' answers to the questionnaire, as well as aggregated variables – indices (described in Section 3).

In all groups surveyed, respondents declared that they involved stakeholders in building resilience. However, significant differences were observed between the individual groups. Managers more often declared a high level of engagement with customers (93.6% of respondents gave answers “4” and “5” combined), employees (85.4% combined), and suppliers (74.3% combined) than the workers surveyed (Table 3). Furthermore, the Kruskal-Wallis test used in the study (Table 4) and post-hoc analysis (Table 5) indicate that the declared commitment (towards customers, as well as employees and suppliers) in the group of managers is significantly higher than among workers. Furthermore, there are no significant differences in this respect between workers of medium/large and micro/small enterprises (Table 5).

A comparison of statements regarding stakeholder engagement with responses about actual activities reveals some discrepancies. The largest discrepancies were observed in managers' responses regarding customer engagement, where optimistic statements clearly predominate (Chart 1C). Significant differences between declarations and actions were also found in managers' responses regarding employee engagement in building business resilience (Chart 2C). These differences are significantly smaller in the responses of workers of micro and small companies (Chart 1A and 2A), while among workers of medium and large companies, declarations and actions are almost the same (Chart 1B and 2B). One possible explanation is that respondents, especially managers, may declare a high level of stakeholder engagement because they perceive such activities as good management practice and an element of building a positive image of the company. Declarations may therefore reflect expectations or the desired perception of the company rather than its actual practices. This is especially true for managers who, being responsible for strategy, may place greater emphasis on customer focus in their statements. Their potentially less direct contact with customers, compared to workers, may further lead to an overestimation of the actual level of engagement.

Despite these discrepancies, the values of the calculated Spearman's rank correlation coefficient showed a positive correlation, although not always significant, between the declared commitment of customers and employees and their actual involvement in resilience building (Tables 6 and 7). In particular, the results of the analyses carried out on both groups of workers (i.e., from micro/small and medium/large companies) show a moderately positive correlation in this regard. This suggests that companies that declare a higher level of engagement are likely to attach greater importance to it and, as a rule,

take more action than companies declaring a low level. The declared intention, therefore, seems to translate into a certain level of actual action. It can also be hypothesized that customer engagement mechanisms are potentially easier to implement than deep, systemic employee engagement, which often requires organizational cultural change. This may explain the stronger correlation observed in the case of customers.

Interesting results were obtained by analysing the priorities indicated by respondents in their declared crisis measures. Although customers are consistently identified as the most important priority, it was observed that the stronger the respondents' declaration regarding meeting customer requirements in a crisis, the less likely they were, on average, to take customers' opinions into account in their actions or to translate them into action. This is reflected in the negative or insignificant Spearman's correlation coefficients calculated between questions Q5 and Q2.1 and Q2.2 (Table 8). In a crisis situation, companies seem to focus primarily on immediate operational survival, security, and financial liquidity. Previously declared concern for customers' opinion may take a back seat to time and resource pressures. The concept of the customer as a priority in a crisis is likely to be understood as maintaining continuity of supply to the customer or protecting the company, seen as an action for the benefit of customers in the future, but not necessarily as actively seeking customers' feedback during the crisis.

Continuing with activities that build the company's resilience in times of crisis and uncertainty (Index 4), we checked whether they are related to the declared commitment of stakeholders to these activities (Index 1). The analysis of the correlation between these indices showed a moderate positive relationship, but it was only significant in workers' groups (Table 9). This means that, according to workers, stakeholder engagement in the activities of a logistics company seems to have a positive impact on the level of operational resilience, measured, among other things, by the level of services provided, and, as a consequence, may build the overall resilience of the company.

A more detailed analysis of the results reveals several important facts. The calculated correlation coefficients vary depending on the group of respondents and the type of stakeholders involved (Table 10). The diversity of these results, primarily in terms of significance but also in terms of the strength of the relationship, suggests that:

- workers, especially those working for micro and small logistics companies, perceive the involvement of various stakeholders as a measure supporting the maintenance of logistics service quality in times of crisis;
- workers of medium-sized and large companies generally do not see how statements about them translate into actual actions in times of crisis;
- managers are most likely to translate statements about suppliers into actual actions (although this correlation is still weak).

Different perceptions of the role of stakeholder engagement in a crisis may stem from different managerial and workers' perspectives. Managers, focusing on control, efficiency, and operational continuity according to established procedures, may perceive engagement (especially external engagement) as time-consuming, unpredictable, and hindering quality assurance, and therefore likely prefer top-down decisions. On the other hand, workers, directly confronted with problems, may see stakeholder engagement as a key adaptive mechanism – essential for obtaining information, solving problems, and maintaining adequate service quality in changing conditions, and its absence as a barrier to effective action.

5. Discussion

To the best of the authors' knowledge, at the time of conducting the described study on stakeholder engagement in building resilience by companies in the logistics sector, no other studies in this sector addressed this issue. Stakeholders were considered one of the elements important for the resilience of entities in the logistics industry, but no attempt was made to examine whether and how the declared actions translate into actual actions in times of disturbances. The previously cited works by León-Mateos et al. (2021) and Nguyen et al. (2023b) even pointed to a lack of a comprehensive approach to the importance of stakeholders for resilience in the logistics sector. The lack of research whose results can be directly compared with those presented in our article confirms the identified research gap, which the authors aimed to fill with the present study.

The authors considered the validity of comparing the obtained results with those concerning stakeholder involvement in building business resilience in other industries, but decided against it due to the specific conditions of the logistics sector. Another factor in favour of not directly comparing the results obtained with those from other sectors was the subject matter and scope of the study. The stakeholder groups included in our analyses (employees, customers, and suppliers – most frequently identified in studies on resilience in the logistics sector) were not examined in this way in other sectors, as these studies focused on stakeholder groups specific to the sectors in question (e.g., Guise et al. (2024) studying stakeholders in the healthcare system or Vann Yaroson et al. (2023) in the pharmaceutical industry). The subjective scope adopted in our research, which involved both managers and workers of logistics companies, also makes it difficult to compare the results with those from other industries.

A comparison with earlier studies on the role of stakeholders in building resilience in logistics companies, unfortunately, without considering their involvement, reveals several similarities with previous studies. A number

of studies, including Zarbakhshnia and Karimi (2024) and Sundarakani and Onyia (2021), point to the importance of customers for resilience, especially in terms of effective communication with them (Orengo-Serra and Sánchez-Jauregui, 2021). Our results confirm that customers are perceived as the most important priority for companies (declarations), but this is not always reflected in the actions taken during disturbances/crises. These seemingly contradictory results can be related to the relationship observed by Asafo-Adjei et al. (2023) between the complexity of the customer network and its positive or negative (depending on the fragmentation of the customer base) impact on resilience during disturbances. Also, in the case of the high declared importance of supplier and employee engagement, reference can be made to earlier studies pointing to the importance of these stakeholder groups for building resilience in the logistics sector (for suppliers, again Asafo-Adjei et al. (2023) and Pahwa and Jaller, (2023); for employees, McVeigh and MacLachlan (2019) and Garola et al. (2023)).

6. Conclusion

The research conducted and the results obtained allowed us to achieve the set goal and answer all the research questions concerning stakeholder engagement in building resilience of companies from the logistics sector. Among the most important conclusions, it should be noted that:

- workers and managers generally point to high stakeholder engagement in building the company's resilience. Managers are the most optimistic in this regard;
- at the same time, Spearman's rank correlation coefficients generally show a moderate relationship between declared and actual activities involving customers and employees in building the company's resilience. Interestingly, the lowest, and sometimes even insignificant, relationship is observed among managers;
- also, in times of crisis, the commitment declared by workers, which is moderate at best, translates into actual actions, i.e., maintaining delivery times, delivering products in the same condition, and ensuring the same level of service as in times of stability. Among managers, there is only a positive correlation between declarations and actions concerning suppliers;
- it can also be said that it is in workers' groups that declarations are most strongly translated into actions aimed at building resilience through stakeholder engagement. However, it is not possible to clearly indicate whether this trend is significantly stronger among workers of micro and small companies or among those of medium and large companies.

The main contribution of the described research is the exploration of an identified research gap concerning stakeholder engagement in building resilience of companies in the logistics industry. The obtained and presented results may contribute to further research in this area.

Based on the study's findings, which highlight a significant gap between the declared importance of stakeholder engagement and the actual implementation of related activities, we recommend that managers and workers in the logistics sector intensify their efforts in stakeholder relationship management to enhance business resilience. To effectively translate these declarations into action, managers should develop and implement formal frameworks for collaboration. This includes establishing stakeholder advisory boards with representatives from key customer and supplier groups to participate in strategic planning, particularly in joint risk assessment and the co-creation of contingency plans. Furthermore, creating shared communication platforms can ensure a transparent and continuous flow of information, which is crucial for building trust and aligning resilience priorities between managerial perspectives and workers' on-the-ground experiences.

However, further research is needed to prepare more detailed recommendations. Only by identifying the types and quality of links between individual stakeholders and their effects – both formal and informal – can strategies be prepared that ensure effective stakeholder engagement in building business resilience. This identification is crucial because any stakeholder can be both a factor supporting a company's resilience and a source of new requirements or limitations. Ultimately, understanding the real needs of stakeholders and involving them in the resilience-building process is fundamental for fostering trust and managing expectations.

Of course, it should be noted that our study is not without certain limitations. One of them is the selection of the sample – the study covered the entire logistics industry, which includes very diverse entities, both in terms of their characteristics (e.g., size, time on the market, number of customers served) and areas of activity (e.g., transport, distribution, warehousing). Furthermore, the research was conducted among Polish enterprises, but since they also operate on the international market, the results may reflect the situation in a broader context. Another limitation is the focus of the study on only three – or as many as three – groups of stakeholders who may be involved by companies in the process of building resilience. One more potential limitation of this study stems from the responses provided by managers, who have not yet been legally obligated to engage in formal ESG reporting. Their responses may be subject to social desirability bias, as there is currently no mechanism to verify their stated positions against the enterprise's actual practices in this domain. While the implementation of sustainable practices within an enterprise demonstrably impacts its long-term success (affecting both its image and investment attractiveness), managers who emphasize fair business practices, diversity, and the inclusion of various

stakeholders in the enterprise's activities may inadvertently construct an overly positive image within the community. This discrepancy between reported and actual performance represents a constraint on the objective interpretation of the managerial data.

Further research directions relate directly to the limitations identified and may include areas such as: 1) comparative studies with logistics sectors in other countries; 2) focusing either on a specific type of entity in the logistics industry or on a selected area of the market served; 3) conducting a case study in several enterprises; 4) extending the study to other stakeholder groups; 5) narrowing and deepening the study to relations with only one stakeholder group; or 6) narrowing the research only to large companies which already comply with ESG reporting requirements.

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Note: the results of this study were presented in another form, such as a presentation at a conference.



Appendix

Table 1. Questions from the survey questionnaire concerning declarations and actual activities that build the company's resilience through stakeholder engagement

Declarations			Activities		
No.	Question		No.	Question	
Q1	To what extent does your company engage the following stakeholder groups in different areas of its operations?		Q2	To what extent does your organization take the following actions towards its customers?	
	1.1	customers		2.1	it identifies customers' needs at the service design stage
	1.2	employees		2.2	it involves customers in making backup plans.
	1.3	suppliers	Q3	To what extent does your organization take the following actions toward employees?	
Q5	In your opinion, is meeting customers' requirements a priority for your company in times of crisis or unforeseen events?		3.1	it engages in dialogue on problem solving within the organization	
			3.2	it involves employees in making backup plans	
			Q4	During times of crisis or disturbances, are you able to...	
			4.1	maintain pre-crisis delivery times	
			4.2	deliver products in the same condition as during periods of stability	
			4.3	ensure the same level of customer service as always	

Source: Own preparation based on Authors' research.

Table 2. Results of reliability analysis

Index	Combined questions	Cronbach's Alpha Value
Index 1	Q1.1, Q1.2, Q1.3	0.738
Index 2	Q2.1, Q2.2	0.626
Index 3	Q3.1, Q3.2	0.737
Index 4	Q4.1, Q4.2, Q4.3	0.728

Source: own calculations based on Authors' research.

Table 3. Cumulative percentage of responses *to a large extent* and *to a very large extent* to questions concerning the involvement of selected stakeholders in the company's activities aimed at increasing its resilience (Q1.1, Q1.2, Q1.3)

Declared commitment to:	Cumulative percentage of responses to a large and to a very large extent		
	Workers of micro and small companies [%]	Workers of medium and large companies [%]	Managers [%]
Q1.1: customers	66.3	70.1	93.6
Q1.2: employees	64.6	63.7	85.4
Q1.3: suppliers	61.1	57.2	74.3

Source: own calculations based on Authors' research.



Table 4. Results of the Kruskal-Wallis test

Question	Kruskal-Wallis test	p-value	Decision
Q1.1: customers	66.3	< 0.001	Significant differences in response patterns between the study groups
Q1.2: employees	64.6	< 0.001	
Q1.3: suppliers	61.1	< 0.001	

Source: own calculations based on Authors' research.

Table 5. *Post-hoc* analysis results

Compared groups	Test statistics			p-value
	Q1.1	Q1.2	Q1.3	
(1) workers of micro and small companies (2) workers of medium and large companies	-8.2	2.6	-5.8	1.0
(1) workers of micro and small companies and (3) managers	107.1	46.9	62.2	< 0.05
(2) workers of medium and large companies and (3) managers	98.9	44.2	56.4	< 0.05

Source: own calculations based on Authors' research.

Table 6. Spearman's correlation coefficients showing the relationship between statements (Q1.1) and actual customer engagement activities (Index 2)

	Index 2: actions to engage customers		
	Workers of micro and small companies	Workers of medium and large companies	Managers
Q1.1: statements about customer engagement	0.492***	0.495***	0.045

p-value: $p < 0.001$, then ***; $0.001 \leq p < 0.01$, then **; $0.01 \leq p < 0.05$, then *

Source: own calculations based on Authors' research.

Table 7. Spearman's correlation coefficients showing the relationship between statements (Q1.2) and actual employee engagement activities (Index 3)

	Index 3: actions to engage employees		
	Workers of micro and small companies	Workers of medium and large companies	Managers
Q1.2: statements about employee engagement	0.451***	0.488***	0.437***

p-value: $p < 0.001$, then ***; $0.001 \leq p < 0.01$, then **; $0.01 \leq p < 0.05$, then *

Source: own calculations based on Authors' research.

Table 8. Spearman's correlation coefficients showing the relationship between the company's declared priority actions (Q5) and actual customer engagement activities (Q2.1, Q2.2)

	Q2.1: identification of customers' needs at the service design stage			Q2.2: customers' involvement in making backup plans		
	(1)	(2)	(3)	(1)	(2)	(3)
Q5: meeting customers' requirements in times of crisis	-0.354**	-0.075	-0.082	-0.378**	-0.177	-0.222*

Legend: group (1) – workers of micro and small companies, (2) – workers of medium and large companies, (3) – managers; p-value: $p < 0.001$, then ***; $0.001 \leq p < 0.01$, then **; $0.01 \leq p < 0.05$, then *; Source: own calculations based on Authors' research.

Table 9. Spearman's correlation coefficients showing the relationship between statements (Index 1) and actual actions involving stakeholders in building the company's resilience in times of crisis (Index 4)

	Index 4: effectiveness of measures to build the company's resilience in times of crisis		
	Workers of micro and small companies	Workers of medium and large companies	Managers
Index 1: declared commitment of the stakeholders	0.538**	0.535**	0.118

p-value: $p < 0.001$, then ***; $0.001 \leq p < 0.01$, then **; $0.01 \leq p < 0.05$, then *

Source: own calculations based on Authors' research.

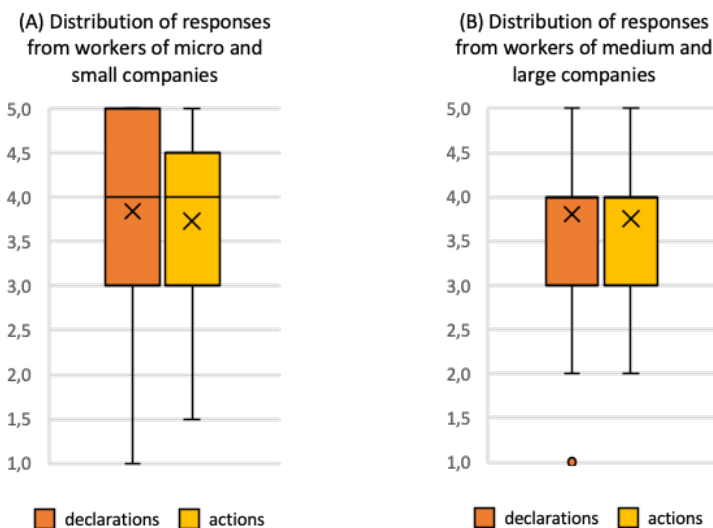
Table 10. Spearman's correlation coefficients showing the relationship between statements regarding stakeholder engagement (Q1.1, Q1.2, Q1.3, and Index 1) and the company's actual actions during times of crisis (Q4.1, Q4.2, and Q4.3)

	Company's actions during times of crisis compared to periods of stability								
	Q4.1: maintaining delivery times			Q4.2: delivering products in the same condition			Q4.3: ensuring the same level of customer service		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Q1.1	0.38**	0.20	-0.25**	0.51**	0.41**	0.00	0.30**	0.36**	-0.01
Q1.2	0.30**	0.20	0.13	0.28**	0.22	-0.05	0.27**	0.17	-0.01
Q1.3	0.36**	0.49**	0.22*	0.45**	0.46**	0.04	0.15*	0.40**	0.27**
Index1	0.44**	0.38**	0.13	0.50**	0.49**	-0.01	0.29**	0.43**	0.16

Legend: group (1) – workers of micro and small companies, (2) – workers of medium and large companies, (3) – managers; p-value: $p < 0.001$, then ***; $0.001 \leq p < 0.01$, then **; $0.01 \leq p < 0.05$, then *

Source: own calculations based on Authors' research.

Chart 1. Comparison of response distributions regarding declared customer engagement (Q1.1) and actual customer-focused activities (Index 2) in three groups of respondents



(C) Distribution of responses
from managers

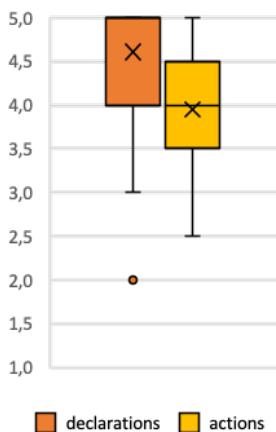
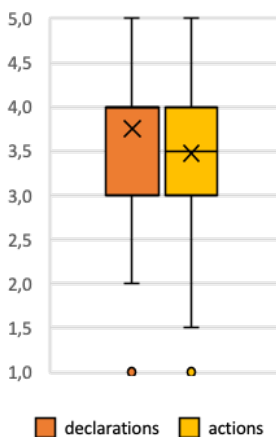


Chart 1. Comparison of response distributions regarding declared customer engagement (Q1.1) and actual customer-focused activities (Index 2) in three groups of respondents

Source: Own preparation based on Authors' research.

Chart 2. Comparison of response distributions regarding declared employee engagement (Q1.2) and actual employee-oriented activities (Index 3) in three groups of respondents

(A) Distribution of responses
from workers of micro and
small companies



(B) Distribution of responses
from workers of medium and
large companies

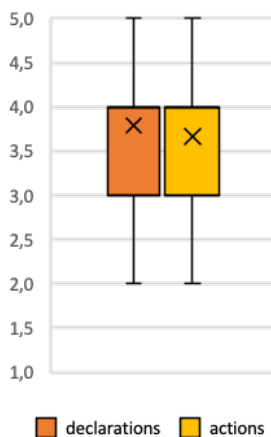
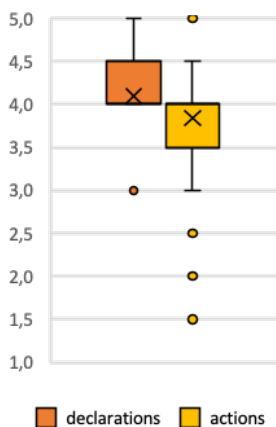


Chart 2. Comparison of response distributions regarding declared employee engagement (Q1.2) and actual employee-oriented activities (Index 3) in three groups of respondents

(C) Distribution of responses
from managers



Source: Own preparation based on Authors' research.