

Resilience and Strategic Agility of Turkish Manufacturing Firms: Post-COVID-19 and 2023 Earthquake Recovery

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ABSTRACT

The global economy is undergoing significant shifts, requiring organisations to develop resilience and agility to navigate a volatile business environment marked by crises such as the COVID-19 pandemic, natural disasters, and globalisation. Strategic agility refers to the ability of the firm to quickly adapt to new trends in the market, consumer taste, and technology and leverage emerging markets and opportunities while mitigating threats and challenges. This study examines the resilience of Turkish manufacturing companies following two major crises: the COVID-19 pandemic and the 2023 earthquake. The research aims to enhance the formulation of comprehensive strategies by implementing strategic agility dimensions to support firms' survival and growth. The study employed a quantitative research design, drawing on secondary data from 100 manufacturing companies on the Istanbul Stock Exchange, with financial data from 2021 to 2024. Of these companies, 17 were family-owned, while 82 were non-family-owned, and a total of 125 patents were issued during the period (2021–2023). The research employed descriptive analysis, paired and independent tests, and regression analysis. The study assessed key financial performance indicators, including net profit margin growth rate, profit growth rate, sales growth rate, and asset growth rate. The results indicate that companies exhibited similar sales and net profit recovery from the COVID-19 pandemic and the earthquake. However, the two crisis periods observed significant differences in profit margins and net assets. Moreover, family-owned and non-family-owned firms displayed distinct recovery patterns, particularly in net asset and profit margin recovery. At the same time, no significant differences were found in net profit and sales performance between the two groups. The research shows that there is a significant relationship between strategic agility and resilience with firm performance. This study provides valuable insights into the resilience of manufacturing firms in crisis conditions and underscores the importance of strategic agility for sustaining business growth during periods of volatility.

Keywords: Resilience, Strategic agility, manufacturing firms.

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Cite as: Yazıcı, Ö. & Mugumbate, H. (2025). Resilience and Strategic Agility of Turkish Manufacturing Firms: Post-COVID-19 and 2023 Earthquake Recovery. *Journal of Business and Trade*, 6(2), 93-103.
<https://doi.org/10.58767/joinbat.1677770>

Türk İmalat Firmalarının Dayanıklılığı ve Stratejik Çevikliği: COVID-19 Sonrası ve 2023 Depremi Sonrası İyileşme

ÖZET

Küresel ekonomi, kuruluşların COVID-19 salgını, doğal afetler ve küreselleşme gibi krizlerin damgasını vurduğu değişken bir iş ortamında gezinmek için esneklik ve çeviklik geliştirmelerini gerektiren önemli değişimlerden geçiyor. Stratejik çeviklik, firmanın pazardaki, tüketici zevkindeki ve teknolojiye yeni trendlere hızlı bir şekilde uyum sağlama ve tehditleri ve zorlukları azaltırken gelişmekte olan pazarlardan ve fırsatlardan yararlanma yeteneğini ifade eder. Bu çalışma, iki büyük krizin ardından Türk imalat şirketlerinin dayanıklılığını incelemektedir: COVID-19 salgını ve 2023 depremi. Araştırma, firmaların hayatta kalmasını ve büyümesini desteklemek için stratejik çeviklik boyutlarını uygulayarak kapsamlı stratejilerin oluşturulmasını geliştirmeyi amaçlamaktadır. Çalışmada, İstanbul Menkul Kıymetler Borsası'nda işlem gören 100 imalat şirketinin ikincil verilerine ve 2021'den 2024'e kadar olan finansal verilere dayanan nicel bir araştırma tasarımı kullanılmıştır. Bu şirketlerden 17'si aileye aitken, 82'si aileye ait değildi ve bu dönemde (2021-2023) toplam 125 patent çıkarıldı. Araştırmada tanımlayıcı analiz, eşleştirilmiş ve bağımsız testler ve regresyon analizi kullanılmış, çalışma net kar marjı büyüme oranı, kar büyüme oranı, satış büyüme oranı ve varlık büyüme oranı dahil olmak üzere temel finansal performans göstergelerini değerlendirmiştir. Sonuçlar, şirketlerin COVID-19 salgını ve depremden benzer satışlar ve net kar toparlanması sergilediklerini gösteriyor. Bununla birlikte, iki kriz döneminde kar marjlarında ve net varlıklarda önemli farklılıklar gözlemlenmiştir. Ayrıca, aileye ait ve aileye ait olmayan firmalar, özellikle net varlık ve kar marjı toparlanmasında farklı toparlanma modelleri sergilemiştir. Aynı zamanda, iki grup arasında net kar ve satış performansında anlamlı bir fark bulunmamıştır. Araştırma, stratejik çeviklik ve esneklik ile firma performansı arasında anlamlı bir ilişki olduğunu göstermektedir. Bu çalışma, imalat firmalarının kriz koşullarında dayanıklılığına ilişkin değerli bilgiler sağlamakta ve oynaklık dönemlerinde iş büyümesini sürdürmek için stratejik çevikliğin öneminin altını çizmektedir.

Anahtar Kelimeler: Esneklik, Stratejik çeviklik, imalat firmaları

1. Introduction

Throughout history, from the medieval period, the first industrialisation to the modern economy, natural disasters such as earthquakes, hurricanes, outbreaks such as COVID-19 and geopolitical events including Russia, Israel and Palestine have always posed unprecedented threats to the growth and survival of the global economy (Rostan & Rostan, 2022; Vogus & Sutcliffe, 2007). The global economy is generally facing major shifts in many industries, including the manufacturing industry, prompting organisations to become more resilient and agile to trends in the business environment (Polinkevych et al., 2021). A worldwide pandemic, globalisation, digitalisation, trade liberalisation, interconnectedness, and globalisation have created an unstable business climate that has left many firms in an environment of prevalent volatility, uncertainty, complexity, and ambivalence (Mishra et al., 2021).

The advent of natural disasters such as earthquakes and the COVID-19 shock affected many European economies. The level of uncertainty in the business world has prompted organisations to identify threats and opportunities that can be maximised to create a sustainable competitive advantage. Disrupted customer buying or purchasing behaviours forced firms to adjust business models quickly (Jordà et al., 2022; Lee et al., 2021). Albeit natural disasters further impacted economies, the global market is continuously changing, calling for new policies and approaches in business. COVID-19 is likely not the last pandemic, so creating new strategies is imperative for survival rather than a choice. It is significant to note that in the face of new natural disasters and pandemics, existing managerial theories cease to be relevant. Only organisations that can innovate and adjust operations continuously (Jones et al., 2022; Lengnick-Hall et al., 2011). The major goal every firm seeks to achieve is creating a sustainable competitive advantage and value for the organisation.

Organisational resilience and agility advocate for flexibility, and fast and critical market analysis as a source of competitive advantage for firms (Clauss et al., 2021). Organisational agility has gained relevance in the business world as a response to the ever-changing business world and in times of crisis. A study by Vogus and Sutcliffe (2007) further argues that an organisation that applies strategic agility and resiliency in responding to business changes can secure its future competitive advantage. Even though strategic agility and resiliency have gained relevance in the academic world, there is still limited literature on public sector organisations or stock exchange-listed firms, especially during a crisis.

1.1. COVID-19 and Earthquakes in Turkey

The COVID-19 pandemic caused major shocks in the global economy, several industries were affected manufacturing, retail, agriculture, etc. The pandemic impacted all developed and developing economies (Alam & Ali, 2023). The pandemic quickly spread to the five continents, killing millions of people within a short period, plunging the world into a recessionary global economy. Governments began to introduce restrictive measures to contain the spread of the virus. Within a few months, over 587,110,053 had contracted and died from the Coronavirus. The restrictive measure paralysed economies, disrupting supply chain, manufacturing, service industry as the labour contracted, many workers became jobless, and economies entered into recession (Büyükbozdoğan, 2024).

Based on the report by World Economic Outlook, the IMF indicated the global economy had already shrunk by over 6.3%. The UN Conference on Trade and Development (UNCTAD) reported \$50 billion in export losses, and worse results were experienced in developing countries. Based on this background, the research study seeks to investigate the resilience of Turkish manufacturing companies during crises such as the pandemic (Lee et al., 2021; Rostan & Rostan, 2022). The pandemic came in 2019, when the Turkish economy suffered from bad loans, and unemployment rates and recovering from the 2018 economic recession, the country recorded almost no growth in 2019. The pandemic hit the Turkish economy harder after experiencing two years of economic dwindles (Lee et al., 2021; Mishra et al., 2021).

The Turkish economy's GDP decreased by over 9.9% by 2020, with increased outflows of capital and debt, and the government spent over 600 billion TRY on COVID-19 support. This further strained the economy, which was already struggling. Before the second wave of COVID-19, the Turkish Lira had already depreciated as the national debt increased (Alam & Ali, 2023). Many manufacturing companies closed operations, production was closed for a certain period, supply chains were disrupted, and revenue decreased. While the service sector constitutes 58% of the economy, the manufacturing sector holds over 20.8% of the economy, which plays a key role in export and growth of the economy.

Turkey experienced another devastating natural disaster phenomenon in the Anatolia region. On February 6, 2023, before dawn, a magnitude 7.8 earthquake devastated southern Turkey, wreaking havoc over eleven Turkish regions (Güneş et al., 2023). This devastating ground shaking was felt in a wide area covering South-eastern Anatolia, Eastern Anatolia, Central Anatolia and Mediterranean Regions, Ekinözü District of Kahramanmaraş. The most powerful earthquake to strike Anatolia in 2000 years, according to Turkey's emergency management organisation, directly affected over 13.5 million people there, with over 40.000 people expected to die and tens of thousands injured (Alam & Ali, 2023; Pandey et al., 2024). Al Jazeera reported that the damage was estimated to be over \$80 billion, including the economic losses, while the World Bank also published over \$34 billion in damage losses before economic losses, however, no exact amount is known. Turkey's GDP fell by 1 per cent in 2023.

The province affected by this constitutes 9.3 per cent of the country's national income. These industries include Finance, crop production, and Agriculture. The provinces prone to earthquakes produce over 21

per cent of the country's crop production and 12 per cent of cereals. So, this means that the region contributes effectively to the growth and development of the Turkish economy (Akkuş & Kışlalıoğlu, 2023). Furthermore, the provinces exposed to earthquakes contribute over 8.7 per cent of the total exports of the economy. In 2022, this brought over 19.76 billion, which was realised from Hatay, Gaziantep, Kahramanmaraş and Adana. Key products exported from these regions include raw textile materials, cereals, pulses, oil seeds, agriculture, steel, and ready-made clothing products (Alam & Ali, 2023; Unvan & Ozdemir, 2023).

This research will provide more conclusive evidence about the impact of strategic agility on the competitive advantage and performance of manufacturing organisations in Turkey. Continued observations will be able to guide business leaders to comprehend the significance of agility in organisational performance. This research will further enhance the empirical evidence in the relationship between strategic agility and resilience towards organisational performance among manufacturing companies in Turkey.

2. Theoretical Framework

In the corporate world, strategic agility and resilience relate to an organisation's capacity to foresee, predict, respond to, and recover from unfavourable circumstances. Various theories relate to strategic agility and resilience, such as the Resource-based view, contingency theory and dynamic capability theory.

2.1. Resource-based view

The Resource-Based View is more applicable in this research because it ensures an enterprise's ability to produce innovations and adapt to changes in the external environment, both of which boost performance by allowing for the exploitation of valuable, scarce resources (Fosso Wamba, 2022). In particular, the research study implies that a corporation might gain a competitive edge by strategically utilising its unique resources or capabilities.

2.2. Contingency Theory

The contingency theory was propounded by Otley in 1980, which considers that organisations operate in a dynamic business environment characterised by rivalry, price volatility, trends, customer preferences and taste. The theory is also relevant to strategic agility and resilience studies because it encourages firms to be agile mainly in all their operational activities (Peter et al., 2023). The theory is built on the assumption that firms should pick the most relevant activities that require agility. For example, a firm that needs to achieve maximum customer retention should focus on customer loyalty activities that increase customer retention. Thus, striking a balance between being agile and flexible (Mwangi, 2021). The important tenet of the contingency theory is that organisations should be flexible enough to adjust their operations and meet demands and developments in the market.

2.3. Dynamic Capability Theory

The research study adopted the Dynamic Capability Theory that Teece et al (1997) propounded. The business environment is ever-changing, organisations that respond to the business environment timely, quick and rapid manner have a guarantee to remain competitive in the market (Eisenhardt & Martin, 2000). Thus, the DCT elucidate how a firm should be able to integrate and reconfigure internal and external competencies and resources to address trends in an ever-changing business environment. The theory further elucidates the relationship between resources and product markets to competitive advantage and performance (Ambrosini & Bowman, 2009). This helps businesses identify and employ the proper strategies to remain competitive in a dynamic and turbulent business environment.

3. Overview of Strategic Agility

Strategic agility constitutes one of the key concepts that has gained momentum in recent years. Agility forms the basis of strategic agility; thus, to have a clear understanding of the concept, one needs to understand the term agility (Rostan & Rostan, 2022). Agility is a term that emerged in the 1990s by the U.S government. Since then, many definitions have been propounded by various scholars. This makes it difficult to narrow down to one definition as it differs from time to time and context (Arbussa et al., 2017). However, it is generally described as the ability of an organisation to be flexible, to continue learning and improve the overall efficiency of the organisation to remain competitive.

Strategic agility, or SA, is also defined as a company's ability to respond swiftly to changing external situations. How well a company's operations adjust to changes and instability in the business environment defines its sustainability (Ahammad et al., 2021). Companies with built-in SA skills may successfully foresee and react to new opportunities and dangers. Consequently, suggests that an organisation's sensitivity to these shifts, or its foresight, is what determines the link between SA and its capacity to recognise and foresee future events in its operational environment (Clauss et al., 2021). An organisation can identify environmental possibilities and problems and react swiftly, nimbly, and profitably to them.

Strategic refers to the capability to survive by responding to market trends by providing customer-oriented products and services (Eisenhardt & Martin, 2000). As the business environment is ever changing, firms that possess the ability to cope with threats, changes and maximise on the opportunities presented by the market have higher chances of survival and employ strategic agility capabilities (Fernandes et al., 2017). This further entails the ability to quickly change structures and operations to suit the demands of the market.

In this competitive business landscape, organisations are prompted to continue innovation, change business strategies, create new markets, products and enhance their responsiveness to the trends in the market (Teece et al., 1997). Due to the ever-changing business environment, the normal way of conducting business operations has shifted and differs from one industry to the other as well. The usual way is no longer useful as challenges and trends in the market are becoming more and more complex, which means organisations must be able to thoroughly understand and respond effectively to the market (Bogers et al., 2019). It is not an instant thing but a continuous improvement process that involves understanding the internal and external strengths of the organisation, industry factors, to getting the best results. This whole process can be summed up as strategic agility, thus the ability to quickly recognise business opportunities (MacInerney-May, 2012).

At the heart of SA is the ability of a firm to predict, prepare and timely respond to changes in the market. Chwiłkowska-Kubala et al. (2023) further attested to this notion that strategic agility is the art of detecting and responding timely to opportunities or threats emerging from the market. More so, strategic agility forms a resilient strategy a firm employs, generally, change is inevitable; SA involves change that occurs rapidly and deliberately, change in strategic actions, investment and expansion strategies, asset deployment, and strategic plan revamp.

To get the best results or performance, every organisation should embark on internal and external research to identify key factors that can enhance its flexibility (Fernandes et al., 2017). The main objective of implementing these strategies is to satisfy or meet customer expectations. Effectively respond to market changes, and by being agile, the firm improves its performance (Winter, 2003). Different situations require different capabilities, thus, firms should consider developing agile variables that allow them to flexibly respond to the business environment.

Key factors firms should consider include innovation and corporate entrepreneurship, Firms should create a work environment that sparks creativity and brings out new ideas, customer-driven products and services (Eisenhardt & Martin, 2000). The integration of information technology, internet technology to enhance research capabilities, data or information management, and quality market research that provides excellent market insights for better decision making. These factors enhance firms' strategic agility and the overall business performance (Bogers et al., 2019).

The literature review on "strategic agility" identifies certain key components or features that require more examination to determine the right dimensions of the ideas. According to Teece et al. (1997), leadership unity, resource flexibility, and sensitivity are the three most important organisational characteristics that promote strategic agility. These skills must be fully developed if the organisation wants greater strategic agility (Doz, 2020).

3.1. Dimension of strategic agility

The strategic agility concept has various variables or key components. Understanding strategic agility requires an exploration of these components. According to Teece et al. (1997), three main components of strategic agility enhance the performance of any organisation if implemented correctly. These variables include strategic leadership, resource fluidity and strategic sensitivity.

3.2. Strategic sensitivity

Strategic sensitivity is described as the quickness of an organisation in organising, obtaining information and responding to the demands of the business environment (Chakravarty et al., 2013). This entails that the company should provide timely data or information in identifying opportunities and threats in the market. This is explained as forward forward-looking strategy whereby organisations' actions are based on the current trends in the market, not buried in the future without addressing current business demands (Chwiłkowska-Kubala et al., 2023). Strategic planning further promotes openness, awareness and fosters quality circles and discussions as strategic planning is done openly. Strategic sensitivity entails that organisations gain insights about the market through market research, the process often follows certain cognitive and emotional patterns, which may impede accuracy in obtaining market insights.

Therefore, to develop strategic sensitivity, organisations must understand disciplines, organisational components that require attention and bring out the best results for the organisations (Dayioglu et al., 2024). For instance, large organisations are seldom rigid in business operations, which limits interactions between the top management and employees and impedes the development of strategic sensitivity. Growth often brings complacency as the rate of failure is less expected. Increasing the interaction between employees, promoting innovation and entrepreneurship in the organisation, creates an environment that is always sensitive to trends in the market (Arbussa et al., 2017). The inclusion of all the departments from human resources, developing key skills, creating a conducive work environment for employees that breeds innovations, leaders should utilise their capabilities to foster strategic sensitivity.

3.3. Resource fluidity

Resource fluidity is a strategic agility concept that is implemented based on the internal resources and capabilities of the company, this effectively correlates with the resource-based view theory (MacInerney-May, 2012). This means organisations should thoroughly analyse the key resources and

capabilities they possess. The most important thing with strategic sensitivity is not about how many key resources the organisation has but how readily they are deployed when needed (Bogers et al., 2019). Organisational learning does concur with this concept as well, in that identifying knowledge and skills embedded in the organisation over the years of operations is key in resource deployment as well. This requires proper analysis and planning, the ability to shift resources and structure.

The 21st century is generally characterised by hypercompetitive business environments, a turbulent market where innovation and corporate entrepreneurship have become a norm as organisations compete to develop dynamic capabilities that allow them to remain competitive in the market (Diana Marie Wiechmanna, 2022). It is imperative to note that organisations that fail to adapt to changes fail in the market. Thus, poor management of internal resources and capabilities may lead to failure, strategic sensitivity is built on these premises.

It is significant to note that the other two components of strategic agility mentioned in this study will not work effectively without resource fluidity. Developing competitive capabilities, skills and resources without resources to deploy them is useless (Doz & Kosonen, 2010). Henceforth, organisations should develop dynamic resource fluidity strategies or allocation of resources to fully leverage strategic agility.

3.4. Strategic leadership unity

Leadership unity refers to the ability of the management in an organisation, particularly top management, to make business decisions swiftly without any interruptions from both internal and external forces (Hodgkinson & Healey, 2011). The absence of rigid policies and systems allows better decision-making in the organisation. Leadership entails that the top management be in sync, dialogue, discuss and have a common interest in the organisation without diverging aspirations. Lack of trust among the top management could be detrimental to the responsiveness of the organisation to the business environment (Bogers et al., 2019). Henceforth, developing trust, cohesiveness, and cooperation should be key in developing trust and strategic agility capabilities.

In many organisations, top management of different departments always have diverging interests, and rigidity in one department, especially when there is no trust, may hinder the competitiveness of the organisation (Ambrosini & Bowman, 2009). Debates, arguments breed mistrust, especially in departments that hold key resources such as finance. Dialogue, open discussion may break these cycles and create better work environments. Winter (2003) stipulated that leadership unity is an important component of strategic agility. Without dialogue, collaboration among the top management, proper leadership and staff management organisations may fail to realise their dream objectives. This is significant in the sense that the organisation can obtain better customer insights, deploy resources when needed, and make better strategic decisions as well.

4. Strategic agility and performance Dimensions

Strategic agility is one of the key concepts that impact the performance of manufacturing firms. According to one of the studies conducted by Salma (2016), in Kenya, in the ICT industry. One of the conclusions made stipulated positive relations between strategic unity and strategic agility in the competitiveness of firms (Ahammad et al., 2021; Ahenkora & Adjei, 2012). Other previous studies have also shown a positive relationship between strategic agility and the performance of firms. It has a wide impact on innovation, thus new product development, financial performance and sales (Fernandes et al., 2017). Strategic agility further advocates for organisational learning, effective organisational structures, effective communication, improved operational processes, business reengineering, creating better relationships with customers, suppliers and other business stakeholders (Clauss et al., 2021; Denise

Dunlop-Hinkler1, 2011). Further, the results show that strategic agility impact on the asset growth of manufacturing firms in Turkey.

Strategic agility is a research study area that has attracted several researchers. Several studies have been conducted, and a significant relationship between strategic agility and organisational performance has been established (Arokodare, 2021); emotional and entrepreneurial ability (Khorshid, 2019); strategic agility and competitive advantage (Al – Romeedy 2019; Tse et al., 2016). Arokodare (2021) further stated that organisations that seek to cope with the current business environment, changes in the market, and survive the competition should consider strategic agility.

More so, with the advent of the Covid 19 pandemic that exacerbated changes in the business environment, it is significant for firms to employ strategic agility in all activities and decision-making processes. One of the studies done by Gerald et al. (2020) investigated the impact of strategic foresight on the performance of small to medium enterprises during COVID-19, strategic foresight is one of the significant dimensions of strategic agility. The author concluded that there is a relationship between strategic foresight and competitive advantage.

5. Methodology

The research study is limited to evaluating the resilience and strategic agility of manufacturing companies in Turkey post-COVID-19 and the earthquake period. The manufacturing sector is one of the significant sectors that hold the Turkish economy. The research adopted a secondary research design using secondary data from the stock exchange. The research collected data from companies listed on the stock exchange only. To achieve the objective of this study, the researcher used the purposive sampling method to select a sample size of 100 manufacturing companies that met the required criteria, thus were listed on the Istanbul stock exchange and had financial statements from 2021 to 2024. Table 1 shows the 100 manufacturing companies which were selected from different regions.

The research used a comparative analysis technique, and drew data from the pre-pandemic 2021 to 2023, the pre-earthquake 2022, and the post-earthquake 2023. The research used financial indicators: net profit margin, sales growth rate, and profit growth rate as the main variables to conclude using the comparative analysis technique over the specified study period. The research employed a simple regression analysis technique, paired test and independent sample test to improve the estimation process based on the secondary data collected.

Table 1 shows a total of 100 companies which were selected from different regions listed on the stock exchange.

Characteristics	
Number of companies	100
Number of Family-Owned Companies	17
Number of non-family-owned Companies	82
Number of Patents Issued (2021 – 2023)	125

Table 1: Descriptive statistics

Source: kap.gov.tr (2024)

6. Discussion and Analysis

The research results and analyses were conducted on the variables, thus the dependent and independent variables. The paired sample test was conducted to test the variability of data from COVID-19 and the

earthquake. And another test on family-owned and non-family-owned businesses was also conducted and discussed.

6.1. Paired Sample Test

Table 2 summary shows the paired sample test results, which show the extent to which the variables vary, based on financial variables between COVID-19 and the earthquake. The model states that if p is less than 0.05, there is a significant difference. In this case, the analysis shows that companies have similar recoveries from the COVID-19 and earthquake crisis in terms of sales and net profit, with .006, .105, and .168 significance levels, above the 0.05 threshold. On the other hand, profit margins and net assets have significantly different between the Covid-19 to earthquake periods with a .001 significance level. Table 2 depicts that strategic agility affects the financial performance of manufacturing.

	dif	One-Sided p	Two-Sided p
Profit M. Covid - Profit M. EQ	99	.006	.011
Sales Covid - Sales EQ	99	.105	.211
Net Profit Covid - Net Profit EQ	99	.168	.335
Net Asset Covid - Net Asset EQ	99	<.001	<.001

Table 2: Paired Sample test

Source: Researchers' results (2024)

6.2. Family-owned and Non-family owned Sample Test

According to Table 3 analysis, family firms and non-family firms are significantly different in net asset and profit margin recovery, while all other indicators, such as net profit and sales, don't show any difference.

Variables	Sig
Profit M.EQ	.054
Sales Covid	.945
Sales EQ	.632
Net Profit Covid	.382
Net Profit EQ	.290
Net Asset Covid	.058
Net Asset EQ	.077

Table 3: Family and non-family test

Source: Researchers' results (2024)

6.3. Findings

The discussion derived from the research study Table 2 indicates that manufacturing was affected by the pandemic and earthquake, and made better recoveries on certain variables such as sales and profit. There has been a significant innovativeness by the manufacturing firms with over 125 patents submitted within this period of the pandemic and earthquake. This shows the significance of strategic agility as companies responded to changes in the business environment. The findings test show that strategic agility impact on the innovativeness of manufacturing firms. Improvements in asset values occur as innovations are introduced.

The research further proposes that a significant factor in adopting or leveraging new technologies is the enhancement of the strategic capabilities of firms, the ability to forecast and build a strong strategy to achieve a higher competitive advantage. The study's findings also provided empirical support for the notion that strategic agility promotes organisational learning, efficient organisational structures, improved communication, enhanced operational procedures, business reengineering, and better relationships with suppliers, customers, and other stakeholders. The study also lends weight to previous research by (Adomako et al., 2022; Ahenkora & Adjei, 2012) that has found a positive relationship between strategic agility and corporate performance. It has a substantial impact on sales, financial performance, and innovation, all of which influence new product development.

Conclusion

This study has shown that strategic agility plays a critical role in shaping the resilience and long-term performance of Turkish manufacturing firms during periods of crisis, particularly following the COVID-19 pandemic and the 2023 earthquake. The findings confirm that while firms were able to restore sales and net profits to similar levels in both crises, significant differences emerged in profit margin and net asset recovery. These differences demonstrate that resilience is not only about returning to pre-crisis performance but also about maintaining profitability and asset strength in volatile environments.

A comparison between family and non-family businesses revealed distinct recovery patterns, with family businesses exhibiting greater sensitivity to net asset and profit margin performance. This suggests that ownership structures influence how firms mobilize resources and adapt to shocks. However, the lack of significant differences in sales and net income performance suggests that operational resilience is generally consistent across ownership types.

Beyond financial recovery, the granting of more than 125 patents during the crisis highlights the role of innovation as a result of strategic agility. Firms that proactively invested in innovation and technology adoption were able to enhance their competitiveness and support recovery. This supports the view that strategic agility (through strategic responsiveness, resource fluidity, and leadership unity) creates the organizational capacity to anticipate change, reallocate resources, and make rapid decisions.

For policymakers, the results highlight the importance of supporting innovation ecosystems, flexible financing, and digital transformation initiatives that enhance firms' agility. For managers, they highlight the need to integrate resilience and agility into daily operations, foster a culture of organizational learning, and strengthen leadership alignment to effectively respond to uncertainty.

Ultimately, the resilience of Turkish manufacturing firms depends not only on their ability to withstand external shocks but also on their capacity to transform crises into opportunities for innovation, efficiency, and long-term growth. Future research should expand this analysis by obtaining qualitative information from firm managers, examining sectoral differences, and assessing the role of global supply

chains in shaping resilience. This can help develop a more holistic understanding of strategic agility that can guide firms to achieve sustainable competitive advantages in turbulent environments.

Declarations

Competing Interests

There is no conflict of interest in this study.

Authors' Contributions

Authors declare that they have contributed equally to the work.

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