

Scenario Planning and Strategic Innovation: The mediating effects of Strategic Thinking and Strategic Flexibility

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Abstract

The purpose of this study was to investigate the effect of scenario planning on strategic innovation considering the mediating role of strategic thinking and strategic flexibility. This research is applied in terms of purpose and descriptive survey in nature. The statistical population of the study is the manufacturing companies of Bushehr province. In order to determine the sample size, the test-software method (G-Power) was used. Based on this, 222 observations were calculated. Using a simple random sampling method with the online survey, 176 questionnaires were finally received by the researchers. Data analysis was performed using the structural equation method and Smart PLS 3 software. Research findings showed that scenario planning has a positive and significant effect on strategic innovation. The mediating effect of strategic flexibility and strategic thinking in the relationship between scenario planning and strategic innovation is also significant. The present study expands the management literature by filling in research gaps. Organizations today need to change their past strategies to be able to understand and meet customer needs faster and more competitively than other competitors.

Keywords: Strategic Innovation, Scenario Planning, Strategic Thinking, Strategic Flexibility.

1. Introduction

Today, the main features of the business environment in developing countries and emerging economies are extreme environmental changes and instability that are highly unpredictable at the macro level (Wiltbank et al., 2006; Bouhalleb & Smida, 2020). In the face of global change, firms can no longer compete with large competitors in the traditionally fast-changing economy through just one type of innovation; And if a firm wants to withstand global competition, it needs to quickly change the way it does business. To do this, it needs a way of innovation that helps your business adapt to a changing business environment as quickly as possible by applying the right types of innovation (Faghih et al., 2018). In such a situation, firms need strategic planning for their implementation and survival. Strategic innovation with a holistic and systematic approach is what firms and organizations can use to maintain competition. Because strategic innovation is a combination of innovation and strategy that by creating growth strategies, new product classes, services, and various business models change the game and create new values for customers and the firm (Schlegelmilch et al., 2003; Bouhalleb & Smida, 2020). Since strategic innovation as a systematic concept is faced with a general change in the plan of an organization, firms to identify the extent of implementation of strategic innovation in the organization and measure it, need to find factors that with their help they can implement strategic innovation in their organizations

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Received 8 May 2025; Received in revised form 10 July 2025; Accepted 20 June 2025



and firms (Chen et al., 2018). On the other hand, most managers have experienced an environment with unpredictable changes and have failed in short-term planning to deal with these uncertainties. Therefore, to develop an effective plan to solve this problem, managers use scenario planning as a technique for forecasting the future (Bood & Postma, 1998). Scenario planning is one of the most dynamic strategic management measures to deal with rapid change and uncertainties (Feng & Luo, 2019). Scenarios contribute to cognitive dynamics and strategic investment decisions in a changing environment. A wide range of literature on scenario planning focuses on the development of this tool in firms (Vecchiato, 2019) and many studies present scenario planning as an innovative activity that deals with uncertainty and improves strategic decisions (Brooks & Curnin, 2020). On the other hand, firms today emphasize strategic thinking and flexibility that results from their ability to negotiate and invest in uncertainty and dynamism in indoor and outdoor environments (Bouhaleb & Smid, 2020). Strategic thinking is defined as an approach to the organizational thinking process that creates smart and inspiring actions to gain a competitive advantage over competitors and create an investment for new business (Shaik & Dhir, 2020). This issue is considered with a special view to the future, determining the current position of the organization and paying attention to the perspective and focusing on the key interdependencies of the organization and its environment (Bratianu, 2017). In other words, strategic thinking is a special way of thinking that can be considered as a "strategy architecture skill". The goal is to discover innovative and creative strategies that can rewrite the rules of the competition game. In addition, the achievement of strategic innovation and competitive advantage can be maintained by a firm in a changing business environment through the flexibility of policies and approaches. Because flexibility is a key factor in reducing risks and uncertainties in the market (Uman & Sommanawat, 2019). Since one of the features of the business environment in developing countries is extreme environmental change and instability, flexibility can be an important mechanism to help firms in these dynamic environments (Yousuf et al, 2021). However, there are limited studies on how to take a balanced approach to strategic planning that, with strategic thinking and flexibility, lead to discipline and a conscious process (Ojha et al, 2020). Therefore, the present study aims to investigate the effect of scenario planning on strategic innovation, considering the mediating role of strategic thinking and strategic flexibility, seeks a deep insight into the scenario planning approach and how this tool affects strategic innovation. Considering these mediating relationships can address many of the criticisms in the field of empirical studies of strategic planning and the relationship between scenario planning and innovation. This new way will open a new view to the planning systems by covering all previous systems. Therefore, the main issue of this study is to investigate the mediating role of strategic thinking and strategic flexibility in the relationship between scenario planning and strategic innovation in manufacturing firms.

2. Theoretical Background

2-1. Strategic Innovation

Strategic innovation refers to new ideas that, when implemented, lead to changes in the methods used by the company to perform the desired activities and better business performance (Majimbo & Namusonge, 2020). Strategic innovation ensures that organizations do not fall into the trap of following accepted practices and repetitive patterns (AlQershi, 2021). Palmer and Kaplan (2016) defined strategic innovation as a comprehensive approach, a combination of creating business strategies, customer insight, and strategic alignment as a structure consistent with innovation to achieve company goals. Jeanne Liedtka (2014) defines strategic innovation as a future-based development structure that identifies growth opportunities, accelerates business decisions, and creates a sustainable competitive advantage for businesses in the long-term (Iravo, 2020; Palmer & Kaplan, 2016). The goal of strategic innovation is to change existing business, move to new markets, and create a leap in customer value (Gebaur, 2012). On the other hand, many organizations and firms today face increasingly sustained and uncertain competition, which has intensified due to technological innovations, changing market environments, and changing customer needs. This condition has led to major improvements in the organization's strategic vision, businesses priorities, and revisions of contemporary business models. In other words, it can be said that other approaches and solutions of the past have relatively lost their capability and ability to meet organizational challenges and the external environment, and it is better to replace them with new approaches and

perspectives. Therefore, one of the ways to respond to these factors of organizational change is the development of creativity, innovation, and scenario planning in organizations (Aldabbagh & Allawzi, 2019).

2-2. Scenario Planning

Foresight is the creation of a vision for the future and is closely related to scenario planning. It is quite difficult to provide a simple definition of scenario planning, and in a short definition, it can be considered a practice for the future. Scenarios are structurally events or stories about how the future will develop (Aldabbagh & Allawzi, 2019). Scenario planning can help policymakers meet their needs and want. This method is a comprehensive planning, examining the tools and paths to achieve the goal in the long-term (Ariza-vlvarez, 2021). The scenario planning literature increasingly emphasizes the strategic role of this tool. Managers participate in the scenario planning method by creating appropriate inputs for planning and decision making and facilitating interaction between stakeholders at different levels of the organization (Bouhaleb & Smida, 2020). Contrary to forecasts, the scenario accepts Uncertainty in the business environment as a fact and tries to understand it. Uncertainty in the business environment due to global change, increasing the speed of change and greater interconnection within and between systems, it is also globalization and new technologies (Alvarez et al, 2018). Research shows that the main advantage of scenario planning, along with trying to predict the future, is encouraging managers to explore strategic responses beyond their previous experiences and to make strategic decisions in a rapidly changing environment (Gray et al, 2020).

2-3. Strategic Thinking

Strategic thinking has long been used in various fields and in businesses, but in recent years has attracted the attention of researchers. Researchers have understood, defined, and discovered the dimensions of these strategies over the last two decades. Researchers interested in such strategies have provided definitions, including that Mintzberg (1994) developed the concept of strategic thinking in an academic context, explained its goals, and identified the dimensions of this concept in other terms (Alomari, 2020). Strategic thinking is the introduction to progress in today's business and is related to social change, technological advances, and applications for centralized opportunities (Shaik & Dhir, 2020). Strategic thinking includes: gathering information, analyzing and discussing the conditions governing firms that have diverse activities, and answering basic questions about the organization's portfolio (Ershadi & Dehdazzi, 2019). Hamel & Prahalad (1998) consider strategic thinking as a special way of thinking that can be considered as the skill of strategic architecture. In today's business, strategic thinking leads to dominant results in competitive markets. Strategic leaders in companies can have better strategic thinking than markets, which leads to a competitive advantage (Sibghatullah & Raza, 2020). One of the elements of strategic thinking is thinking in time, which analyzes the existing gaps. This can help facilitate the organization to achieve a competitive advantage in the organization and improve its performance by using scenario planning (Alatailat et al., 2019). Schoemaker(1995) sees scenario creation as an organized way of imagining possible futures in which company decisions about futures should be made, and such a framework reinforces strategic thinking in firms (Klarin & Ray, 2019; Schoemaker, 1995). Strategic thinking and scenario planning Differentiated thought processes, but they are interconnected and complementary (Pagani, 2009). O 'Brien and Meadows (2013) emphasize the role of scenario planning in strategic thinking. They conclude that the role of the scenario is focused on strategy development (Bouhaleb & Smida, 2020). In addition, scenario planning is a principled tool for creative thinking about a complex and uncertain future. Creating a scenario based on the circumstances, the desired goals, and the existence of insufficient opportunities in the environment leads to a combination of choices and strategic actions. (Nyaupane & Buzinde, 2017).

2-4. Strategic Flexibility

Strategic flexibility is an interesting theoretical structure that is very common in contemporary organizational research. This theoretical structure has been emphasized as a key factor for the survival of firms. Strategic flexibility is the organization's ability to respond to a changing environment (Wang et al, 2019) and reflects the changing nature of the firm's resources in creating a competitive advantage in market changes (Rialti et al, 2020). Flexible firms have the ability to change from one strategy to another (Majid et al, 2019). Shimizu and

Hitt (2004) consider strategic flexibility as an organization's ability to identify major changes in the external environment that are essential for the survival of firms in the face of increasing rates of change in product and process technology (Stelmaszczyk et al., 2020, Umam & Sommanawat, 2019). On the other hand, a review of the strategic foresight literature reveals scenario planning as a suitable tool for promoting strategic flexibility (Haarhaus & Liening, 2020). This type of planning, based on strategic flexibility, creates the many perspectives that strategy researchers need to defeat dogmatism (Georgantzas, 2020). Scenario planning based on flexibility reflects uncertainties in supply and demand (Chandra et al, 2005) Which replaces equilibrium with market fluctuations (Sala et al, 2012). In these conditions, management has to make difficult decisions about the direction of the firm. Timely response to changes in the market will ensure that the firm is not trapped in a stagnant or declining business and new growth opportunities are not lost. Scenario planning, if applied, can explain and create alternative perspectives on how changing needs, emerging technologies, government policies, and competitors' strategies can affect the structure of the industry and what its consequences for competitiveness and competitive advantage can be (Robert Grant, 2005). Research shows that flexible organizations have the ability to identify new knowledge, technology, and absorb and use them in products or service intermediaries, all of which improve business innovation (Miroshnychenko et al, 2020).

3. Research model and hypotheses

According to the theoretical foundations of the research and identifying the main variables of the research, the conceptual model of the research and the hypotheses proposed below have been formulated.

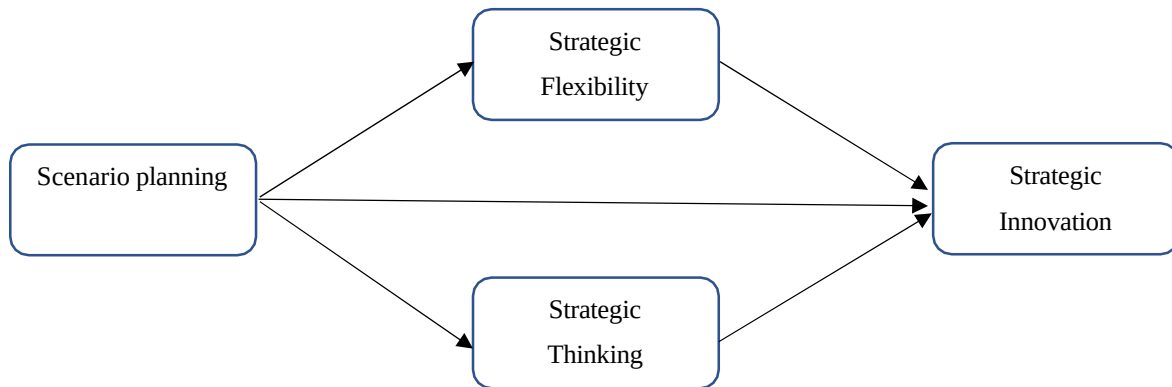


Figure 1. The proposed research conceptual model

Research Hypotheses

- H1. Scenario planning has a positive and significant effect on strategic thinking.
- H2. Scenario planning has a positive and significant effect on strategic flexibility.
- H3. Scenario planning Strategic innovation has a positive and significant effect.
- H4. Strategic flexibility has a positive and significant effect on strategic innovation.
- H5. Strategic thinking has a positive and significant effect on strategic innovation.
- H6. Strategic flexibility has a mediating role in the relationship between scenario planning and strategic innovation.
- H7. Strategic thinking has a mediating role in the relationship between scenario planning and strategic innovation.

4. Research Methodology

The present study is applied in terms of purpose and descriptive survey in terms of data collection method because it describes the desired variables in the studied statistical sample, and develops applied knowledge about relationship quality and the impact of four variables: scenario planning, strategic thinking, strategic flexibility, and strategic innovation. The statistical population of the research is the managers of manufacturing firms in

Bushehr province. Due to the problems of thumb rules (Hair et al., 2014), the sample size was determined using the test-based method and G-Power software version 3.1 (Faul et al., 2009). The sample size was calculated by considering the error level of 5% and the minimum test power of 80% of the 3 predictor variables, 222 observations (Figure 2). The questionnaires were distributed online and a total of 176 questionnaires were received by the researchers. The return rate of the online questionnaire should be at least 65% for the survey process to have the necessary validity (Fincham, 2008), which is 79% in this study. A standard questionnaire was used to measure the research variables. Thus, it was used to measure scenario planning (Bouhaleb & Smida, 2020), strategic thinking (Moon, 2013), strategic flexibility (Yang et al., 2015), and strategic innovation (Berghman et al., 2013). Data analysis was performed in the descriptive statistics section with SPSS software version 26. In the inferential statistics section, the partial least squares approach and Smart PLS 3 software were used. Then, based on the opinion of Hair et al. (2011), the factor load values were first investigated. Then, by implementing the model, the researchers first evaluated the reliability, validity, and quality of the outer model by evaluating the measurement model, and finally evaluated the structural model and the quality of the overall model and analyzed the mediators.

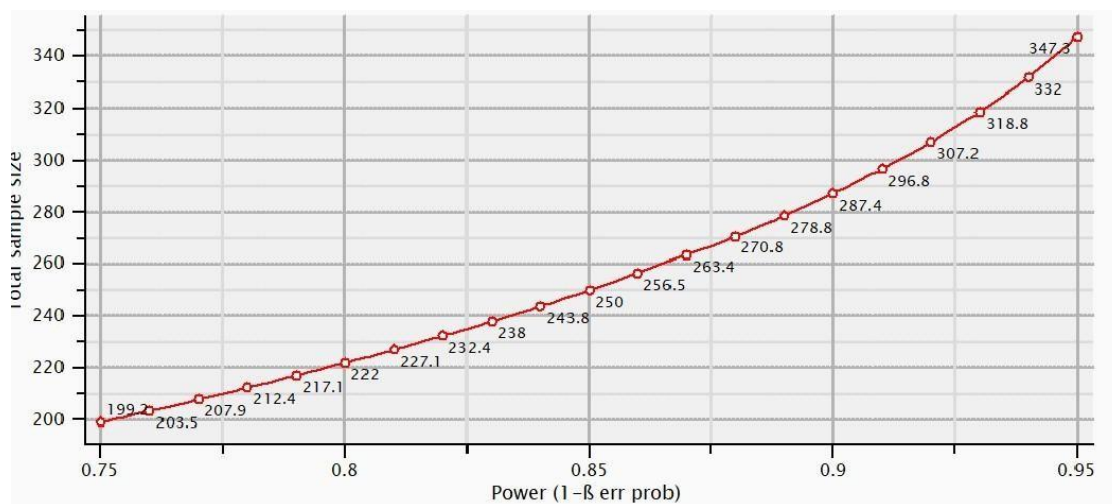


Figure 2. Recommended sample size based on a priori power analysis

5. Analysis and findings

Table 1 shows the characteristics of the people participating in the survey. In order to obtain an appropriate overview of the research findings, the gender, age, and education of firm managers were examined.

Table 1: Demographic characteristics of the research participants (n=176)

Variable	Level	Frequency percentage
Gender	Male	78.9
	Female	21
Education	Diploma	1.7
	Associate Degree	16.4
	BSc	57.9
	MSC and higher	23.8
Age	Less than 30 years	7.9
	30 to 40 years	41.5
	41 to 50 years	35.2
	More than 50 years	15.3

In the following, according to Tables (2 & 3) by performing and confirming tests related to Cronbach's alpha reliability (α), composite reliability (CR), and (ρ_A) as well as average variance extracted (AVE) and Fornell–Larcker tests related to validity Convergent and divergent, the reliability and validity of the measurement model were confirmed.

Table 2. Reliability and convergent validity for the measurement model (n= 176)

Latent Variables	Cronbach's Alpha	Rho_A	CR	AVE
Scenario planning (SP)	0.871	0.873	0.903	0.609
Strategic Flexibility (SF)	0.881	0.884	0.910	0.628
Strategic Thinking (ST)	0.840	0.850	0.893	0.678
Strategic Innovation (SI)	0.841	0.846	0.880	0.513

Table 3. Fornell–Larcker criterion (n= 176)

Latent Variables	SP	SF	ST	SI
Scenario planning (SP)	0.780			
Strategic Flexibility (SF)	0.608	0.792		
Strategic Thinking (ST)	0.616	0.643	0.823	
Strategic Innovation (SI)	0.650	0.735	0.698	0.716

Hair et al. (2019) maintains that in order to perform divergent validity in the variance-based approach along with other tests, the values of the HTMT test should be below 0.9. Based on the results of the HTMT test, the measurement model is of good quality for all variables (Table 4).

Table 4. Heterotrait–Monotrait Ratio (HTMT)

Latent Variables	SP	SF	ST	SI
Scenario planning (SP)	1			
Strategic Flexibility (SF)	0.684	1		
Strategic Thinking (ST)	0.705	0.724	1	
Strategic Innovation (SI)	0.745	0.845	0.816	1

The research hypotheses have been tested in PLS Algorithm and Bootstrapping modes with an error level of 5%.

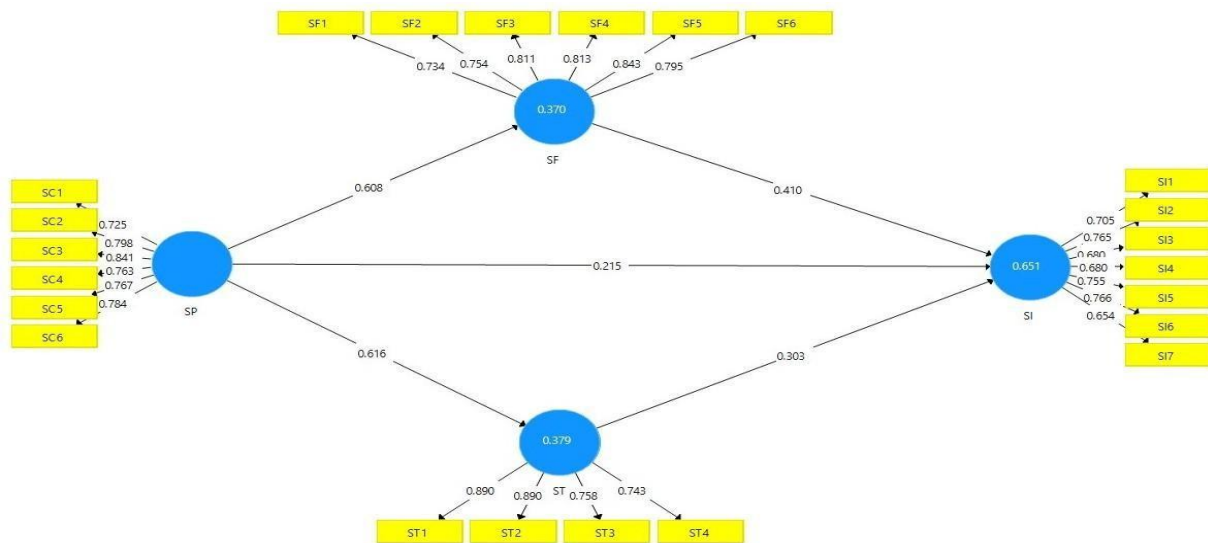


Figure 3. Confirmatory Factor Analysis

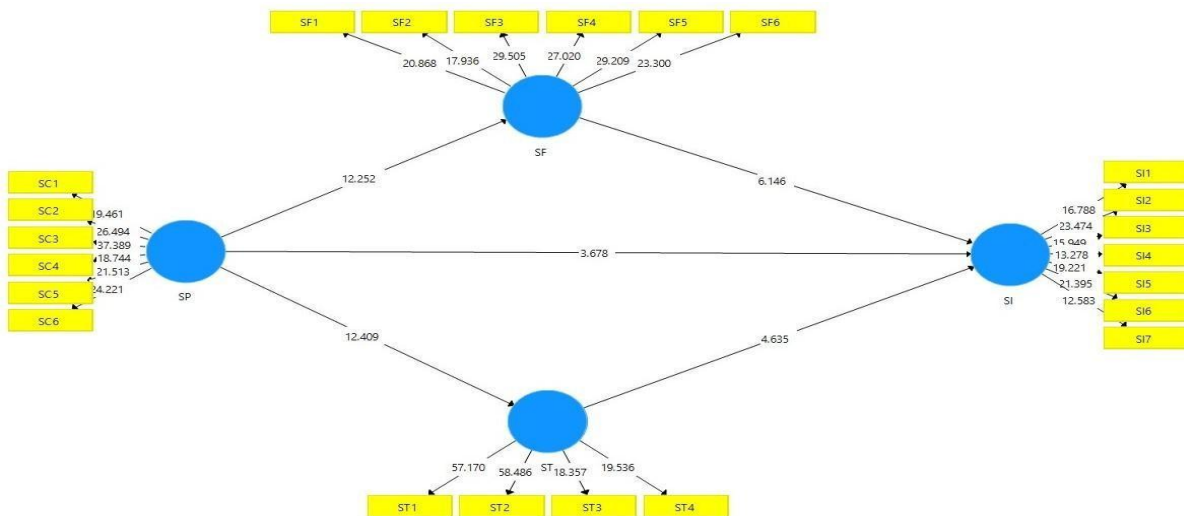


Figure 4. Results for Direct Hypotheses Test

Based on the results of Table (5), the first seven hypotheses of the study were all significant at a 95% confidence level.

Table 5. PLS-SEM path coefficients: Direct effect results (n= 176)

Hypothesis	Path	Path Coefficient	t-Statistic	P-Value	Result
H1	SP → ST	0.616	12.409	0.000	Confirmed
H2	SP → SF	0.608	12.252	0.000	Confirmed
H3	SP → SI	0.215	3.678	0.000	Confirmed
H4	SF → SI	0.410	4.146	0.000	Confirmed
H5	ST → SI	0.303	4.635	0.000	Confirmed

Note Scenario planning (SP), Strategic Flexibility (SF), Strategic thinking (ST), Strategic Innovation (SI).

Considering the values of coefficient of determination (R^2) with three values of 0.19, 0.33, and 0.67, i.e. small, medium, and large predictive accuracy compared with the research results in Table (6), it was found that the behavior prediction of both variables including endogenous sustainable competitive advantage and business performance are at an extremely strong level. Ultimately, to evaluate the quality of the general model of the present study, two quality fit tests of the model including standardized root mean square residual tests (SRMR) with a suitable value of less than 0.08 and a Goodness-of-fit (GOF) for the general model with three values of 0.1, 0.25 And 0.36, ie small, medium, and large were used. The SRMR test was approved and according to the GOF value, the accuracy and results of the overall research model were at an extremely strong level.

Table 6. Goodness-of-fit measures

GOF	SRMR	R^2
$GOF = \sqrt{AVE} \times R^2$	Estimated Model= 0/079	0.370
$GOF = 0.532$	Saturated Model= 0/079	0.379
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The Sobel test is the most common method of testing mediating coefficients. This framework was introduced by Michael Sobel in 1982. The Sobel test is used to examine the significance of the mediator variable in the relationship between the independent and dependent variables. Therefore, the model should be run once without the presence of an intermediary and again with the presence of the intermediary variable in the software. In the present study, the model was implemented without the presence of a mediating variable. The value of T-VALUE in both triangles (first and second mediator analysis) is significant for the straight path. That is, strategic flexibility and strategic thinking have a mediating effect on the relationship between scenario planning variables and strategic innovation with respect to direct significance. On the other hand, in the Sobel test, a Z-Value is calculated; if this value is greater than 1.96, the null hypothesis (that the mediating variable has no role between the relationship between the independent and dependent variables), at the error level of 0.05 was rejected and the mediating effect in this regard is significant. The results are reported in Table 7 below. Therefore, it can be acknowledged that the sixth to seventh hypotheses of the research are confirmed at the 95% confidence level.

Table 7. Sobel test results

Variable	Z-Value	Result
H6	5.46	Confirmed
H7	4.39	Confirmed

6. Discussion and conclusion

The purpose of this study is to investigate the relationship between scenario planning, strategic innovation, strategic thinking, and strategic flexibility. Scenario planning has a significant impact on the firm's strategy and innovation. Corporate executives in the global marketplace are facing rapid environmental change and uncertainty in the 21st century. Empirical evidence for the theoretical relationships presented in the research confirms significant direct and indirect relationships. Model validation showed that scenario planning directly and through the variables of strategic thinking and strategic flexibility have a significant impact on strategic innovation in manufacturing firms. In the continuation of this research report, the discussion about the research findings, the conclusions related to the testing of research hypotheses, and the presentation of suggestions according to the obtained results are expressed in detail. The results of the first hypothesis test show the results;

Scenario planning with a path coefficient of 0.616 and t-statistic with a value of 12.409 has a positive and significant effect on strategic thinking. Scenario designers use external changes and opportunities as a tool to facilitate strategic thinking and political decision-making. Scenarios are also valuable tools for use in the innovation and development activities of manufacturing firms. Scenario managers need to think strategically about the future in new ways and focus on key interdependencies of the organization and its environment to achieve innovation strategies. Scenario planners need strategic thinking to be aware of assumptions about the future, unexpected changes in the external environment, and to avoid taking the organization by surprise and re-examining them. By integrating strategic thinking, Scenario managers create unique capabilities that form the basis of sustainable competitive advantage and strategic innovation in companies. This result is consistent with previous studies (e.g. Schoemaker, 1995; Verity, 2003; Pagani, 2009; Aldabbagh & Allawzi, 2019). Testing the second hypothesis shows that scenario planning with a path coefficient of 0.608 and t-statistic with a value of 12.252 has a positive and significant effect on strategic flexibility. Scenario planning is a strategic foresight tool designed to address uncertainty through exploration and anticipation of change. Thus, the importance of strategic flexibility increases through the formulation of strategies that take into account the consequences of current actions, anticipate important changes and events, and develop scenarios. Scenario planners in particular, by using multiple powers, strengthen the firm's ability to identify new business opportunities or threats. In other words, it increases the firm's ability to respond to environmental probabilities. Scenario planning in manufacturing firms helps to enrich strategic options and enable decision-makers to be flexible in their actions in the face of uncertain environments. This result is consistent with the findings. This result is consistent with studies (Vecchiato, 2015; Haarhaus & Liening, 2020; Bouhalleb & Smida, 2020). The results of the third hypothesis showed that scenario planning with a path coefficient of 0.215 and t-statistic with a value of 3.678 has a positive and significant effect on strategic innovation. Scenario planning can be considered as one of the dynamic ways to achieve strategic innovation in the face of possible futures and uncertainties. Scenario planning is presented as a way to approach complex project management, construct narratives, and identify alternative outcomes. In cases of high uncertainty, due to the occurrence of unexpected events, innovation is required. Increasing uncertainty has increased the importance of identifying future trends, expected business prospects, and strategic innovation in companies. In other words, the scenarios provide an overview of the environment and highlight the interaction between several future trends and events. The use of scenarios has increased due to the complexity and lack of obedience in the business environment. The scenario-building process contributes to learning and innovation in the organization. Scenario planners can achieve strategic innovation in manufacturing firms in the face of uncertainties. This result is consistent with the studies of Amer et al. (2013), Aldabbagh & Allawzi. (2019), and Turner (2021). Examination of the fourth hypothesis also showed that strategic flexibility with a path coefficient of 0.410 and t-statistic with a value of 6.146 has a positive and significant effect on strategic innovation. Strategic flexibility means that firms can achieve goals effectively. Strategic flexibility can help new firms dynamically adapt internal and external resources and capabilities and achieve strategic innovation. With strategic flexibility, senior managers can understand changes in the external environment and internal position of the firm in a timely manner and provide the process of development and impact on firm growth and strategic innovation. Strategic flexibility can help firms Modernization resources and dynamic capabilities to achieve strategic transformation, which has an important impact on the realization of strategic innovation in business. In manufacturing firms, strategic flexibility improves the competition and performance of firms by allocating resources and creating higher value for the customer, resulting in superior performance and strategic innovation in the business. This result is consistent with the findings of Nadkarni & Herrmann. (2010), Jiang (2020), and Mai et al. (2021). Testing the fifth hypothesis shows that strategic thinking with a path coefficient of 0.303 and t-statistic with a value of 4.635 has a positive and significant effect on strategic innovation. In manufacturing firms, the application of strategic thinking leads to the superior performance of firms in the market and strategic innovation in business. The purpose of strategic thinking is to develop learners who innovate, design, and manage new products and services, value-based information, communication and technology design, and creativity and innovation, leading to strategic innovation in business. The strategic thinking of leaders or mental processes is the basis of strategic innovation in business. For leaders, the path of strategic thinking to innovation is complex, effective, and full of obstacles. The rationality of leaders is limited, but through strategic thinking

with a combination of rationality and the necessary insight, they can be a good foundation for creative and effective strategies and the realization of strategic innovation. Baumgartner and Korhonen (2010) define strategic thinking as a process that involves gathering, combining, and refining information to create innovative ideas and strategies. Strategic thinking with rationality and intuition and visualizing the future among firm managers leads to strategic innovation in business. In other words, strategic thinking is a combination of creative, intuitive, and innovative thinking and is part of the strategic management process. This result is consistent with the findings of Calabrese & Costa (2015), Kazmi et al. (2016), AlQershi (2021), and Park & Lee (2021). Examination of the sixth and seventh hypotheses also showed that strategic thinking and flexibility at the 95% confidence level mediate the relationship between scenario planning and strategic innovation.

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