




Impact of Using TQM on Organizational Agility with the Mediator Role of Ambidexterity for SME's*



Toplam Kalite Yönetiminin Ambideksterite Aracı Değişkeni ile Küçük ve Orta Ölçekli İşletmelerin Örgütsel Çevikliğine Olan Etkisi

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Abstract

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This paper discusses the effect of Total Quality Management (TQM) on organizational agility in SMEs, as it is mediatized by ambidexterity. Data from 400 managers and supervisors were analyzed using SPSS and AMOS with structural equation modeling. Results show that TQM principles—customer orientation, optimization, and continuous incremental gain—have a direct effect on organizational agility and ambidexterity mediation did not apply. The aim and scope of this article is to uncover the relationship between the use of TQM, which has an important impact on the increasing competitive conditions, and the effects on organizational agility with the mediating role of ambidexterity. And used quantitative approach, which emphasizes the data collection and analysis of numerical data to uncover the results. The findings highlight the value of TQM as an independent accelerator of agility. Small and medium enterprises (SMEs) should make the strategic use of TQM to improve its dynamic responsiveness to environments. Future investigations are warranted to examine other mediators, ecological factors, and more general organizational environments.

Keywords: TQM, organizational agility, ambidexterity, Istanbul, SME'S.

Öz

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Bu makale, KOBİ'lerde örgütsel çeviklik üzerinde Toplam Kalite Yönetimi'nin (TKY) etkisini, ambideksterite tarafından aracılık edildiği şekliyle ele almaktadır. Farklı kademelerden 400 yöneticiden alınan veriler, SPSS ve AMOS kullanılarak yapısal denklem modellemesi kullanılarak analiz edilmiştir. Sonuçlar, TKY ilkelerinin (müşteri önceliği, optimizasyon ve sürekli artımlı kazanç) örgütsel çeviklik üzerinde doğrudan bir etkiye sahip olduğunu ve ambideksterite aracılık etmediğini göstermektedir. Bu çalışmanın amacı ve kapsamı, artan rekabet koşullarında önemli bir etkiye sahip olan toplam kalite yönetiminin kullanımı ile örgütsel çeviklik üzerindeki etkileri arasındaki ilişkiyi, ambideksterliğin aracılık rolüyle ortaya çıkarmaktır. Ayrıca sonuçları ortaya çıkarmak için sayısal verilerin toplanması ve analizine vurgu yapan nicel yaklaşım kullanılmıştır. Bulgular, TKY'nin çevikliğin bağımsız bir hızlandırıcısı olarak değerini vurgulamaktadır. Küçük ve orta ölçekli işletmeler (KOBİ'ler), çevrelere karşı dinamik tepkilerini iyileştirmek için TKY'nin stratejik kullanımını yapması daha uygun olacaktır. Diğer araçları, ekolojik faktörleri ve daha genel örgütsel çevreleri incelemek için gelecekteki araştırmalara ihtiyaç vardır.

Anahtar Kelimeler: TKY, organizasyonel çeviklik, ambideksterite, İstanbul, KOBİ.

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1. Introduction

TQM is crucial for successful adaptation processes in enterprises, with strategic beliefs and adaptive capacity influenced by market orientation and organizational learning orientation. However, the literature often discusses only the relationship between agility and TQM. Focusing on the compatibility or synergy between TQM practices and organizational agility, this research seeks to examine to find and looking the relation between TQM and organizational agility in SMEs in Istanbul. In the literature suggests, ambidexterity plays a mediator role in this relation, and the study provides comprehensive results and recommendations for SMEs in Istanbul to create higher levels of organizational agility. Despite numerous scientific guidelines addressing TQM, agility, and ambidexterity, few have explored the relationships linking them together. Understanding the compatibility or synergy relationship among the implementation of these frameworks is essential for successful practical applications. The research gap is addressed by examining the relationship among TQM, organizational agility, and ambidexterity, especially in SMEs subject to aggressive competition.

SMEs are essential to the expansion and development of the any country's economy, and TQM is seen as a valuable tool for overcoming problems and providing a competitive advantage. However, there is limited evidence on the relationship between TQM practices and organizational performance, with study focusing more on improving business efficiency and controlling processes than on individual and organizational abilities like flexibility, adaptability, and speed (Hilman et al., 2020; Niyi Anifowose et al., 2022). In a rapidly changing environment, creating value through the central competitiveness component of organizational agility is critical for business sustainability, but this area remains relatively underexplored. Analyzing the relationship between TQM practices and agility is important for clarifying responsibilities and duties in the post-contract period, yet SMEs may face organizational structural dilemmas, integration complexity, and high levels of ambidexterity (Abdallah et al., 2021). Understanding how these resources come together and how businesses respond to hybrid operations is crucial for achieving success.

Additionally, the strategic integration of TQM and organizational agility has become a requirement for sustainable competitiveness as the global business environment becomes more unpredictable and volatile (Talib et al., 2013; Zhang et al., 2024). TQM enhances customer satisfaction and internal efficiency, but it is much more effective when combined with agile practices that allow businesses to react quickly to external changes, according to empirical research (Firman et al., 2020). The ability of an organization to strike a balance between innovation and operational efficiency is known as ambidexterity, and it has become a crucial mediator in this regard (O'Reilly and Tushman, 2013). However, little research has been conducted on how ambidextrous skills operationalize the TQM and agility synergy in SMEs, particularly in transitional economies like Türkiye. In order to fill this gap, the current study offers context-specific insights relevant to Istanbul's SMEs while also contributing to the body of knowledge on dynamic capabilities. It combines ideas from organizational learning, strategic agility, and quality management to offer a comprehensive strategy for improving performance in unpredictable situations.

This study is relevant and significant given Istanbul's shifting SME landscape, where companies must continuously handle shifting customer demands, technological disruption, and increased international competition. Rarely has the relationship between TQM, agility, and ambidexterity been examined in a coherent manner, particularly when it comes to emerging markets and businesses with limited resources. These three characteristics have typically been isolated as independent factors affecting business performance in prior research. This study contributes to the theoretical understanding of dynamic capabilities by showing how TQM can serve as a platform for flexibility, innovation, and dual capacity building (exploration and exploitation) in addition to being a mechanism for control and standardization. With SMEs in Istanbul as its focus, this study provides empirical insights into how businesses can strategically integrate quality management systems with

adaptive and ambidextrous capabilities to thrive in turbulent environments. Istanbul is renowned for its entrepreneurial dynamism as well as its operational challenges. By combining structural, behavioral, and strategic aspects of performance improvement, the study closes a significant gap in the literature and offers a framework and useful recommendations for both SME managers and policymakers.

2. Literature Review

This section presents the concept of TQM, organizational agility, and ambidexterity and their dimensions. Literature helps researchers and practitioners understand.

2.1. TQM

TQM is a management approach that gained acceptance as a new administrative technique in the 1980s in the developed world and then began to be used in other countries (Permana et al., 2021). It is a management approach that aims to integrate activities to comply with customer expectations and pursue organizational goals more effectively for individuals working in management and leadership, from organizational processes and policies to technical skills. It is accepted as a managerial philosophy that involves the effective involvement of all individual employees in terms of continuous improvement (Wilson et al., 2020). Although many different definitions have been made in the literature about TQM, a standard definition is the creation of competitive superiority and customer satisfaction with the least inconvenience and high customer value in all the processes that an organization performs and to provide fair returns to the employees and to the organization (Firman et al., 2020).

2.1.1. Management Leadership

Effective management leadership is crucial for implementing TQM and achieving business success. It involves converting planned actions into reality, leading to profitable outcomes. Participative management has been found to increase job satisfaction among employees, and government bodies are increasingly using strategic planning techniques to improve effectiveness and credibility. A study found that efficient supervisory communication within the strategic planning process can increase employee work satisfaction (Kim, 2002).

Researchers define a default identity as a baseline identity that contributes significantly to understanding, obtaining, and executing new character constructs. Understanding these dynamics and interrelationships offers opportunities for innovative ideas and creativity in the field of identity within organizations, leadership growth, and organizational change (Carroll and Levy, 2008).

2.1.2. Decision Making Approach

Decision-making is a crucial aspect of TQM systems, as it involves the selection of effective tools and techniques for change, improvement, and development. Narang et al. (2022) presented a two-stage framework-based integrated method for smooth stock portfolio selection, focusing on maximizing gains with minimal uncertainty. Ye et al. (2020) presented a three-dimensional decision-making approach using fuzzy neighborhood classes to provide authentic and accurate outcomes.

Caglayan et al. (2021) provided insights into decision-making approaches in forest management and trade-offs considering ecosystem services (ES) and Sustainable Development Goals (SDGs). A participatory approach was developed for allocating management actions to forest stands, highlighting the advantages of this revised strategy for effective and efficient asset utilization.

Decision-making processes are closely monitored by management, as they directly impact organizational performance. Zare et al. (2016) found that multi criteria decision making (MCDM) has been influential in the performance improvements of E-learning.

2.1.3. Process Approach

TQM is a systematic approach that focuses on improving the efficiency of procedures and resource allocation. The process approach is considered the foundation of the TQM system and has been analyzed by various authors. A study by Kowalik and Klimecka-Tatar (2018) highlighted the role of process approach in improving business performance, with service sector quality improvement being dependent on it. Trkman et al. (2007) highlighted the importance of efficient utilization of business assets and the need for effective monitoring and evaluation of performance.

The process approach is essential for companies to maximize their wealth and focus on cost efficiency. A well-structured and carefully planned process is highly beneficial for companies, and a different strategy, according to Aoieong et al. (2002) and the process cost model, is more likely to achieve TQM's main objective of ongoing process improvement. Experts in the field of construction quality management support the suggested framework's applicability in the construction setting.

2.1.4. Continuous Improvement Approach

TQM is the process of continuous improvement and development in products or services designed according to customer demand, taste, and preference. Success is linked to these improvements without compromising quality, which is a major concern for organizations in the rapidly evolving and highly competitive business environment of today. Studies have highlighted the key roles of the Continuous Improvement Approach in TQM, with industries like manufacturing, industrial, and medicine adopting digitalization for quality system enhancement and promoting innovative models (Beckett et al., 2000).

2.1.5. Employee Participation

Employee participation is referred to as the employee engagement or involvement in towards the activities of business with keen interest and satisfaction. It is a most crucial factor that plays an important role in managing the quality of work and working environment. The research by (Bhatti et al., 2007) indicates that it is commonly believed that employee engagement increases work satisfaction, commitment, and productivity, all of which can give the company a competitive edge.

2.1.6. Relations with Suppliers

The term refers to the bond between the businesses and suppliers highlighting the relationship with suppliers. It is dependent upon the practices of business or organizations how it is maintaining the association with their suppliers. TQM practices also focusing on the improving the relations and maintaining the quality of this relationship as well. The business project performance and success are also affected by their connection with the suppliers. Understating the relation of organization with suppliers is also very crucial (Urbaniak, 2019).

Recent years have seen a significant increase in both commercial and scholarly interest in the development of suppliers and the relationship between buyers and suppliers. This study offers a framework for examining how supplier development methods, their impact on performance, and buyer-supplier relationship approaches as they are currently understood. Buyers and suppliers must consciously collaborate to create a stronger, more enduring relationships. The target is to have a better

knowledge of buyer-supplier relationships and supplier expansion objectives. Supplier development is a four-steps process that involves understanding: 1) Supplier evaluation; 2) Competitive pressure; 3) Supplier incentives; and 4) Direct involvement (Sillanpää et al., 2015).

2.1.7. Customer Orientation

Customer orientation refers to the customer centric approach that is highly concerned about customer taste and preferences and provides the services according to the demand and need of customers it has major influence on the performance of business as well the success of business. And we can say the customer satisfaction and production sustainability lead to economic success (Cai, 2009).

2.1.8. Education

Education that indicates the system of learning that organized to educate the employees in order to aware them with the latest trends and teaching them how to adopt that advancements and implement them effectively and efficiently. According to the current trend in the business environment change is mandatory. In order to cope with these arising challenges organizations trained their employee organized training and development sessions. Most of past researche has disclosed that education in TQM is highly effective in improving the performance of business. Some of earlier studies has also mentioned that it also contributes to higher profitability (Vermeulen et al., 2000).

2.2. Organizational Agility (OAg)

Agility is an organization's capacity to sense and respond to environmental changes, both metaphorically and often deliberately, quickly. Agile enterprises have the ability to respond quickly and efficiently to changing market conditions while proposing new strategies and organizing methods to create strategic detection, development, commercialization, and service delivery (Baran and Woznyj, 2020). Organizational agility expands the boundaries of traditional management and creates a context that encourages people to apply their wisdom to their work. The main pillars of organizational agility are openness to transformational change, pursuit of continuous improvement, responsiveness to customer needs, elimination of physical and psychological wear, and creative applicability of the potential of people (Miceli et al., 2021; Attar and Abdul-Kareem, 2020).

Also, can the term agility is conceived as a firm that can adapt to the immediate changes in business priorities. Unlike other business aspects that require timing with process re-engineering and just-in-time production and delivery, organizational agility has received practically no scholarly attention until recently. The major aim of agility is to align the corporate culture and structures with the strategy and operational focus of the firm (Walter, 2021). The main principle of organizational agility emphasizes the fact that a radical change in the 21st century can only provide a long-term edge over competitors. Organizational agility refers to the ability to respond quickly and flexibly to rapidly changing, unpredictable, chaotic, uncertain, and complex environments (Walter, 2021).

These dynamics changes in the world, has enabled business organizations to survive, confront, outpace competitors, lead the market, and reach the highest performance (Volberda et al., 2021). As a result, this has enabled business organizations to capture the "state of agility", The approach to competing in any business varies only in its timing; some organizations can think in a long time frame with stable knowledge about their business and its environment, while others must adopt a more emergent path, being more dynamic and ready to face quick and continuous changes.

The difference between these two positions involves understanding the business and its model, comprehending the environment, the kind of market, and also the firm's capacity for agility. The high degree of global competitiveness has toughened businesses to design innovative strategies, make

rapid decisions, and take high-quality actions in a turbulent environment. There is a need to be ready for quick responses to the changing dynamics of the market. This readiness can be achieved when industries apply Total Quality Management (TQM) to drive continuous improvement and ambidexterity to remain both efficient and innovative (Clauss et al., 2021).

2.2.1. Organizational Agility Dimensions

Competence, flexibility, responsiveness, and speed are essential elements of organizational agility. When combined, these interconnected qualities allow a company to take advantage of opportunities and manage uncertainty.

- **Competence:** The capacity of an organization to acquire and use the skills, knowledge, and competencies required to accomplish strategic objectives is referred to as competence. Core competencies are the special assets and skills that give a long-term competitive advantage, according to Barney (1991).

- **Flexibility:** The capacity to reorganize systems, procedures, and resources in response to shifting circumstances is known as flexibility. Agile companies are characterized by it (Sushil, 2015). Organizations that are adaptable are better equipped to handle changes in the market, legal requirements, or challenges from competitors.

- **Responsiveness:** The ability to distinguish and react quickly to changes in the environment is known as responsiveness. To stay responsive, a company must have strong lines of communication and sound decision-making procedures (Jaworski and Kohli, 1993).

- **Speed:** In fast-paced environments, speed is crucial for staying relevant and gaining a competitive advantage. One essential component of agility is speed in decision-making, product creation, and service provision (Eisenhardt, 1989).

2.3. Organizational Ambidexterity (OAmb)

Ambidexterity is based on the assumption that radical innovation and adaptation in a changing environment are critical for company performance while continuing the exploitation of the existing knowledge and skill base. This term was originally developed to describe companies that are consistent with both opposing innovation policies, termed exploration and exploitation, exploration and reinforcement, or a variation of change and continuity (Khan et al., 2022). In the broadest sense, ambidexterity summarizes the simultaneous implementation of both conflicting strategies. The company ensures long-term competitiveness and viability. Thus, organizational ambidexterity is the ability of especially innovative organizations that face dual management: exploitation and exploration (Clauss et al., 2021).

At the same time, ambidexterity is asymmetric in the sense that this contradiction between organizational exploration and exploitation requires spatial differentiation and possibly temporary separation. This suggests that achieving organizational ambidexterity is hampered by a series of challenges and contradictions that require organizational solutions. Several companies avoid this challenge by taking the role of a dominant strategy—not being a follower in the chosen distribution. According to this reasoning, focused companies do not have to worry about the dilemmas and contradictions of ambidexterity because they consciously limit their focus and position themselves on the simplistic side of the exploration-exploitation reservoir (Al-Atwi et al., 2021).

Organizational ambidexterity is permanent and thus contradictory. It involves conducting exploration activities that allow for long-term growth and exploitation activities that allow for short-term profits. Organizational ambidexterity involves overcoming conflicts between capabilities and

organizational units at one and the same time (Clauss et al., 2021). At the same time, the organization is focused on operational efficiency, while it keeps pace with the technological changes and learning necessary for the organization to respond to different customer and market needs. The study of ambidexterity emphasizes the importance of focusing on the two forms of organizational exploration and exploitation, while the notion of paradoxical tension has been linked to the norms of organization members and their alignment with the level of ambidexterity achieved (Shaji George et al., 2023).

2.3.1. Components of Organizational Ambidexterity

Ambidexterity is a significant topic of study for managers and executives as they have to carry out both exploitation and exploration activities to survive in complex and continuously changing business environments. Managers carry out exploitation activities by improving existing goals, such as applying human resources to implement existing customer demands, as well as applying physical resources, accounting, and financial functions to achieve these goals (Yuan et al., 2021). This is known as the classic problem in organizational research, namely the problem of exploiting current knowledge. This is a problem because innovative activities that experiment with new knowledge are often abandoned permanently to reduce uncertainty and to realize short-term financial goals. These activities include having R&D projects that support product development, advertising and signaling the value of the firm's goals to the market (Giones et al., 2020).

Because goals are intended to be complicated in terms of incompatibility, achieving them simultaneously could bring an advantage for an establishment. Those establishments applying both aspirations, called ambidextrous establishments, realize financial and market performance superior to those employing only exploration or exploitation techniques. Being an ambidextrous enterprise also encourages comparisons relative to others because it acts as a mediator in conflicts brought about by the problem of goal incompatibility (Wang et al., 2020). This method for comparing management strategies of exploitation and exploration indicates how related company resources and routines can be mixed to increase knowledge and market performance. How heads of organizations effectively address this conflict has important relationship recommendations (Alzoubi et al., 2022).

2.3.2. Explorative and Exploitative

It is generally accepted that the creation of strengths in terms of "first response" to the changes in highly intense competitive markets in which SMEs operate generates valuable outcomes. These strengths may be gathered either by allowing the innovation practices of the enterprise to reflect intellect and objective establishment, and using strategies related to the product group aligned with the functioning of the enterprise under local market circumstances and above average performance levels (Klein and Todesco, 2021). The explored and exploited strategies of the firms are two well-known characteristics that enable them to establish these powers. The business RSAs (Resilient Strategic Assets) that enable compatibility between change and the organization are vital for the firms, especially in market conditions where fast defensive behaviors are not enough and where the markets function as offensive strategies for the companies. The threats arising from rapid changes may convert to opportunities for the companies that possess these strengths (Mahmood and Mubarik, 2020).

The first successful concepts related to explorative and exploitative processes date back to the 1990s. The awareness of these two concepts has become dominant recently due to the tendencies of firms to grow and the need for broadening the competitive environment for the companies. This means that companies perform above average in terms of existing product groups within the environment of financial markets and competitors based on such product groups, if they create competition by challenging their rivals with ideas that lead to new competitive products (Ali et al, 2022). Explorative products are those for which it is difficult to develop since the tests showing their success are not certain. These are also the product types that have the potential to drive the markets

from a completely different place and that may easily undermine the performance advantages of competitors. These are capable of showing healthy commercial performances only on the basis of a newly developed business method. The business community conventionally has difficulties with these acquisitions and acts ambivalently towards such initiatives. Only the leading firms in the field do not consent to any idea without asking why, and matters related to exploration are given maximum attention through a complete evaluation for the possibility of creating utilities (Randhawa et al., 2021).

2.4. Ambidexterity as a Mediator

When viewed conceptually, the TQM and organization ambidexterity that are observed in large-scale enterprises can be applied in a very limited way to SMEs from time to time, but a model that acts as a mediator between the TQM applied to SMEs and their effectiveness actually exists within ambidexterity concepts that are not to be revealed (Cabeza-Pullés et al., 2020). Because SMEs are generally occupied with their daily operational tasks, they have little time to focus on strategic development and TQM practices, even if they recognize their importance. However, ambidexterity, which is identified as a moderating factor, requires the same amount of separate attention to both the current situation of business life and the path to follow in the future, and can produce certain types of innovation. Since SMEs are open to learning, they would be capable of doing this. SMEs actually produce different types of innovations to extend their lifetimes among their rivals (Ferreira and Coelho, 2020).

2.5. Gaps in the Literature

It could be seen that TQM usage and its impacts on an organization could be one of the most interesting topics to study. In fact, just as in agility and TQM, alignment between ambidexterity and TQM concepts has not been studied well enough. Although there are some studies indicating that relationships among ambidexterity, cultural intelligence, and TQM usage exist, the relation between ambidexterity and organizational agility through the mediating role of TQM usage has been studied only by a specific study. Therefore, it was thought that there is a gap in the literature, and it was aimed to fill this gap by conducting a study. Dwiri and Okatan (2021) pointed to the importance of the leadership styles for the success of an organization, emphasizing the way effective leadership can influence team interactions and operative results. In the area of TQM and its effect on organizational agility for SMEs, leadership has a key function to ensure the culture is conducive to TQM practices of customer orientation, continuous improvement, and process optimization. The ability of leaders to adapt their styles to facilitate ambidexterity—balancing exploration and exploitation—further enhances the ability of a company to react quickly and efficiently to changes in the market while adhering to agile principles.

2.6. Research Model

The model illustrates how TQM, as the independent variable, directly influences Organizational Agility (H1). At the same time, TQM also enhances Ambidexterity, which in turn improves agility (H2 and H3). Thus, Ambidexterity acts as a mediating variable (H4), explaining how TQM can indirectly strengthen organizational agility through innovation and adaptability.

will target managers and employees in SMEs to obtain a comprehensive perspective on TQM implementation and its impact on organizational agility. The scale adopting as below:

- First: The Total Quality Management scale developed by Kurt and Zehir (2016).
- Second: Agility Questionnaire will be adopted from Sharifi and Zhang (1999) and the Turkish version from Akkaya and Tabak (2018).
- Third: Ambidexterity measurement adopted from Lubatkin et al. (2006).

3.3. Types of Research and Approach

This study encompasses descriptive and explanatory research types. Descriptive research will be used to depict the current state of TQM practices and organizational agility in SMEs. Explanatory research will aim to establish causal relationships and determine how TQM influences organizational agility through ambidexterity. And by using a deductive research methodology, this study will generate hypotheses based on established ideas and literature.

3.4. Selected Sampling Technique

This study has selected the probability sampling technique and has taken Türkiye's employees' small, medium, and selected private firms. The researcher intended that the sample should be unbiased and that the results should be analyzed for that.

The number of companies in Türkiye, has 3.645.469 small-medium firms, and the majority are based in Istanbul information based on KOSGEB (2024). In addition, using the calculation below, the sample size needed for this investigation is close to 400 individuals based on the equation used by (Mansor and Kurt, 2019).

$$\text{Sample size, } n = N * \frac{\frac{Z^2 * p * (1-p)}{e^2}}{\left[N - 1 + \frac{Z^2 * p * (1-p)}{e^2} \right]} \quad \text{Equation 1: Sample Siz Equation} \quad (1)$$

4. Analysis

A wide range of statistical methods was used in the study. Key dimensions and underlying data patterns were identified using exploratory factor analysis (EFA), and these patterns were confirmed using confirmatory factor analysis (CFA), which ensured the validity of the measurement scales. Validity and reliability were evaluated using a variety of techniques, including as item-total correlations, Cronbach's alpha coefficient, and content, construct, and criteria procedures. Finally, SEM improved the precision and depth of the study by revealing intricate relationships between latent components and observable variables.

4.1. Job Tilt

The table below presents the organizational roles of the respondents who completed the survey. It also demonstrates that the survey was conducted across different managerial levels within the companies.

Table 1. Job Title

	Frequency	Percent
Owner	48	12.0
Mid-Level Manager	113	28.2
Senior Manager	85	21.3
Worker	154	38.5
Total	400	100.0

4.2. Reliability Test

A common tool is Cronbach's alpha is used to evaluate the internal consistency of a scale. As aplity to seen in the table, all the factors have high Cronbach's alpha, indicating their reliability. A value of more than 0.7 is often regarded as satisfactory Pallant (2020).

Table 2. Reliability Test

Variable	Cronbach's Alpha	N of Items
TQM Scale	.895	43
Organizational Agility Scale	.889	18
Organizational Ambidexterity Scale	.887	12
All	.927	73

4.3. Exploratory factor analysis (EFA), factor loading

These items TQM.CI.1, TQM.CI.2, TQM.RS.1, TQM.RS.2, TQM.RS.3, TQM.RS.4, TQM.E.1, TQM.E.2, TQM.E.3, and TQM.E.4, were removed during the process because low or insignificant factor loading. And the the deletion of these items ensures that TQM scale includes only those items highly and clearly associated with each of the identified factors.

Table 3. Pattern Matrix-TQM Scale

	Factor							
	1	2	3	4	5	6	7	8
Management Leadership (ML)								
1. All departments within the company accept their responsibility for quality.				.635				
2. Company management provides individual leadership for quality products and quality improvement.				.732				
3. All managers within the company work to encourage Just-in-Time Production.				.724				
4. Top management encourages employee participation in the production process.				.688				
5. Company management creates and utilizes a vision focused on quality improvement.				.554				
6. Company management participates individually in the quality improvement project.				.560				
Decision Making Approach (DM)								
1. Quality information (cost of quality, defects, errors, scrap, etc.) is used as a tool to manage quality.			.749					
2. Quality information is used to evaluate managers and supervisors.			.650					
3. New product and service designs are carefully reviewed before the product is produced and marketed.			.761					
4. Product and service specifications and procedures in our business are understandable.			.661					
5. Realization and manufacturability are taken into account in product and service design processes.			.728					

Table 3 (Cont.). Pattern Matrix-TQM Scale

	Factor							
	1	2	3	4	5	6	7	8
Process Approach (PA)								
1. A large percentage of the equipment or process in the shop is commonly under statistical quality control.					.580			
2. We use extensive statistical techniques to reduce friction in processes.					.669			
3. We use charts to determine if our production process is under control.					.636			
4. We monitor our processes using statistical processes.					.575			
5. In our business, we generally organize training on basic statistical techniques (histograms and control charts).					.469			
6. In our business, we generally organize training on advanced statistical techniques (experimental designs and regression analysis).					.546			
Continuous Improvement Approach (CI)								
1. Many of our products or services have been improved recently	.472							
2. This organization has recently received accolades and is recognized for improving its products/services/processes.								
Employee participation (EP)								
1. During the problem-solving session, we try to get the ideas and opinions of all team members before making a decision.	.705							
2. Team problem-solving system is applied in our company.	.708							
3. Over the past 3 years, many problems have been solved through small team sessions.	.745							
4. Problem-solving teams helped improve the production process in this company	.708							
5. As much as possible, employees are encouraged to try to solve their own problems.	.630							
6. The ideas of production workers are actively used.	.819							
7. Teamwork is common in this organization.	.635							
8. In this organization, everyone participates in the improvement of our products, services and processes.	.658							
9. In this organization, everyone participates in the improvement of our products, services and processes.	.741							
Relations with Suppliers (RS)								
1. We focus on quality rather than price when selecting suppliers.								
2. We take commitment to quality into consideration when selecting suppliers.								
3. We take process capability into consideration when selecting suppliers.								
4. We take into consideration the commitment to continuous improvement in supplier selection.								
Customer Orientation (CO)								
1. Customer requirements are disseminated and understood in our business.		.777						
2. We know our customers' current and future needs.		.692						
3. We are frequently in close contact with our customers.		.711						
4. Our customers often visit our factory.		.548						
5. Our Managers/Executives and Supervisors encourage customer satisfaction improvement activities.		.677						
6. Satisfying our customers and meeting their expectations is the most important thing we do.		.660						
7. Top managers constantly emphasize the importance of customers.		.584						
Education (E)								
1. Specific skill-based training (technical and vocational) is provided to hourly employees in the organization.								
2. Quality-related training is provided to hourly employees in the organization.								
3. Quality-related training is provided to managers in the organization.								
4. "Total Quality Concept" (a business-wide responsibility philosophy for quality) training is provided throughout the organization.								

Regarding Organizational Agility grouped in 4 factors. Only the OAg.C.6 loaded poorly, with .503 on another factor, and was excluded because it did not load strongly onto the primary factor.

Table 4. Pattern Matrix - Organizational Agility Scale

	Factor			
	1	2	3	4
Competence (C)				
1. Our business has a strategic vision to achieve its long-term goals.		.567		
2. Our business has sufficient technology in accordance with the requirements of the age.		.610		
3. Our company's products and the service it offers to customers regarding this product are of high quality.		.656		
4. Our business aims to achieve maximum output with minimum input in all processes in order to achieve its goal.		.649		
5. Our business promotes products at a high level		.455		
6. Our company attaches importance to providing and developing a collaborative environment both inside and outside the company.			.503	
7. Our business has expert and authorized human resources.		.697		
8. All business processes in our company are defined simply, clearly and explicitly.		.480		
9. Our company attaches importance to providing and developing a collaborative environment both inside and outside the company.		.477		
Flexibility (F)				
1. Our business has the flexibility to produce different product models.	.717			
2. Our business has the flexibility to produce different amounts of products and services.	.700			
3. Our company has flexibility within the scope of human resources policies.	.507			
Responsiveness (R)				
1. Our business has the ability to respond quickly to changes in customer needs and preferences.			.657	
2. Our business senses and perceives the direction of change within the scope of environmental change and is prepared for these changes.			.675	
3. Our company's ability to overcome innovations and environmental and technological changes quickly and in a timely manner is higher than its competitors.			.627	
Speed (S)				
1. Our company is faster in production processes than its competitors.				.620
2. Our company is quick to introduce new products to the market.				.710
3. Our business distributes products and services to customers quickly and on time.				.638

Regarding the Organizational Ambidexterity grouped and loaded in 2 factors. And the results have shown a two-factor structure, with items clearly clustering into two distinct groups.

Table 5. Pattern Matrix - Organizational Ambidexterity Scale

	Factor	
	1	2
Explorative		
1. In our institution, we seek new technological ideas by encouraging different thinking and looking at events from different perspectives.		.646
2. We believe that our corporate success comes from our ability to develop and acquire new technologies.		.593
3. We ensure that our organization is innovative by developing or acquiring new products and services for our organization.		.590
4. We seek creative/innovative ways to satisfy customer needs in our organization.		.602
5. As an institution, we exhibit a competitive attitude in entering new markets.		.540
6. As an institution, we are targeting new customer groups in addition to our existing customers.		.761
Exploitative		
1. As an institution, we always adhere to the goals of low cost and high quality.	.642	
2. As an institution, we strive to improve existing products and services.	.685	
3. We are constantly increasing our autonomy/independence while operating.	.579	
4. As an institution, we measure the satisfaction levels of our existing customers at regular intervals.	.595	
5. We do whatever is necessary to increase the satisfaction and contentment level of our existing / new / potential customers.	.558	
6. As an institution, we strive to effectively penetrate our existing customer base.	.742	

4.4. Direct Effects

The Direct Effects analysis shows significant relationships between TQM and Organizational Ambidexterity, and Organizational Agility. From the Regression Weights, there is a strong positive effect of TQM on OAmb with an unstandardized estimate of 0.999, a critical ratio of 65.618, and a p-value of less than 0.001. In the same vein, TQM has a direct influence on OAg at 0.568, a C.R. of 14.096, and a very significant p-value. Furthermore, there is a significant contribution of OAmb in explaining OAg with an unstandardized estimate of 0.410, a C.R. of 10.610, and a p-value of less than 0.001.

These are further refined by the Measurement Scale-adjusted Standardized Regression Weights. The standardized estimate of the effect of TQM upon OAmb is 0.957, which is extremely strong. TQM has a standardized effect of 0.561 on OAg, that is, moderate, but the effect of OAmb on OAg is somewhat weaker though still significant, standing at 0.422.

These findings underline how TQM acts as the very driver of improvements at organizations, while OAmb mediates and significantly amplifies the relationship between TQM and agility. The findings thus demonstrate that a focus on TQM processes enhances not only amplification processes themselves but also higher levels of agility through OAmb.

Table 6. Standardized Regression Weights - Direct Effects

			Estimate
Organizational Ambidexterity	<---	TQM	.957
Organizational Agility	<---	TQM	.561
Organizational Agility	<---	Organizational Ambidexterity	.422

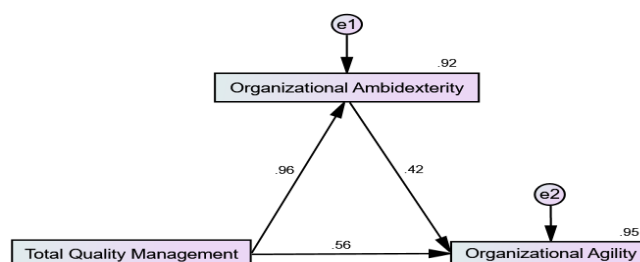


Figure 2. Direct Effects

4.5. Confirmatory Factor Analysis (CFA), reliability and validity assessment

Getting a model fit is the first step in CFA, which entails eliminating questions with low factor loading and performing covariance for a few more questions. The data are suitable for CFA and SEM analysis, and the research's hypothesized factor model fits the data well (CMIN/DF = 1.735, CFI = 0.965, TLI = 0.964, IFI = 0.965, and RMSEA = 0.043). Checking the validity and dependability of the data used in the analysis is made possible by obtaining a fit model. Composite reliability, which must be equal to or greater than 0.70 (CR ≥ 0.70), indicates the degree to which test results are free from measurement error or the components of mistakes that arise when testing anything. Validity, on the other hand, "works on confirming if the latent variables are being measured accurately or not" (Muijs, 2004). When the average variance extracted is greater than or equal to 0.5 (AVE ≥ 0.5) and the maximum shared variance is less than the average variance extracted (MSV > AVE), acceptable validity is achieved.

Table 7. Reliability and Validity Assessment

	CR	AVE	MSV	MaxR(H)	TQM	OAg	OAmb
TQM	0.820	0.628	0.030	0.923	0.674		
OAg	0.801	0.503	0.557	0.905	0.936	0.709	
OAmb	0.744	0.656	0.292	0.751	0.540	0.519	0.544

Numerous noteworthy indirect impacts of the model's latent variables were discovered by the SEM analysis. These indirect effects show how one variable affects another through the mediation of other model variables. The mediation analysis for the standardized indirect effects will test relationships of TQM, OAmP, and OAg. This would allow one to gain insight into how the latent variables impact one another indirectly.

The mediating effect or indirect relationship between the variables in question does not exist in the present model, as the results indicate that the indirect effect of TQM on OAmP is 0.000. This would thus mean that TQM does not indirectly affect organizational ambidexterity through any other variable or pathway considered in this analysis. By contrast, the indirect effect of TQM on OAg is 0.404, which shows a moderate positive mediation effect. The implication of this result is that although there might be some intervening variables not shown here in this model, TQM significantly affects organizational agility through one or more intermediate factors. The indirect effect of OAmP on OAg is also 0.000, meaning no mediation effect exists between organizational ambidexterity and organizational agility. This would, therefore, mean that any relationship between these two variables, if present, might be more direct or dependent on other unexamined variables.

In other words, the results of the analysis show that TQM has a significant indirect effect on organizational agility, which underlines the importance of TQM in nurturing agile practices. The nonsignificant indirect effects of other relationships suggest further research is required to identify potential mediators or mechanisms driving these dynamics.

Table 9. Hypothesis Testing Results

Hypotheses	Results
1 TQM will have a positive effect on Organizational Agility.	Accepted
2 TQM will have a positive effect on Organizational Ambidexterity	Accepted
3 Ambidexterity will have a positive effect on Organizational Agility	Accepted
4 Organizational Ambidexterity will mediate the relationship between TQM and Organizational Agility	Rejected

5. Discussion and Conclusions

The target for this study was to check and finding how TQM implementation affects organizational agility in SMEs, with a particular emphasis on investigating the mediating function of ambidexterity in this relationship. Organizational agility, i.e., the organizational capacity to speedily respond to changes and capitalize on new opportunities, has become a key element for SMEs to overcome challenges in the volatile commercial scene. The hypothesis that as a systemic method of quality improvement, TQM could lead to increased agility through its emphasis on both efficiency and continual progress was proposed.

The founding and result of analysis show that TQM have direct and positive effect of a high degree on organizational agility. SMEs that effectively implement TQM practices—like the customer orientation, process optimization, and continuous improvement—are better equipped to expect changes in their external environment and adjust their strategies and operations correspondingly. The direct relationship observed emphasizes the major role that TQM plays in constructing the foundational capabilities required for agility, such as streamlined processes and responsive decision-making frameworks. A KMO test was tested, and both the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity strongly support the suitability of data for EFA. High KMO values of 0.989 for the TQM scale, 0.986 for the OAg scale, and 0.983 for the OAmP scale indicate excellent sampling adequacy and thus a strong partial correlation structure among the variables. These high KMO values show that the datasets are suitable for factor analysis. And the reliability test for TQM scale showed strong internal consistency as 0.895 for the 43 items, the reliability for OAmP scale with its 12 items is confirmed by a high Cronbach's Alpha of 0.887, and the OAg scale showed a similar high status of internal consistency represented by the Cronbach's Alpha of 0.889 in respect of 18 items. Based on

all reliability testes, making up all these scales which shows that these items reliably depict the intended TQM, OAg, and OAm construct.

On the other hand, the paper also points out that ambidexterity does not mediate the relation between TQM and OA. Structure, described as an organization's capability to make tradeoffs between exploration (renewal flexibility) and exploitation (effectiveness consistency), was anticipated to be a facilitator that would increase the speed (i.e., agility) that is possible from TQM principles. The lack of mediating effect implies that although ambidexterity may be useful organizational asset, it independently operates from TQM as a determinant of agility in SMEs. This finding would suggest that the agility-promoting effects of TQM are due to its focus on process mastery and organizational congruence and not via the balancing act of ambidexterity.

From a practical perspective, the result show that SMEs should concentration on implementing TQM to enhance their capacity for rapid adaptation. Heads and managements should concentrate their efforts on the introduction of quality management principles within the organizational culture, as these principles have a direct significance in their capacity to work in a highly volatile business environment. Simultaneously, although ambidexterity may not act as a moderator, it is a positive trait for companies to develop, especially when tackling the dual demands of innovation and operational efficiency.

In summary, this study indicates that direct and substantial role of TQM on organizational agility and absence of mediated role of ambidexterity. These results offer meaningful implications for SMEs with respect to improving their agility in bipolar markets, reinforcing the strategic significance of TQM, but also suggesting that ambidexterity, if advisable, works in isolation within this framework. Future investigations are warranted as to under which conditions ambidexterity may beneficially interact with TQM, or as to whether any alternative potential mediators should be considered in the TQM-agility association.

Future research should also investigate the moderating effect of company size on the relationship between TQM, organizational ambidexterity, and organizational agility. As revealed in this study, the mediating effect of ambidexterity is stronger in larger firms. Hence, understanding how TQM affects organizations of varying sizes and across different industries would provide a better understanding of its effects. It would be more interesting to see how these dynamics compare in larger multinational corporations versus small businesses focused on local operations.

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