

## The influence of balanced scorecard dimension on total quality management and sustainable performance as a mediating variable: An empirical study in KSA services projects

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### ABSTRACT

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This study aims to analyze the influence of the Balanced Scorecard (BSC) dimensions (financial, customer, internal processes, and learning and growth) on Total Quality Management (TQM), with sustainability performance as a mediating variable. The study utilized a cross-sectional survey method, distributing 400 questionnaires to employees in the service projects in KSA. Out of these, 340 questionnaires were deemed valid for final analysis. Data analysis was conducted using the SmartPLS program. The study found that all BSC dimensions, except for the learning and growth dimension, had a negative direct effect on TQM, and the BSC dimensions through sustainability performance positively affected TQM, except for the learning and growth dimension. The main contribution of the research is to identify the BSC dimensions that best predict TQM in service projects in Saudi Arabia. The extended model test shows that sustainability performance is a good mediator in the causal relationship between the BSC dimensions and TQM. Future research can validate these findings in projects such as capital construction and industrial projects using a longitudinal survey design. Organizations can apply these research findings by leveraging the Balanced Scorecard as a management framework for predicting and improving TQM.

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## 1. Introduction

The Balanced Scorecard (BSC) framework, introduced by Kaplan and Norton in the early 1990s, significantly changed how organizations approach strategic management and performance evaluation. The BSC incorporates multiple perspectives—financial, customer, internal business processes, and learning and growth—into a unified structure to enhance organizational performance beyond traditional financial metrics. This multidimensional approach addresses the challenges of sustainable performance evaluation and the achievement of total quality (Hoque, 2014). The BSC emphasizes strategic alignment, helping organizations connect their vision with operational realities. This facilitates a deeper understanding of performance that encompasses long-term strategic objectives, considers various stakeholders' perspectives, and fosters an organizational culture of sustainable practices by including measures that reflect the interests of customers, employees, and the broader community (Schaltegger, 2011). With the growing realization of interdependence among social, environmental, and economic factors, the Balanced Scorecard (BSC) has developed to incorporate a more significant focus on sustainability. Companies can now add sustainability measures to the traditional BSC framework and undertake a full range of performance evaluations beyond financial measures. Such attention also allows organizations to assess their operational effectiveness in sustainable management and corporate social responsibility and thus enables them to 'operationalize' sustainability in corporate strategies.

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This change improves responsibility for performance and answers the global need for sustainability by increasing recognition of stakeholders' power and legal requirements (Tawse & Tabesh, 2023). Additionally, the study by Hoque (2014) has proven the usefulness of the BSC in different regions as well as how it enhances quality performance. For instance, the BSC enables firms to monitor the quality measurements in production, which in turn enhances processes, reduces waste, and increases productivity. Assessing customer satisfaction and employee involvement increases service quality by using continuous improvement methodologies in the area of services. This accuracy enables the BSC to be useful in any industry. This approach further classifies the BSC as a critical component for those companies that want to achieve their strategic objectives and goals over a sustained period of time. The BSC helps organizations maintain a strategic focus on their mission and vision, allowing them to remain agile in their operations (Hansen & Schaltegger, 2016). In an environment characterized by rapid changes and market volatility, swiftly adapting strategic priorities through a structured framework like the BSC can be advantageous. Research has shown that organizations leveraging the BSC are better positioned to proactively respond to changes in market demands, thereby enhancing their competitiveness (Schaltegger, 2011).

The study is concerned with revealing the impact of the dimensions of the balanced scorecard on total quality management, and discussing them theoretically and practically. Moreover, considering the four dimensions of the balanced scorecard and the need for a comprehensive internal assessment, this study will also explore the mediating effects of sustainable performance between the dimensions of the balanced scorecard and total quality management. Moreover, considering the four dimensions of the Balanced Scorecard and the need for a thorough internal evaluation, this study will also explore the mediating variables within the performance evaluation index between the Balanced Scorecard and Total Quality Management (TQM). The study aims to determine whether BSC dimensions can influence TQM and address this gap by achieving the following objectives: 1. To demonstrate that BSC dimensions can enhance TQM. 2. To illustrate the mediating influences of sustainable performance.

## **2. Theoretical Framework and Hypothesis Development**

### *2.1 Balanced Scorecard*

The BSC concept is an essential tool for strategic management, allowing organizations to translate their overall vision and strategy into specific, attainable objectives from multiple perspectives. The BSC framework comprises four key components: financial, customer, internal processes, and learning and growth (Kaplan & McMillan, 2020; Carneiro-da-Cunha et al., 2016). This multidimensional approach enables organizations to align their daily operations with long-term goals, which is crucial for achieving sustainable performance; the integrated nature of the BSC allows organizations to adopt a broader approach to performance measurement, moving beyond traditional financial metrics that often offer a limited view of Tawse and Tabesh (2023). As Benková et al. (2020) noted, implementing the BSC structure encourages a more comprehensive evaluation of organizational performance, aligning closely with long-term strategic objectives. The Balanced Scorecard (BSC) is a dynamic tool that guides organizations toward their envisioned futures while remaining adaptable to the constantly changing environment. Analyzing the balanced scorecard concept, I've gained a deeper understanding of its significance in strategic management, particularly in fostering alignment between organizational objectives and individual performance measures (Abdelraheem & Hussien, 2022). The BSC's ability to express and communicate strategic goals at various levels of an organization highlights its crucial role in bridging the gap between theoretical frameworks and practical applications. (Frederico et al., 2021) Note that this framework enhances team communication, promotes transparency, and facilitates a shared understanding of strategic objectives. Mio et al. (2022) argue that the BSC goes beyond simple financial metrics by including a diverse range of performance indicators, such as customer satisfaction, internal processes, and opportunities for learning and growth. This comprehensive approach enables organizations to evaluate their performance in detail and pinpoint areas that need improvement. Such a multifaceted strategy is essential for organizations that foster a culture of continuous improvement and operational efficiency, ultimately driving their growth trajectory.

Lin et al. (2013) discussed the Balanced Scorecard (BSC) method as a mechanism that enables managers to achieve their strategic goals. They developed fuzzy systems to evaluate functions within the management systems they aimed to improve. This paper aimed to create a framework for assessing procedures that utilize ambiguous language to model the cognitive processes of managers in order to access relevant information and data. Such studies can assist organizations in evaluating their strategies and adopting modern management approaches in their daily operations. In 1985, the concept of linking teaching staff performance to education improvements through teacher performance management emerged in Britain. In 1998, the United States developed a performance evaluation method that includes 13 indicators across four dimensions: financial, physical, human, and informational capital (Zhao et al., 2020). Alomiri et al. (2019) discuss the adoption of the Balanced Scorecard (BSC) in service companies in the Kingdom of Saudi Arabia. The study concluded that there is a relationship between applying the Balanced Scorecard, competitive advantage, and implementing a total quality management approach. These factors provide direction for further research. The study by Hameed Abbas Bahia et al. (2019) aimed to highlight the role of the BSC in enhancing organizational performance through the adoption of both financial and non-financial measures. The study concluded that an increase of one unit in the Balanced Scorecard leads to a rise in organizational performance by 0.89 units. According to (Zhao et al., 2020), private universities in China evaluate their performance using the Balanced Scorecard. This systematic method assesses performance by relating it to the strategies of higher education in China and improving health in universities. The paper by Kedzierska-Bujak. (2021) aimed to clarify key topics regarding the Balanced Scorecard (BSC) and its significance for Polish universities in performance evaluation. It concluded that the current

administrative model of universities does not effectively support employee performance development and overlooks their aspirations. However, the study affirmed that the BSC is suitable for evaluating performance in academic institutions. Benková et al. (2020) sought to confirm the importance of incorporating non-financial factors in business management through the Balanced Scorecard methodology. Their study established a connection between the BSC and non-financial performance indicators. Additionally, Sutherland (2000) reported that the University of Southern California utilized the Balanced Scorecard to assess its academic programs. Bremser and White (2000) developed a Bachelor of Accounting curriculum using the BSC framework. Philbin. (2011) explored the application of the BSC in evaluating university performance; the study highlighted financial and non-financial dimensions that university administration can leverage to enhance management practices and provide tangible benefits to stakeholders. The paper also discussed potential modifications to the Balanced Scorecard to assess performance better. The financial dimension gives organizations a clear view of their health and economic success. However, the focus on immediate financial metrics can overshadow other important areas of growth and development. This point is supported by Acuña-Carvajal et al. (2019) and Chow et al. (1997), who emphasize that a robust planning and validation mechanism under the Balanced Scorecard (BSC) framework addresses not only immediate performance indicators but also prepares organizations for future challenges and opportunities. The customer dimension is equally essential, as it emphasizes customer satisfaction and market positioning, which are crucial for maintaining a competitive advantage. By using well-structured metrics, organizations can gather invaluable information about customer preferences, leading to enhanced service and increased brand loyalty. This focus on external factors promotes a customer-centered mindset within organizations, helping them adapt more effectively to changes in market dynamics (Kaplan & Norton, 1992; Kaplan & Norton, 1996). The internal process dimension underlines the importance of operational efficiency, innovation, and excellence in service delivery. Organizations can adjust their processes by concentrating on internal resources to meet and exceed customer expectations. This shift fosters a culture of continuous improvement, which is vital for long-term success in an increasingly complex business (Lipe & Salterio, 2000; Pham et al., 2020). The learning and growth dimension highlights that an organization's value significantly rests on its human capital and innovation capability. Nurturing a qualified and engaged workforce is not just a strategic necessity; it establishes the foundation for sustained competitive advantage. I have observed organizations that actively incorporate employee development and knowledge sharing into their strategic frameworks, creating a fertile environment for innovation and adaptability (Brander Brown & McDonnell, 1995).

## 2.2 Sustainable Performance and its Dimensions

Sustainable performance has become a crucial concept in modern commercial practices. It refers to the ability of organizations to meet the needs of the present while ensuring that future generations can also meet their own needs. This approach incorporates economic, environmental, and social dimensions, promoting long-term economic growth and enhancing social responsibility (Rashid et al., 2025; Hussain et al., 2018). To fully understand the importance of sustainable performance, it is essential to analyze its significance within commercial practices and its broader environmental impact. The Triple Bottom Line (TBL) framework effectively illustrates the theoretical foundation for sustainable performance, which encompasses economic, social, and environmental dimensions (Hubbard, 2009; Govindan et al., 2013). This approach suggests that companies should assess their success through traditional financial metrics and by considering their social contributions and environmental stewardship. The TBL perspective promotes a holistic view of a company's operations and impacts, encouraging an integrative approach to managing stakeholder relationships. This perspective supports the idea that successful companies aim for financial profitability while positively influencing the ecosystems and communities in which they operate. The success of an organization is determined by its ability to evaluate sustainability along with both short- and long-term performance (Afoakwah et al., 2023). Sustainable performance is increasingly recognized as a critical factor for long-term viability, highlighting the interconnectedness of environmental, social, and economic dimensions. The environmental aspect focuses on minimizing the ecological impact by managing the green supply chain, significantly contributing to overall sustainability performance (Yildiz Çankaya & Sezen, 2019). Additionally, incorporating sustainability reporting into business risk management enhances business performance by aligning environmental objectives with corporate governance (Shad et al., 2019; Hongming et al., 2020; Hussain et al., 2018).

Social factors, such as the involvement of stakeholders and corporate social responsibility initiatives, are crucial for achieving sustainable performance (de Sousa Jabbour et al., 2020). It is important to highlight the role of innovative business models that foster collaboration among stakeholders in emerging economies, addressing institutional gaps that hinder sustainability efforts. Additionally, green human resource management practices are essential for fostering a culture of sustainability within organizations (Mousa & Othman, 2020). Economic dimensions, driven by profitability and financial viability, are necessary to sustain environmental and social initiatives (Caldera et al., 2019). Small and medium enterprises (SMEs) should balance these dimensions to implement sustainable business practices successfully. The framework (Khan et al., 2018) proposed for evaluating suppliers' sustainability performance demonstrates how economic factors influence the effectiveness of the supply chain and corporate sustainability outcomes. The interaction between dimensions highlights the complexity of achieving long-term sustainability and identifies that aligning operational programs with sustainable performance measures enhances an organization's capacity. Establishing performance indicators encompassing environmental, social, and economic metrics is essential, as discussed by (Kravchenko et al., 2019), to promote a holistic approach to sustainability. Focusing on creating shared value within business models improves organizations' ability to respond to sustainability challenges while reinforcing their economic foundations (Curtis & Mont, 2020). Ultimately, recognizing the interdependencies among these dimensions is crucial for organizations striving for long-term sustainable performance (Henao et al., 2019; Kamble et al., 2020).

### 2.3 Total Quality Management (TQM)

Total Quality Management (TQM) is an administrative philosophy encompassing all activities aimed at satisfying the needs and expectations of individuals. Its goal is to continuously improve the quality of services, thereby helping organizations meet their objectives with high efficiency (Mohammed et al., 2017). TQM refers to a service or product's overall features and characteristics that align with its ability to fulfill explicit and implicit needs (Alshourah, 2021). Pakdil et al. (2012) define quality as “meeting market requirements regarding good design and after-sales services”. Total Quality Management (TQM) is a comprehensive approach that aims to develop and continuously improve operations to meet customer needs and enhance organizational performance (Budayan & Okudan, 2022; Jasti et al., 2022; Saffar & Obeidat, 2020). It serves as an administrative philosophy focused on the quality of management within organizations (Souza et al., 2022; Liu et al., 2023; Taha et al., 2024), thereby increasing their competitiveness and value to customers. At the heart of TQM are several guiding principles that direct organizations toward quality improvement. These principles include customer focus, continuous improvement, and employee involvement. Customer focus prioritizes meeting the needs and expectations of customers in all business operations (Dahlggaard-Park et al., 2018). Continuous improvement emphasizes ongoing efforts to enhance processes, products, or services (Alauddin & Yamada, 2019). Employee involvement fosters a participatory culture where all employees contribute to achieving quality objectives (Stamatis, 2018). By embracing these principles, organizations create a framework for success that aligns everyone with quality goals (Luthra et al., 2020).

### 2.4 Integrating Sustainability in KSA's Diverse Sectors

Sustainable practices are essential for enhancing performance across various sectors in Saudi Arabia, significantly impacting economic, environmental, and social outcomes. Chaaben et al. (2024) emphasized the transition to a green economy and provided empirical evidence that sustainable development initiatives positively contribute to economic performance while achieving substantial sustainability goals. This alignment of economic growth with sustainability underscores the importance of integrating green innovations; as Wasiq et al. (2023) highlighted, the study demonstrates that small and medium enterprises (SMEs) in Saudi Arabia have embraced green innovations, enhancing their sustainability performance. The Kingdom's commitment to renewable energy sources is regarded as a strategic initiative within the framework of Saudi Vision 2030 (Amran et al., 2020). Islam and Ali (2024) emphasized that the political framework surrounding the transition to green energy is essential for fostering sustainable economic growth, highlighting a clear relationship between environmental initiatives and financial stability. Similarly, Abubakar et al. (2020) examined the structures of universities, demonstrating that these educational institutions play a significant role in promoting sustainable development, which further supports the economic advantages of sustainable practices across various sectors. The environmental benefits associated with sustainable practices also have a positive impact. Kamboj et al. (2024) discussed the necessity for Saudi Arabia to implement long-term strategies to reduce greenhouse gas emissions. They emphasize that improved governance and adopting sustainable practices can significantly lessen the country's environmental footprint. Meanwhile, Ghaithan et al. (2021) elaborate on how technological advancements can enhance sustainability performance. They highlight that manufacturing practices in plastics and petrochemicals can effectively reduce waste, promoting greater environmental sustainability. The literature indicates that sustainable practices enhance economic performance while yielding significant environmental and social benefits (Alsharari & Aljohani, 2024). Their research on benchmarking implementation demonstrates how cultural and environmental factors are interconnected and work together to improve sustainability across various sectors. As Saudi Arabia continues to develop its sustainable landscape, it is becoming increasingly clear that these practices are essential for achieving long-term and comprehensive improvements.

### 2.5 Balanced Scorecard (BSC) and Total Quality Management (TQM)

The Balanced Scorecard (BSC), developed by Kaplan and Norton in 1992, is a strategic management tool that offers a comprehensive view of organizational performance beyond traditional financial metrics. It encompasses four critical dimensions: financial processes, customers, internal business processes, and learning and growth. Each of these dimensions plays a key role in aligning organizational activities with strategic objectives and significantly contributes to the successful implementation of TQM practices. The financial dimension emphasizes evaluating performance through financial metrics that reflect shareholder profitability, growth, and value. TQM practices, which focus on continuous improvement and customer satisfaction, directly impact financial performance by reducing waste, increasing efficiency, and enhancing product quality. Baird et al. (2011) highlighted the mutual influence between financial performance and TQM, noting that successful quality initiatives yield better financial results, encouraging other organizations to invest in quality practices. Consequently, this dimension is a foundation for integrating TQM efforts with overall financial goals. The customer dimension underscores the necessity of understanding customer needs and expectations, which is essential for guiding TQM practices to improve customer satisfaction and loyalty. Organizations that excel in TQM have effective mechanisms for soliciting customer feedback and leveraging it to drive improvements (Sadikoglu & Zehir, 2010). This alignment is crucial; organizations that successfully integrate their TQM practices with customer insights can significantly enhance their market positioning and competitive advantage. The focus on customer-centered strategies within the BSC reinforces the significance of TQM practices in fostering a culture of responsiveness and adaptability (Mehralian et al., 2017). The structure of internal business processes plays a crucial role in helping organizations evaluate and enhance their operations as part of TQM initiatives. This aspect encourages organizations to identify and optimize processes that need improvement, thereby facilitating systematic efforts to enhance quality. A study by Baird et al. (2011) demonstrated that organizations implementing TQM tend to succeed by aligning their internal processes with strategic objectives, as the Balanced Scorecard (BSC) emphasized. This alignment

fosters a culture of continuous improvement, where processes are regularly analyzed and refined to meet quality standards and organizational goals. The learning and growth dimension of the Balanced Scorecard (BSC) focuses on employee development and organizational culture, playing a pivotal role in implementing TQM. TQM is inherently a people-centered approach that actively involves employees at all levels (Kaplan, 2009) suggesting that an organization's commitment to learning and growth fosters an environment conducive to successfully implementing TQM practices. Organizations cultivate a skilled and motivated workforce to maintain quality standards by providing training and development opportunities. Niven (2008) further emphasized that this dimension is fundamental in linking TQM initiatives to strategic objectives, thus fostering a culture prioritizing quality throughout the organization.

In summary, the interaction between BSC dimensions and TQM practices highlights a synergistic relationship that enhances organizational performance; the BSC serves as a measurement tool and a framework that underscores the importance of quality management in achieving strategic goals. Organizations can develop a quality-oriented culture essential for operational excellence and long-term success by aligning TQM initiatives with the four BSC dimensions. The literature indicates that successful TQM implementation requires a robust structure like the BSC, reinforcing strategic alignment and essential cultural values to promote quality within organizations (Oakland, 2014). The BSC acts as a strategic management tool, providing a holistic framework to understand how various organizational dimensions interact to strengthen the implementation and effectiveness of TQM. From a financial perspective, allocating resources for TQM initiatives is crucial. Tasleem et al. (2019) underscored that effective financial management allows organizations to prioritize investments related to TQM, ensuring adequate funding for training programs, quality improvement projects, and technological updates. This resource allocation not only influences the widespread implementation of TQM practices but also affects their sustainability. Without sufficient financial resources, organizations may struggle to fully realize the benefits of TQM, highlighting the interdependence between financial health and quality initiatives. Customer perspective is another vital pillar in the BSC framework, particularly concerning customer satisfaction metrics closely aligning with TQM objectives. Research by Chang et al. (2009) and Ali and Raza (2017) illustrated that organizations prioritizing customer-focused performance measures are better positioned to implement TQM practices that foster customer loyalty. By acquiring and analyzing customer feedback, organizations can identify areas for improvement, which helps address customer needs and allows for more effective adaptation of TQM strategies. This alignment underscores organizations' need to cultivate a customer-centric culture as a fundamental element of their quality management efforts. The internal business processes dimension emphasizes the critical role of operational efficiency in facilitating TQM practices aimed at process improvement. Kaynak and Hartley (2008) and Wu et al. (2009) note that organizations that diligently monitor and enhance their internal processes are more adept at incorporating TQM principles into daily operations, thereby driving continuous improvement and operational excellence. The connection between this dimension and TQM demonstrates how streamlined processes reduce waste and inefficiencies and enhance the organization's ability to deliver quality outcomes aligned with customer expectations.

The dimension of learning and growth emphasizes the significance of organizational learning and employee development, which are vital for sustaining TQM efforts over time. (Ismail Salaheldin, 2009) and (Kim et al., 2012) suggest that organizations cultivate a qualified and highly engaged workforce focused on quality initiatives by investing in training and professional development. This, in turn, reinforces the TQM framework. The interaction among the dimensions of the BSC creates a cohesive framework that supports the effective implementation of TQM practices within organizations. Appelbaum et al. (2017) and Verbeeten (2008) emphasize that a balanced approach ensures that financial, customer, process, and learning objectives are pursued simultaneously, resulting in a synergistic effect. Additionally, Bou-Llusar et al. (2009) and Al-Shboul et al. (2017) reinforced this idea by demonstrating that organizations that integrate these dimensions experience improved performance and quality outcomes. Furthermore, Sousa and Aspinwall (2010) explained that the holistic application of the BSC aligns with TQM principles and fosters a quality culture throughout the organization, solidifying the foundation for effective TQM implementation.

**H1:** *The Customer dimension of a balanced scorecard positively affects total quality management.*

**H2:** *The financial dimension of a balanced scorecard positively affects total quality management.*

**H3:** *The internal processes dimension of a balanced scorecard has a positive effect on total quality management.*

**H4:** *The learning and growth dimension of a balanced scorecard has a positive effect on total quality management.*

## 2.6 *Balanced Scorecard, Sustainable Performance Evaluation, and Total Quality Management*

In summary, integrating sustainability measures into the balanced scorecard enhances the link between economic performance and sustainable practices while improving overall quality results. When adopting this multidimensional approach, organizations are better prepared to navigate the complexities of the modern corporate environment, address the concerns of stakeholders, and pursue long-term strategic goals that align environmental management with economic profitability (Mio et al., 2022). Successful implementations documented by Butler et al. (2011) and Cook et al. (2017) demonstrated that organizations can thrive when they recognize sustainability as a vital component of their operations and strategic initiatives. The BSC is a strategic performance management tool essential for fostering an organizational culture supportive of TQM and continuous improvement. A well-structured BSC helps organizations align their operational activities with strategic

objectives, thus promoting a culture that prioritizes quality and performance. Understanding cultural factors can influence the adoption TQM practices and the effectiveness of performance evaluation systems (Anjomshoae et al., 2017).

**H5:** Sustainable performance is a mediating variable that moderates the effect of customer dimensions and total quality management.

**H6:** Sustainable performance is a mediating variable that moderates the effect of the financial dimensions and total quality management.

**H7:** Sustainable performance is a mediating variable that moderates the effect of the internal process dimensions and total quality management.

**H8:** Sustainable performance is a mediating variable that moderates the effect of the learning and growth dimensions and total quality management.

### 3. Methodology

This study uses a questionnaire to clarify and evaluate the proposed theories and hypotheses through methodologies. The questionnaire was conducted, distributed, and collected over three months, from October 2024 to January 2025, targeting service projects in KSA. The data collection process resulted in 340 respondents. The data reveals a significant male prevalence in the business landscape, with male firm owners comprising 85% (204 respondents) compared to females, who represent 15% (36 respondents). Most of the study sample has a bachelor's degree, making up 55% (187 participants), while those with a master's degree make up 10 % (34 participants). Regarding age demographics, 66.67% (316 participants) of the study sample are between the epochs of 31 and 45.

### 4. Results and Discussion

#### 4.1 Measurement of Model Validity

According to (Mohd Dzin & Lay, 2021), the first step in assessing model validity using Smart PLS (Partial Least Squares) involves evaluating the loadings of the questionnaire statements on the latent variables as well as the extracted variance (Hair Jr, Joseph F. et al., 2010). The loading rate must exceed 60%, and the extracted variance should be above 50%. Table 1 and Fig. 1 show that the loading rates surpass 60%, and the extracted variance is greater than 50%, indicating that the measurement model is valid.

**Table 1**  
Loading Matrix

	Customer Dimension	Financial Dimension	Internal Process Dimension	Learning and Growth Dimension	Sustainable Performance	TQM
CD1	0.94					
CD2	0.905					
CD3	0.914					
CD4	0.841					
FD1		0.917				
FD2		0.918				
FD3		0.862				
FD4		0.785				
IPD1			0.914			
IPD2			0.849			
IPD3			0.86			
IPD4			0.732			
LGD1				0.933		
LGD2				0.913		
LGD3				0.908		
LGD4				0.913		
SP1					0.901	
SP2					0.808	
SP3					0.816	
SP4					0.681	
TQM1						0.955
TQM2						0.9
TQM3						0.895
TQM4						0.936

#### 4.2 Measurement of the Model Reliability and Discriminant Validity

The second step involves verifying the model's reliability through composite reliability (CR) and Cronbach's alpha (CA), both of which should be no less than 70% (Hair Jr, Joe F. et al., 2017). As shown in Table 2, both the composite reliability (CR)

and Cronbach's alpha (CA) exceed 70%, indicating that the study variables possess adequate reliability and internal consistency.

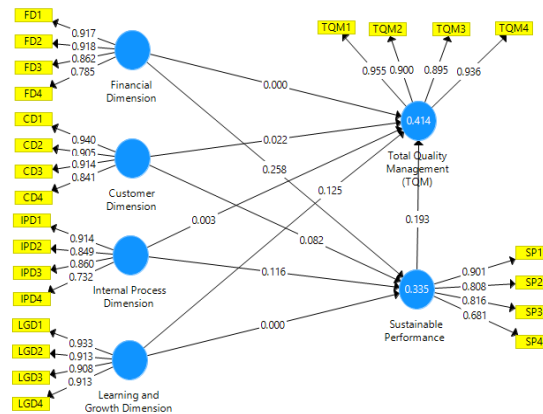


Fig. 1. loading Rate, F<sup>2</sup> and R<sup>2</sup>

**Table 2**  
Model Validity and Reliability

	(CA)	(CR)	(AVE)
Customer Dimension	0.922	0.945	0.811
Financial Dimension	0.895	0.927	0.760
Internal Process Dimension	0.860	0.906	0.708
Learning and Growth Dimension	0.937	0.955	0.840
Sustainable Performance	0.818	0.880	0.649
Total Quality Management (TQM)	0.941	0.958	0.850

The third step in assessing model performance in SmartPLS is to evaluate discriminant validity. This concept highlights how latent variables correlate with themselves. According to (Cheung et al., 2023), a variable's correlation with itself should be greater than its correlation with other variables. This relationship is illustrated in Table 3.

**Table 3**  
Discriminant Validity

	Customer Dimension	Financial Dimension	Internal Process Dimension	Learning and Growth Dimension	Sustainable Performance	TQM
Customer Dimension	0.901					
Financial Dimension	0.266	0.872				
Internal Process Dimension	0.038	0.053	0.841			
Learning and Growth Dimension	0.476	0.519	0.178	0.917		
Sustainable Performance	-0.115	0.441	0.303	0.199	0.805	
TQM	0.254	0.394	0.235	0.502	0.476	0.922

4.3 Structural Model Assessment:

The analysis uses the coefficient of determination (R<sup>2</sup>), which quantifies the variance in the dependent variable explained by the independent variable. R<sup>2</sup> values can be interpreted as follows: ≥0.67 indicates a strong relationship, 0.33 - 0.67 indicates a moderate relationship and 0.19 - 0.33 indicates a weak relationship (Chin, 1998). According to Table 4 and Figure 1, the R<sup>2</sup> values for the dependent variables are all greater than 0.33. Therefore, the model is deemed suitable for explaining the variance in the dependent variables based on the independent variables. Additionally, we can calculate the effect size using F<sup>2</sup>, which measures the impact of the independent variables on the dependent variables. F<sup>2</sup> values are categorized as follows: ≥0.35 indicates a large effect, 0.15 – 0.35 indicates a medium effect, 0.02 – 0.15 indicates a small effect, and ≤0.02 indicates no effect (Selya et al., 2012). Table 4 and Figure 1 illustrate the effect sizes of the independent variables on sustainable performance and TQM, with a value of 0.082, 0.022. There is a medium effect of the financial dimension on sustainable performance and no effect on TQM, with values of 0.258 and 0.000, respectively. Furthermore, a small effect of 0.116 for the internal process dimension on sustainable performance was found, along with a no effect on TQM, valued at 0.003, There is no effect of the learning and growth dimension on sustainable performance and a small effect on TQM.

**Table 4**  
F<sup>2</sup>& R<sup>2</sup>

F <sup>2</sup>	Sustainable Performance	Total Quality Management (TQM)
Customer Dimension	0.082	0.022
Financial Dimension	0.258	0.000
Internal Process Dimension	0.116	0.003
Learning and Growth Dimension	0.000	0.125
Sustainable Performance		0.193
R <sup>2</sup>	0.335	0.414

4.4 Hypotheses Test

According to Guenther et al. (2023), the Partial Least Squares (PLS) method in Structural Equation Modeling (SEM) is effective in determining the impact of independent variables on dependent variables and the direction of that effect. Table 5 and Figure 2 present the results of the direct effects of the balanced scorecard dimensions on total quality management TQM and sustainable performance. The results reveal that the customer dimension has a negative effect of 0.134 on total quality management TQM at a significance level of 0.05 (T = 1.695, P = 0.090), indicating the rejection of hypothesis H1. In addition, the financial dimension shows a negative effect of 0.009 at a statistical significance of 0.05 (T = 0.087, P = 0.006), confirming the rejection of H2. Furthermore, the internal operations dimension has a negative effect of 0.042 on total quality management TQM, at a significance level of 0.05 (T = 0.565, P = 0.572), indicating the rejection of hypothesis H3. However, the learning and growth dimension positively affects total quality management TQM at a significance level of 0.001 (T = 4.521, P = 0.000), which indicates the acceptance of hypothesis H4. These indicators indicate that the balanced scorecard's dimensions negatively affect total quality management, except for the learning and growth dimension.

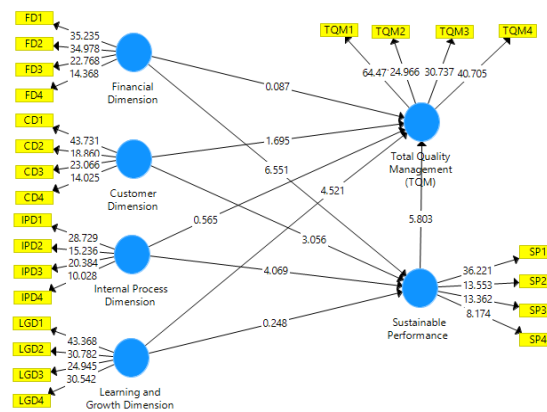
**Table 5**  
Direct Effects

Direct Effects	Std. Beta	T Statistics	P Values	Result
Customer Dimension → TQM	0.134	1.695	0.090	Rejected
Financial Dimension → TQM	0.009	0.087	0.931	Rejected
Internal Process Dimension → TQM	0.042	0.565	0.572	Rejected
Learning and Growth Dimension → TQM	0.353	4.521	0.000	Accepted

Table 6 presents the results of the indirect effects of the balanced scorecard dimensions on TQM mediated by sustainable performance. The results reveal that sustainable performance improves the impact of the customer dimension on TQM at a significance level of 0.005 (T = 2.857, P = 0.004), indicating the acceptance of H5. In addition, the results show that sustainable performance improves the impact of the financial dimension on TQM at a significance level of 0.001 (T = 4.227, P = 0.000), indicating the acceptance of H6. Furthermore, sustainable performance improves the impact of the internal operations dimension on TQM at a significance level of 0.001 (T = 3.195, P = 0.001), indicating the acceptance of H7. The results show that sustainable performance negatively mediates the learning and growth dimension on TQM at a significance level of 0.05 (T = 0.245, P = 0.806), indicating the rejection of H8.

**Table 6**  
Indirect Effects

Indirect Effects	Std. Beta	T Statistics	P Values	Result
Customer Dimension → Sustainable Performance → TQM	0.109	2.857	0.004	Accepted
Financial Dimension → Sustainable Performance → TQM	0.200	4.227	0.000	Accepted
Internal Process Dimension → Sustainable Performance → TQM	0.117	3.195	0.001	Accepted
Learning and Growth Dimension → Sustainable Performance → TQM	0.010	0.245	0.806	Rejected



**Fig. 2.** Structural Equation Model



## 5. Conclusion

The study was designed to find out the profound impact of the dimensions of the balanced scorecard on total quality management through sustainable performance in service projects in KSA, and a negative impact on total quality management was found. The result of testing the direct impact of the dimensions of the balanced scorecard on total quality management was related to the theory of the resource-based viewpoint. It thus did not support previous studies that showed a positive impact of the dimensions of the balanced scorecard on total quality. In contrast, there were indirect effects of the balanced scorecard on total quality management through the mediation of sustainable performance of the balanced scorecard. Despite the effects and contributions, some limitations in this study were related to the generalization and complexity of the study topic. The complexity of the measurement topic related to the successful implementation of total quality management, the balanced scorecard, and sustainability systems requires validation of objective measurement scales in different countries. To do this, it is highly recommended that a comparative analysis of this study be conducted in different countries, and we also recommend further exploration, especially about implementing the dimensions of the balanced scorecard and environmental sustainability within the company's strategy. This area of exploration is open to different interpretations regarding environmental management and other tools used in business sustainability, all of which are treated with a fragmented approach due to large gaps in the literature that fail to highlight the link between the organization, sustainability, and complexity.

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