

Employees' Perceived Strategic Interrelatedness Between Sustainability and Quality Management: A Cross-Sectional Multi-Sector Study in Türkiye

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ABSTRACT

Purpose: To examine employees' perceptions of the strategic importance and perceived interrelatedness of sustainability and quality management within a cross-sectional multi-sector sample in Türkiye.

Methodology/Approach: A quantitative, cross-sectional survey design was employed using a structured questionnaire administered to 253 employees from eight sector categories. The data were analysed through exploratory factor analysis, one-sample t-tests, and structural equation modelling (SEM) using SPSS and AMOS.

Findings: Respondents attached high strategic importance to both sustainability and quality management dimensions. The SEM results suggest a statistically significant but weak positive association between the perceived strategic importance of sustainability and the perceived strategic importance of quality management.

Research Limitation/Implication: The study is limited to cross-sectional, self-reported survey data collected from 253 employees across eight sector categories in Türkiye.

Originality/Value of paper: The study contributes by proposing and empirically examining a perception-based instrument that links sustainability and quality management within a Turkish multi-sector context, thereby complementing integrated-management-system, EFQM, ISO, and TQM-oriented studies with employee-level evidence on perceived strategic interrelatedness.

Category: Research paper

Keywords: sustainability; quality management; organizations; strategic context

Research Areas: Quality by Sustainability; Strategic Quality Management

1 INTRODUCTION

Organizations operate under conditions of limited resources while striving, on the one hand, to strategically meet the expectations of customers, society, stakeholders, and the environment through value creation, and on the other hand, to achieve balanced growth and development by sustaining competitive advantage in an increasingly competitive environment. Accordingly, organizations pursue their activities within the scope of their missions in interaction with both their internal and external environments, enabling them to achieve their objectives and goals and, consequently, to ensure sustainability.

In recent years, leading organizations and governments worldwide have increasingly recognized sustainability – both social and environmental – as one of the foremost strategic priorities. This strategic orientation has the potential to make a significant contribution to the long-term maintenance and advancement of sustainability (Oakland, 2014, p. 77).

On the other hand, organizations implement a certain level of quality standardization across all managerial processes, including pre-production, production, sales/service delivery, and post-sales/service activities. Within this framework, organizations operate with a strong emphasis on value creation throughout their quality management processes.

Both sustainability and quality management should be regarded not as outcomes, but as continuous and never-ending processes embedded within a strategic context. Accordingly, organizations are expected to evaluate the achievement of sustainability and the implementation of quality management not only separately but also in interaction with one another, across the short, medium, long, and very long term from a strategic perspective. In line with this objective, the present study examines employees' perceptions of the strategic importance of sustainability and quality management within organizations, as well as the perceived interrelatedness between these two concepts.

2 LITERATURE REVIEW

2.1 Sustainability

In the Our Common Future report published by the World Commission on Environment and Development (WCED), sustainability is addressed within a normative and strategic framework based on the principle of intergenerational equity (WCED, 1987, p. 41). Accordingly, the concept of sustainability encompasses not only environmental and ethical concerns but also social and economic dimensions.

Elkington (1997, p. 70), through the triple bottom line approach, conceptualizes sustainability as an interactive framework consisting of economic, environmental, and social dimensions. From an organizational perspective, this approach may

systematically form an integrated structure that creates value within the concept of quality from the viewpoint of customers and target groups, while simultaneously constituting the foundation for long-term competitive advantage.

Sustainability can also be considered synonymous with strategic orientation for organizations. Strategic management represents an effort to holistically address organizations' past, present, and future (short-, medium-, long-, and very long-term) in conjunction with external environmental conditions. Within the shared value approach proposed by Porter & Kramer (2011, p. 64), it is emphasized that making positive contributions to the resolution of social and environmental problems can generate strategic opportunities for organizations and lead to competitive advantage. Similarly, Eccles, Ioannou, & Serafeim (2014) demonstrate that sustainability-oriented management practices developed within a strategic context maximize long-term financial and operational performance. From this perspective, profitability should not be viewed as an objective in itself, but rather as an outcome of a process embedded in sustainability-driven efforts.

The Sustainable Development Goals (SDGs), established by the United Nations, provide a globally recognized reference framework for organizations by addressing issues such as enhancing prosperity and peace within an equitable framework, overcoming poverty, protecting the environment, and responding to the climate crisis (United Nations, 2015, p. 3). Within this context, themes such as quality, sustainable production and consumption, and human-centered working conditions are particularly emphasized.

When addressed in an integrated manner from a quality management perspective within the framework of standards, sustainability can contribute to systematic implementation, long-term continuity, and sustained success. Sustainability objectives are strongly grounded in quality standards. In particular, standards such as ISO 14001 and ISO 50001 support the systematic improvement of environmental and energy performance, while ISO 26000 provides a guiding framework for social responsibility (Zeng, Meng, Yin, Tam, & Sun, 2011, p. 978; Lozano et al., 2015, p. 433).

2.2 Quality Management

The concept of quality may be defined as the presence of specific attributes that encompass positive change and transformation as a philosophy, an approach, and a management practice. From the customer perspective, quality can be explained as the ability to meet customer expectations, while from the product and service perspective it refers to possessing the required characteristics and attributes (Kumar, Singh, Kumar, & Antil, 2016, p. 45; Garvin, 1987, p. 104). Quality management, within a strategic perspective, may be defined as a management approach and philosophy that incorporates leadership, customer focus, process orientation, human resources, continuous improvement, learning, and innovation (Knowles, 2011, pp. 11–12). From another perspective, quality management, in technical terms, encompasses a set of principles, practices, and techniques aimed

at improving organizational performance, which inherently include process control mechanisms and behavioural practices (Dean & Bowen, 1994, pp. 395–396).

The historical development of quality management reveals a progressive evolution from inspection, to process and system control, to total quality control, and ultimately to total quality management, which emphasizes the quality of all managerial processes in an integrated manner (Garvin, 1988, pp. 18–25). The contemporary understanding of quality management has been significantly shaped by pioneering contributors such as W. E. Deming (1986; post 1945 PDCA cycle, 14 principles of quality, participative culture), J. M. Juran (1988, 1950s; managerial processes, leadership), K. Ishikawa (1950s; Ishikawa diagram, quality circles), G. Taguchi (1960s; quality standards and loss function), V. Feigenbaum (1970s; Total Quality Control), P. B. Crosby (1979, 1970s; conformance to requirements), and T. Peters and R. H. Waterman (1980s; excellence and quality culture) (Luthra, Dixit, Agarwal, & Mangla, 2021, p. 12; Dale, 1999, p. 21; Chileshe, 2007, p. 52).

Within this framework, quality management can be regarded as a comprehensive management approach and/or philosophy that encompasses leadership and motivation, participation, continuous improvement, continuous education and training, internal and external customer orientation, process management and standardization, as well as sensitivity to external environments and conditions.

Within this framework, the continuous improvement (Kaizen) approach pioneered by Masaaki Imai is grounded in the sustainable development of quality across all sectors, fields, and activities, with a particular emphasis on improvement and advancement for societal benefit. In this approach, quality is brought to a certain standard, practices continue, and subsequently a new standard is established; this process proceeds in an ongoing and never-ending manner. The continuous improvement cycle is supported by organizational culture, effective leadership, education and training, and the application of problem-solving techniques (Imai, 1986, p. 95).

The development of quality and quality management has been supported and advanced through specific standards. In this regard, the ISO 9001 standard has played a central and highly significant role in the institutionalization of quality management at the international level. With the ISO 9001:2015 revision, elements such as strategic management, risk-based thinking, and stakeholder expectations have become integral components of quality management systems (ISO, 2015, p. 8). Empirical studies demonstrate that ISO 9001 implementation has positive and lasting effects on operational efficiency, reduction of error rates, and improvements in both internal and external customer satisfaction (Benner & Veloso, 2008; Psomas, Fotopoulos, & Kafetzopoulos, 2013, p. 670).

Another important approach contributing to quality standardization and practical implementation is the EFQM Excellence Model. The EFQM Excellence Model is based on a journey toward excellence in quality and the sustained efforts required to achieve it. The model addresses quality in an integrated manner through

leadership, strategy, people, processes, and societal results, and presents organizations with a long-term excellence perspective structured across defined dimensions with specific weightings (EFQM, 2020, p. 9). A critical point to note, however, is that the model goes beyond internal efficiency and value creation by promoting a win-win strategy that delivers both societal and environmental benefits (EFQM, 2020, p. 6).

In recent years, digitalization and data-driven management approaches have further expanded the scope of quality management. Big data analytics, process mining, and artificial intelligence-supported decision-making mechanisms are transforming quality management into a more predictive and proactive structure (Antony et al., 2021, p. 560). In this context, key elements in the development of sustainable quality include artificial intelligence applications, communication and high-performance technologies, predictive analytics (e.g., classification and regression), clustering and accumulation (e.g., descriptive analytics), as well as data storage and data cleansing processes (Akpınar, 2000, p. 2). For example, leveraging the opportunities provided by big data, organizations are creating numerous sustainability clusters aligned with business innovation, while transforming operational patterns to generate environmental benefits (Etzion & Aragón-Correa, 2016, p. 7). These developments clearly demonstrate that quality management functions as a strategic lever for sustainability across all domains and processes.

2.3. The Relationship Between Sustainability and Quality Management

In organizations, both quality management and sustainability – together with their underlying philosophies, approaches, and practices – constitute an integrated set of processes that generate solutions to ensure sustainability and are realized through leadership ownership and guidance. In this regard, the presence of strong leadership capabilities and supportive managerial commitment plays a fundamental role (Oakland, 2014, pp. 43–45, 77).

Accordingly, the existence of an appropriate organizational culture and climate that supports both sustainability and quality management within a leadership framework is indispensable. From this perspective, sustainability and quality should be shared and internalized as a coherent set of organizational values, serving a guiding function across the organization. When quality is addressed holistically, it has the potential to lead organizations toward successful outcomes. Therefore, it can be argued that a sustainability and quality management approach that proactively considers both internal and external environments from a strategic perspective is inevitable (Al-Ani & Al-Mashhadani, 2004, p. 350).

When referring to the external environment, priority is given to nature, well-being, society, individuals, organizations, as well as the immediate and broader external organizational environment and its components, together with the sustainable fulfilment of their needs and expectations (Boaden, 1997, p. 161). For both organizations and all segments of society, attributes such as legitimacy, openness, transparency, clarity, credibility, respect, ethics, trust, a human-centered

orientation, innovativeness, and social usefulness are indispensable in ensuring comprehensibility and acceptance. All levels of management are obliged and responsible for adopting a participatory approach to quality management for sustainability, including actively soliciting the views and expectations of society and citizens (Boyne, Gould-Williams, Law, & Walker, 2002, p. 13).

Boyne et al. (2002, p. 10) define quality management as a performance improvement strategy that encompasses improvement-oriented approaches from an organizational perspective, revealing how an organization actually operates. Notably, this perspective does not emphasize profitability or self-interest. In fact, within the framework of contemporary management understanding, neither product nor service provision is pursued solely for profitability. Rather, profitability can be considered a natural outcome that emerges from the successful implementation of sustainability-oriented quality management.

Quality management implies the existence of an integrative infrastructure that connects operational processes down to their finest details. From a process-oriented perspective, this framework enables sustainability to move beyond an abstract vision and be transformed into measurable performance indicators (Zairi, 2002, p. 1163).

On the other hand, empirical research demonstrates that organizations that effectively implement quality management systems achieve superior outcomes in areas such as environmental performance, occupational health and safety, and social responsibility (Heras-Saizarbitoria, Molina-Azorín, & Dick, 2011, p. 6; Siva et al., 2016, p. 151). Within the context of standardization, the integration of ISO 9001 and ISO 14001 systems enhances cost efficiency while enabling the systematic management of environmental risks (Bernardo, Simon, Tarí, & Molina-Azorín, 2015, p. 264).

From a sustainability perspective, quality management also plays a critical role in supply chain management and stakeholder relations. Sustainable supply chain practices are disseminated through quality standards and contribute to controlling environmental and social risks throughout the entire supply chain (Seuring & Müller, 2008, p. 1702).

This situation reveals that quality management functions as an “implementation mechanism” for sustainability. For example, mechanisms that support the objectives and targets of various stakeholder groups, influence and transform suppliers’ practices and behaviours, and provide monitoring and improvement functions bring the philosophy of “total benefit” to the forefront (Bové & Swartz, 2016, p. 7).

Moreover, quality management supports the consistent and systematic management of sustainable innovation. A culture of continuous improvement provides a fertile ground for the development of innovative solutions in areas such as environmental efficiency, resource effectiveness, and social innovation (Boiral, Heras-Saizarbitoria, & Testa, 2018). With digital transformation, quality

management enables the real-time monitoring of sustainability performance and facilitates more agile management practices. In this context, the relationship between sustainability and quality management should be viewed not as linear, but as a mutually reinforcing, dynamic, and strategically embedded interaction.

Furthermore, within the stakeholder framework, quality and sustainability are increasingly regarded as integral components of overall quality of life. In practice, successful innovation processes tend to emerge alongside effective quality management and sustainability practices. Within the framework of innovation, quality, and sustainability, it becomes possible to achieve higher levels of value through effective design, lower costs and resource utilization, and enhanced overall benefits (Trott, 2017, pp. 58, 127, 168).

3 RESEARCH

3.1 Research Objective

The primary objective of this research is to examine employees' perceptions of the strategic importance of sustainability and quality management and to test the perceived interrelatedness between these two constructs. The study therefore addresses a perception-based empirical question rather than measuring implemented practices, management-system integration, sustainability performance, or organizational outcomes.

3.2 Data Collection Instruments

The data collection instrument used in this study consists of two main sections. The first section includes the independent variables of the research, namely age, gender, educational level, position (managerial or non-managerial), sector, and length of professional experience. In addition, participants' overall perceptions of sustainability and quality management within a strategic framework were assessed through the question: "To what extent are sustainability and quality management related?"

The second section presents the core strategic framework for sustainability and quality management in organizations within a two-dimensional structure. In this context, the scale comprises 15 items related to sustainability and 10 items related to quality management. At the strategic level, the sustainability dimension is primarily grounded in Freeman's (1984) stakeholder-based strategic management approach and the long-term sustainable value creation perspective proposed by Bansal and DesJardine (2014). The quality management dimension is mainly based on the quality management and continuous improvement approaches developed by Juran (1988) and Deming (1986).

For statistical analysis, all items were measured using a five-point Likert scale, where 1 = strongly disagree, 2 = disagree, 3 = moderately agree, 4 = agree, and 5 = strongly agree.

3.3 Data Collection and Analysis

The questionnaires were administered to a total of 253 employees working in eight sector categories, namely energy, consulting, education, healthcare, services, manufacturing, public sector, and information technology, between June 2025 and December 2025. Factor analysis, one-sample t-tests, and structural equation modelling (SEM) were employed as the main analytical techniques. Statistical analyses were conducted using SPSS and AMOS, and the findings were interpreted in light of the relevant literature. Because the data are cross-sectional and self-reported, the results are interpreted as perception-based associations rather than causal effects.

A non-probability convenience sampling approach was employed in this study. Participants were recruited through professional networks and organizational contacts operating in different sectors in Türkiye. Participation was voluntary and anonymous. Only fully completed questionnaires were included in the final analysis, resulting in an analysable sample of 253 respondents. Due to the non-probability nature of the sampling process, the findings should be interpreted as perception-based evidence derived from the observed sample rather than as statistically representative findings for all organizations or sectors.

Questionnaire development and validation. The instrument comprised 25 Likert-type items: 15 sustainability-related items and 10 quality-management-related items. The items were designed to operationalize the conceptual framework derived from the literature and were examined through factor analysis.

To reduce the risk of common method bias, procedural remedies were implemented during data collection. Participants were informed that responses would remain anonymous and be used only for scientific purposes, thereby reducing evaluation apprehension and social desirability bias. In addition, all questionnaire items were presented using standardized response categories and neutral wording.

The study was conducted in accordance with the principles of voluntary participation, confidentiality, and informed consent. No personal or sensitive data were collected. Participants were informed about the purpose of the study prior to participation and consented to the use of their responses for academic research.

Effect sizes and statistical significance were interpreted jointly to avoid overreliance on p-values. Given the cross-sectional and self-reported nature of the data, the findings should be interpreted as perception-based associations rather than causal relationships.

The authors declare that no external funding was received for this research and that there are no conflicts of interest associated with the study. The dataset supporting

the findings of this study is available from the corresponding author upon reasonable request. Statistical analyses were conducted using SPSS and AMOS, and analysis outputs were retained to ensure transparency and reproducibility.

3.4 Research Hypotheses

The main hypotheses of the study are formulated as follows:

H1: Within the strategic context of organizations, the quality management framework factors are perceived as important (f1: Human resources, production and value creation; f5: Leadership, value creation, and holistic integration).

H2: Within the strategic context of organizations, the sustainability framework factors are perceived as important (f2: Leadership and value creation; f3: Well-being and nature; f4: Proactiveness and clarity; f6: Culture and strategy).

H3: There is a positive association between employees' perceived strategic importance of sustainability and employees' perceived strategic importance of quality management.

4 FINDINGS

4.1 Findings Related to Participants

The mean age of the participants included in the study ($n = 253$) was 46.0 ± 9.26 years (min–max = 27–70). The mean age was 46.1 ± 9.96 years for female participants ($n = 109$, 43.1%) and 45.9 ± 8.73 years for male participants ($n = 144$, 56.9%). Regarding educational level, 49% of the participants held a bachelor's degree ($n = 124$), while 51% held a postgraduate degree ($n = 129$). In terms of professional experience, 17.0% of the participants had 1–9 years of experience ($n = 43$), whereas 83.0% had 10 years or more of professional experience ($n = 210$). With respect to organizational position, 62.1% of the participants were managers ($n = 157$), while 37.9% were non-managerial employees ($n = 96$).

The participants represented a broad sectoral distribution across eight categories. However, because the study does not rely on probability sampling, the findings should be interpreted as analytically informative for the observed sample rather than statistically representative of all sectors. Participation was relatively higher in the manufacturing, services, and healthcare sectors, respectively (see Table 1).

Table 1 – Sector (field) of participants

Sector (Field)	n	%
Energy	26	10.3
Consulting	28	11.1
Education	20	7.9

Sector (Field)	n	%
Healthcare	33	13.0
Services	41	16.2
Manufacturing	69	27.3
Public Sector	13	5.1
Information Technology (IT)	23	9.1
Total	253	100.0

Participants' overall perceptions regarding the interrelatedness of sustainability and quality management within a strategic context are presented in Table 2. The vast majority of participants perceive this interrelationship to be at a high or very high level. Only 4.3% of the participants ($n = 11$) reported that the relationship is at a moderate level. Accordingly, based on these results, none of the respondents – despite representing different sectors – perceived the relationship between sustainability and quality management as insignificant (see Table 2).

Table 2 – Sustainability and quality management

Level	n	%
Moderate	11	4.3
High	109	43.1
Very High	133	52.6
Total	253	100.0

4.2 Validity and Reliability of the Measurement Instruments

In the second section of the questionnaire, Principal Component Analysis (PCA) was applied as the extraction method within the framework of Exploratory Factor Analysis (EFA) to examine the items related to sustainability and quality management in a strategic context. Varimax rotation (orthogonal rotation) was employed as the rotation method. This orthogonal rotation facilitated a clearer and more interpretable factor structure, thereby yielding a parsimonious solution.

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.819, and Bartlett's Test of Sphericity yielded a statistically significant result ($\chi^2 = 4011.569$, $df = 300$, $p < 0.001$). The diagonal values of the anti-image correlation matrix ranged from 0.775 to 0.891. Based on these findings, the data were considered suitable for factor analysis. Furthermore, no items were removed from the six-factor solution (Tables 3 and Table 4).

For the construction of factor scores, the arithmetic means of the items comprising each factor were calculated. This approach provided continuous measurement

variables representing each factor, which were subsequently used in the statistical analyses.

The resulting six-factor structure explained 70.736% of the total variance. Specifically, the first factor accounted for 20.681%, the second factor 11.831%, the third factor 11.168%, the fourth factor 10.155%, the fifth factor 9.731%, and the sixth factor 7.169% of the total variance. The overall Cronbach's alpha coefficient for the six-factor structure was 0.951, indicating a high level of internal consistency. The overall item mean was 4.248, with a variance of 0.523. These results demonstrate that the factors represented by the items in the questionnaire explain the construct at a high and reliable level (see Table 3).

The extracted factors were labelled in accordance with the content of their respective items as follows: f1: Human resources, production and value creation; f2: Leadership and value creation; f3: Well-being and nature; f4: Proactiveness and clarity; f5: Leadership, value creation, and holistic integration; and f6: Culture and strategy (see Table 3). Among these factors, f1 and f5 pertain to quality management, whereas f2, f3, f4, and f6 fall within the scope of sustainability.

Table 3 – Validity and reliability test results

Items (Statements)	Factors						Cronbach Alfa
	Human Resources, Production and Value (F1)	Leadership and Value Creation (F2)	Well- Being and Nature (F3)	Proactiveness and Clarity (F4)	Leadership, Value Creation and Holistic Integration (F5)	Culture and Strategy (F6)	General = 0.951
In quality management, ... is of strategic importance as a fundamental element.							
Adopting a participatory management approach within a quality-oriented framework	0.878	0.043	-0.015	-0.063	0.043	0.175	0.909
Ensuring the most efficient use of scarce resources (labour, natural resources, capital, knowledge, etc.)	0.863	0.060	-0.025	-0.002	0.010	0.182	0.913
Enhancing employees' work and overall quality of life in a holistic manner	0.826	0.042	0.115	0.083	0.251	-0.117	0.907

Items (Statements)	Factors						Cronbach Alfa
	Human Resources, Production and Value (F1)	Leadership and Value Creation (F2)	Well- Being and Nature (F3)	Proactiveness and Clarity (F4)	Leadership, Value Creation and Holistic Integration (F5)	Culture and Strategy (F6)	General = 0.951
Mobilizing efforts and opportunities to support employees' continuous development	0.797	0.069	0.102	0.057	0.321	-0.072	0.908
Maintaining the highest quality standards across pre-production, production, sales, and after-sales processes	0.789	0.024	0.041	0.036	0.296	-0.048	0.911
Valuing people, human-centered values, and individual potential (e.g., innovativeness, ethics, dignity)	0.754	0.025	-0.045	0.154	0.066	-0.070	0.915
Undertaking initiatives to enhance corporate, societal, and individual customer orientation, expectations, and satisfaction	0.694	0,069	-0,014	-0,038	0,457	0,001	0,916
0.924							
In sustainability, ... is of strategic importance as a fundamental element.							
Effective and efficient use of resources	0.120	0.792	0.077	0.202	0.066	0.168	0.699
Projects, activities, and contributions that generate value for society	0.015	0.741	0.246	0.165	0.137	-0.216	0.755
Alignment of stakeholder engagement with a win-win strategy	0.047	0.703	0.263	0.271	-0.029	0.075	0.706

Items (Statements)	Factors						Cronbach Alfa
	Human Resources, Production and Value (F1)	Leadership and Value Creation (F2)	Well- Being and Nature (F3)	Proactiveness and Clarity (F4)	Leadership, Value Creation and Holistic Integration (F5)	Culture and Strategy (F6)	General = 0.951
Leadership's vision, commitment, and guiding role	0.047	0.533	-0.201	0.528	-0.034	0.224	0.790
Approaches, activities, and contributions aimed at enhancing well-being	0.067	-0.185	0.806	0.234	-0.035	0.078	0.721
Ensuring the continuity of natural systems and resources for future generations within a framework of balance and moderation	0.030	0.212	0.687	-0.003	-0.093	0.276	0.725
Meeting and managing stakeholders' expectations	-0.094	0.257	0.667	0.143	0.004	-0.148	0.767
The presence of social equality, justice, and democratic principles	-0.036	0.337	0.592	0.142	-0.003	0.433	0.721
Achieving growth and profitability within a holistic framework integrated with service to society	0.216	0.454	0.527	0.171	0.151	0.082	0.752
Demonstrating proactive and strategic behaviours to ensure sustainability	0.059	0.107	0.119	0.842	-0.022	0.033	0.711
Exhibiting responsible, transparent, and clearly articulated orientations	-0.045	0.415	0.153	0.656	0.035	-0.126	0.733
Employee satisfaction and continuous development	0.114	0.254	0.241	0.632	-0.006	0.211	0.734

Items (Statements)	Factors						Cronbach Alfa
	Human Resources, Production and Value (F1)	Leadership and Value Creation (F2)	Well- Being and Nature (F3)	Proactiveness and Clarity (F4)	Leadership, Value Creation and Holistic Integration (F5)	Culture and Strategy (F6)	General = 0.951
Placing people and human-centered values at the core	0.045	0.114	0.489	0.602	0.027	0.093	0.742
0.783							
In quality management, ... is of strategic importance as a fundamental element.							
Being under the responsibility of top management and its leadership	0.318	0.034	-0.060	0.016	0.885	0.073	0.771
Viewing image, reputation, and profitability as outcomes of the delivery of quality	0.384	-0.011	0.008	0.030	0.858	0.009	0.766
Adopting a holistic orientation toward quality through preventive and continuous improvement approaches	0.468	0.255	-0.021	-0.090	0.602	0.146	0.739
0.797							
In sustainability, ... is of strategic importance as a fundamental element.							
Developing organizational culture to support sustainability and transforming it when necessary	0.224	0.320	0.164	0.037	0.056	0.707	-
Placing sustainability at the core through a strategic perspective	-0.211	-0.301	0.168	0.205	0.138	0.653	-
0.691							

As shown in Table 3, the six-factor solution demonstrated high overall internal consistency. The communalities of the retained items are presented in Table 4, indicating the proportion of variance in each item accounted for by the extracted factor solution.

Table 4 – Communalities

	Initial	Extraction
Placing sustainability at the center through a strategic perspective	1.000	0.651
Developing organizational culture for sustainability and transforming it when necessary	1.000	0.684
Leadership's pioneering role, commitment, and guidance	1.000	0.657
Demonstrating proactive strategic behaviours for sustainability	1.000	0.740
Demonstrating responsible, open, transparent, and clearly articulated orientations	1.000	0.644
Alignment of stakeholder engagement with a win-win strategy	1.000	0.646
Effective use of resources	1.000	0.721
Placing people and human-centered elements at the core	1.000	0.626
Employee satisfaction and development	1.000	0.579
The existence of social equality, justice, and democratic principles	1.000	0.673
All types of projects, activities, and contributions that can be made to society	1.000	0.703
Ensuring that natural systems and resources can be carried into the future within a framework of balance and moderation	1.000	0.602
Meeting stakeholders' expectations	1.000	0.562
Approaches, activities, and contributions aimed at increasing well-being	1.000	0.751
Achieving growth and profitability within a holistic framework integrated with service to society	1.000	0.589
Placing sustainability at the center through a strategic perspective	1.000	0.894
Developing organizational culture for sustainability and transforming it when necessary	1.000	0.782
Leadership's pioneering role, commitment, and guidance	1.000	0.696
Demonstrating proactive strategic behaviours for sustainability	1.000	0.716
Being under the responsibility of top management and its leadership	1.000	0.604
Ensuring the most efficient use of scarce resources (labour, natural resources, capital, knowledge, etc.)	1.000	0.781
Activities aimed at increasing organizational, societal, and individual customer orientation, expectations, and satisfaction	1.000	0.761
Not compromising the highest quality standards in pre-production, production, sales, and after-sales processes	1.000	0.677
Valuing people, human values, and human potential (innovativeness, ethics, dignity, etc.)	1.000	0.884
Increasing employees' work and private-life quality in a holistic manner	1.000	0.809
Extraction Method: Principal Component Analysis.		

4.3 Findings Related to the Factors

The main hypotheses of the study, H1 (quality-management-related factors are perceived as important) and H2 (sustainability-related factors are perceived as important), were supported for all relevant factors. Accordingly, the propositions were statistically significant, indicating that participants attached a high level of strategic importance to each factor separately within the quality management and sustainability frameworks (Table 5).

Table 5 – One-sample t-test

Factors	n	$\bar{x} \pm s$	Test Value = 3	
			t	p
Human Resources, Production and Value (k1)	253	4.2 $\pm$ 0.55	35.357	p < 0.001
Leadership and Value Creation (s1)	253	4.1 $\pm$ 0.65	28.674	p < 0.001
Well-Being and Nature (s2)	253	4.2 $\pm$ 0.52	38.645	p < 0.001
Proactiveness and Clarity (s3)	253	4.2 $\pm$ 0.52	38.715	p < 0.001
Leadership, Value Creation, and Holistic Integration (k2)	253	4.3 $\pm$ 0.66	33.418	p < 0.001
Culture and Strategy (s4)	253	4.1 $\pm$ 0.59	29.773	p < 0.001

Note: “s” refers to sustainability-related factors, whereas “k” refers to quality-related factors.

4.4 Structural Equation Modelling

To present the structural equation model (SEM) of the study in a more parsimonious and comprehensible manner, factor means were used to specify sustainability (S) and quality management (K) as latent variables, while the factors were treated as observed variables/indicators. The research model was specified not in terms of sustainability and quality management as dependent and independent variables, but rather in terms of the association between the two latent variables. Maximum Likelihood (ML) was employed as the estimation method.

According to the structural equation model, Hypothesis H3 was supported (Table 6). The estimated covariance path was positive and statistically significant, although the magnitude of the association was weak. Therefore, the finding should be interpreted as evidence of perceived interrelatedness rather than a strong structural effect, causal relationship, or implemented organizational integration. The obtained fit indices (CMIN/DF = 2.652, GFI = 0.974, NFI = 0.945, CFI = 0.964, and RMSEA = 0.073) indicate an acceptable to good level of model fit (Figure 1).

In addition, the Average Variance Extracted (AVE) and Composite Reliability (CR) values were calculated. For sustainability, AVE was 0.655875 and CR was 0.876806. For quality management, AVE was 0.878450 and CR was 0.935000.

These values indicate satisfactory internal consistency and convergent validity for the two latent constructs.

Table 6 – Structural equation model analysis results

Relationship	Estimate	Standard Error	Critical Ratio	p	Result
Sustainability (S) ↔ Quality Management (K)	0.043	0.019	2.312	0.021	Supported

The standardized residuals for the specified SEM are presented in Table 7. These residuals provide an additional diagnostic indication of the discrepancies between the observed and model-implied covariance structures.

Table 7 – Standardized residuals

	k2	k1	s4	s3	s2	s1
k2	0.000					
k1	0.000	0.000				
s4	1.376	0.372	0.000			
s3	-0.769	-0.284	-0.453	0.000		
s2	-0.281	-0.250	1.955	-0.119	0.000	
s1	1.136	0.589	-1.062	0.261	-0.277	0.000

As shown in Table 7, the standardized residuals ranged from -1.062 to 1.955. Reliability and convergent validity results for the two latent constructs are summarized in Table 8.

Table 8 – Reliability and convergent validity of latent constructs

Latent construct	AVE	CR	Assessment
Sustainability (S)	0.655875	0.876806	Satisfactory
Quality Management (K)	0.878450	0.935000	Satisfactory

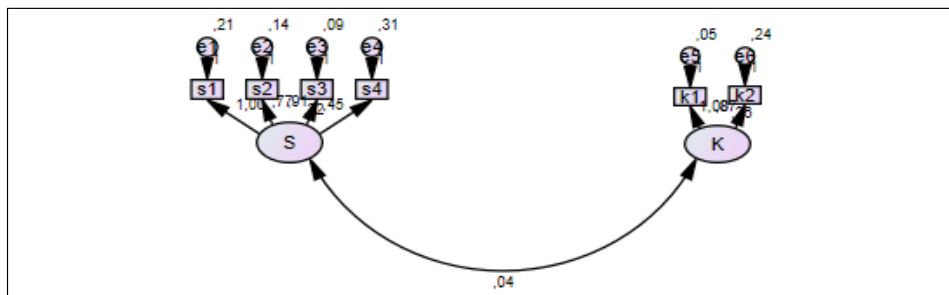


Figure 1 – Structural equation model of the relationship between the strategic importance of sustainability and the strategic importance of quality management

As reported in Table 8, the AVE and CR values were satisfactory for both sustainability and quality management. For completeness, the correlations among the model parameter estimates are presented in Table 9.

Table 9 – Correlations of estimates for the model

	par_1	par_2	par_3	par_4	par_5	par_6	par_7	par_8	par_9	par_10
par_1	1.000									
par_2	0.500	1.000								
par_3	0.260	0.288	1.000							
par_4	0.000	0.000	0.000	1.000						
par_5	-0.122	-0.154	-0.067	-0.134	1.000					
par_6	-0.598	-0.710	-0.326	0.000	0.255	1.000				
par_7	0.000	0.000	0.000	-0.967	0.175	0.03	1.000			

5 DISCUSSION

The results should be positioned as employee-level perception evidence that complements, rather than replaces, research on integrated management systems, EFQM-based excellence models, ISO-based management systems, and TQM-oriented sustainability practices. The empirical contribution lies in validating a perception-based framework in a Turkish multi-sector context and showing that sustainability-related and quality-management-related strategic perceptions are positively associated.

Managerial implications should therefore remain bounded by the evidence. The findings suggest that managers may benefit from communicating sustainability and quality management as mutually supportive strategic priorities, but the data do not demonstrate improvements in competitiveness, leadership effectiveness, sustainability performance, or organizational success. Such effects require additional performance indicators and longitudinal or multi-source research designs.

6 CONCLUSION

This study examined employees' perceived strategic importance of sustainability and quality management and the perceived association between these two constructs. The findings indicate that respondents attributed high importance to the selected sustainability and quality-management dimensions and that these two perception-based constructs were positively, although weakly, associated. These results should be interpreted within the limits of the cross-sectional survey design and should not be read as evidence of causal effects, implemented integration, or realized organizational performance outcomes.

Within this framework, the strategic perception, internalization, and integration of this understanding into managerial processes within organizations will naturally begin with, and be sustained through, leadership by management. Leadership exercised by management in this direction simultaneously enables value creation and supports a holistic approach to the subject matter. The findings obtained within the scope of the research also support this line of reasoning, indicating that, from a strategic sustainability perspective, the factors of “leadership and value creation,” and from a quality management perspective, the factors of “leadership, value creation, and holistic integration,” are particularly prominent. Employees participating in the study from various sectors attach a high level of importance to leadership, as well as to value creation and holistic integration.

On the other hand, the culture and foundational elements of organizations shaped together with their initial founders – such as mission, vision, values, beliefs, norms, principles, and tangible artifacts – also constitute a domain that inherently involves sharing and dissemination under the guidance of leadership. Accordingly, when an organization’s culture supports sustainability and the philosophy of quality, human resources, production, and value creation processes can be mobilized in alignment with this framework. The research findings support this perspective, identifying the factors of “culture and strategy” within the context of strategic sustainability, and “human resources, production, and value creation” within the context of quality management. Participants attach a high level of importance to these dimensions.

Finally, within the organizational framework, participants also perceive as highly important the strategic orientation that acts proactively in alignment with the external environment and communicates this orientation clearly, as well as the proactive support of well-being and nature – both internally and externally – for the present and the future. These aspects are reflected in the factors of “proactiveness and clarity” and “well-being and nature,” which are considered highly significant by the participants.

In the strategic context, the SEM results show that employees who attach higher strategic importance to sustainability also tend to attach higher strategic importance to quality management, although the magnitude of this association is weak. Future research should examine this relationship using longitudinal designs, probability-based sampling, organization-level indicators, and additional constructs such as integrated management-system maturity, EFQM deployment, ISO implementation scope, sustainability performance, innovation capability, and quality performance. The possible influence of sectoral heterogeneity should also be tested statistically rather than inferred from pooled descriptive data.

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AUHOR CONTRIBUTIONS

Conceptualisation, Ö.Ö. and N.M.Ö.; Methodology, Ö.Ö. and N.M.Ö.; Software, Ö.Ö. and N.M.Ö.; Validation, Ö.Ö. and N.M.Ö.; Formal analysis, Ö.Ö. and N.M.Ö.; Investigation, Ö.Ö.; Resources, Ö.Ö. and N.M.Ö.; Data curation, Ö.Ö. and N.M.Ö.; Original draft preparation, O.Ö.; Review and editing, O.Ö. and N.M.Ö.; Visualisation, O.Ö.; Supervision, N.M.Ö. Both authors have read and approved the final version of the manuscript.

CONFLICTS OF INTEREST

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APPENDIX A – FULL QUESTIONNAIRE ITEMS APPLIED IN THE FACTOR ANALYSIS

Survey Form on Sustainability and Quality Management

The purpose of this survey is to determine, from a strategic perspective and based on employee opinions, the interrelatedness between sustainability and quality management in organizations. Since the questionnaires will be evaluated collectively, no identifying information, whether organizational or personal, is requested from participants. The average completion time is approximately five minutes. Thank you for your participation and contribution to scientific research.

Participant Information

1. Age:	
2. Gender:	1 () Female 2 () Male
3. Educational Level:	1 () Primary / Secondary / High School 2 () Associate Degree / Bachelor's Degree 3 () Postgraduate
4. Position:	1 () Manager 2 () Other
5. Sector You Work In:	
6. Professional Experience (Years):	
7. To what extent are sustainability and quality management related?	5 () Very High 4 () High 3 () Moderate 2 () Low 1 () Very Low

Please mark each statement using the scale below, where 5 is the highest and 1 is the lowest.

Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
5	4	3	2	1

In Sustainability, ... is Strategically Important as a Fundamental Element

Statement	5	4	3	2	1
Placing sustainability at the center through a strategic perspective	☐	☐	☐	☐	☐
Developing organizational culture for sustainability and transforming it when necessary	☐	☐	☐	☐	☐
Leadership's pioneering role, commitment, and guidance	☐	☐	☐	☐	☐
Demonstrating proactive strategic behaviors for sustainability	☐	☐	☐	☐	☐
Demonstrating responsible, open, transparent, and clearly articulated orientations	☐	☐	☐	☐	☐
Alignment of stakeholder engagement with a win-win strategy	☐	☐	☐	☐	☐
Effective use of resources	☐	☐	☐	☐	☐
Placing people and human-centered elements at the core	☐	☐	☐	☐	☐
Employee satisfaction and development	☐	☐	☐	☐	☐
The existence of social equality, justice, and democratic principles	☐	☐	☐	☐	☐
All types of projects, activities, and contributions that can be made to society	☐	☐	☐	☐	☐
Ensuring that natural systems and resources can be carried into the future within a framework of balance and moderation	☐	☐	☐	☐	☐

Statement	5	4	3	2	1
Meeting stakeholders' expectations	☐	☐	☐	☐	☐
Approaches, activities, and contributions aimed at increasing well-being	☐	☐	☐	☐	☐
Achieving growth and profitability within a holistic framework integrated with service to society	☐	☐	☐	☐	☐

In Quality Management, ... is Strategically Important as a Fundamental Element

Statement	5	4	3	2	1
Being under the responsibility of top management and its leadership	☐	☐	☐	☐	☐
Ensuring the most efficient use of scarce resources (labor, natural resources, capital, knowledge, etc.)	☐	☐	☐	☐	☐
Activities aimed at increasing organizational, societal, and individual customer orientation, expectations, and satisfaction	☐	☐	☐	☐	☐
Not compromising the highest quality standards in pre-production, production, sales, and after-sales processes	☐	☐	☐	☐	☐
Valuing people, human values, and human potential (innovativeness, ethics, dignity, etc.)	☐	☐	☐	☐	☐
Increasing employees' work and private-life quality in a holistic manner	☐	☐	☐	☐	☐
Mobilizing efforts and opportunities for employees' continuous development	☐	☐	☐	☐	☐
Orientation toward holistic quality through preventive and continuous-improvement approaches	☐	☐	☐	☐	☐
Viewing image, reputation, and profitability as outcomes of delivering quality	☐	☐	☐	☐	☐
Adopting a participative management approach within a quality-oriented framework	☐	☐	☐	☐	☐

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