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A Decision-Making Framework for Enhancing Quality Performance through Quality Management Practices and Organizational Culture in Food Manufacturing

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ABSTRACT

This research presents a decision-making framework that merges quality management (QM) practices with organisational culture (OC) to improve quality performance (QP) in the food manufacturing industry. It explores how various types of OC impact the implementation of both core and infrastructure QM practices and how these relationships influence overall QP. Data were gathered using a structured questionnaire, which was distributed to a random sample of food manufacturing firms in Palestine. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to analyse the data and test the proposed relationships. The Competing Values Framework (CVF) was utilised to assess organisational culture. The findings indicate that market and clan cultures significantly foster the adoption of core and infrastructure QM practices, respectively, while hierarchical culture plays a role in enhancing supplier involvement and information quality. Both core and infrastructure QM practices were found to have a positive impact on QP, with clan culture acting as a significant moderator between infrastructure practices and performance. This study provides an empirically supported model that connects culture-driven quality management with decision-making strategies for performance improvement, offering practical insights for managers in food manufacturing, especially within developing economies.

1. Introduction

In the era of open markets, companies aim to deliver competitive products that maintain high quality while keeping costs low, thereby ensuring customer satisfaction and loyalty, and attracting

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new customers to contend with both national and international competitors. In the Palestinian context, the development of local manufacturing contributes to financial gains, increases national income, reduces unemployment, and bolsters social stability. The Palestinian manufacturing sector is the second-largest economic activity, comprising 3,549 industrial establishments (Palestinian Central Bureau of Statistics [PCBS], 2017). Within this sector, food manufacturing holds a prominent role, with 628 establishments (Ministry of National Economy [MNE], 2021), positively impacting the growth of the agricultural industry. However, despite its significant contribution, food manufacturers face numerous challenges, primarily due to competition from imported goods. [1] reports that only 4.8% of food manufacturers in Palestine hold quality certification, according to the PCBS industrial survey of 2019. The researcher also highlights the lack of required skills in food industry factories, concluding that the Palestinian food sector must invest in effective quality programmes to improve customer perceptions of food product quality. These programmes necessitate the adoption of core and infrastructure quality practices, a commitment to international standards, and the attainment of both international and Palestinian quality certifications.

QM is a philosophy that has gained increasing attention due to its perceived benefits [2]. Most experts in QM agree that QM helps companies improve performance, enhance product quality, reduce costs, boost productivity, and increase customer satisfaction[3]. However, despite its importance, the literature reveals that many initiatives encounter significant challenges during the implementation of quality projects. A number of studies have identified OC as a crucial factor influencing the successful implementation of QM practices[4]. Thus, prior to the implementation of core and infrastructure QM practices, top management should recognise the importance of cultural values and select the type of culture that facilitates successful QM implementation [3; 5]. [6] argue that failures in QM practices in many organisations are often due to limited deployment and a lack of understanding of the OC. OC comprises four dimensions—clan, hierarchy, market, and adhocracy—which together form the Competing Values Framework (CVF) [7; 8].

In the Palestinian context, limited research exists on the role of OC in facilitating the implementation of QM practices, particularly within the food manufacturing sector. Therefore, there is a need to better understand how OC influences QM practices and which types of OC motivate their implementation in Palestine. This research also aims to assess the effect of QM practices and OC on QP. The study explores the influence of OC on QM implementation in the Palestinian food manufacturing sector and aims to identify which type of OC should be pursued to enhance overall QP. The remainder of this paper is structured as follows: Section two reviews the relevant literature; Section three outlines the adopted methodology; Section four presents the results of the data analysis; Section five discusses the findings; and Section six provides the conclusion and recommendations.

2. Literature Review

2.1 Core and Infrastructure Quality Practices

Previous research categorises QM practices into two primary clusters. The first cluster consists of infrastructure or soft practices, which are associated with people, their interactions, and their teams. The second cluster includes practices that are primarily methodology-oriented, aimed at improving process performance through scientific methods and statistical tools. Some scholars have noted that "Statistical Process Control (SPC) is among these practices, often referred to as core or sometimes hard practices" [9-11].

2.1.1 Core (Hard) Quality Practices

Hard practices are focused on "the use of methods and various tools of QM to enhance and

support overall performance and productivity" [12]. These hard elements are regarded as tangible aspects of QM practices [13]. Based on the reviewed literature, the hard elements incorporated in this study include: Quality Information [14], Process Management [15], and Product Design [16].

2.1.2 Infrastructure (Soft) Quality Practices

People-oriented practices primarily emphasise organisational development and change, particularly in areas such as customer relationships, leadership, management commitment, personnel management, and supplier relationships [17]. The key components of these practices adopted in this study are as follows: Supplier Involvement [18], Top Management Support [19], Workforce Management [20], and Customer Involvement [21].

2.2 Competing Values Framework for OC

The Competing Values Framework (CVF) was developed in 1991 and is considered one of the most widely-used models in OC research [4]. According to [22], CVF is recognised as one of the fifty most influential models in management science. The framework is depicted with two axes: the x-axis ranges from “internal focus/integration” to “external focus/differentiation” [22], while the y-axis spans from “stability and control” to “flexibility and discretion” [22]. These two axes result in four opposing subcultures: Clan, Adhocracy, Hierarchy, and Market, as illustrated in Fig. 1. In Clan culture, cultural values emphasise cohesion, morale, and human resource management (HRM), with a leadership style that is facilitative, mentoring, and nurturing. Adhocracy culture values creativity, growth, and cutting-edge output, with leadership characterised by innovation, entrepreneurship, and vision. In Hierarchy culture, the values focus on efficiency, timeliness, and smooth functioning, while the leadership style is centred on coordination. Finally, Market culture prioritises market share, goal achievement, and competition, with leadership that is focused on driving performance [22].

2.3 Quality Performance

Companies are consistently striving for effective and efficient outcomes in all their activities, making the evaluation and assessment of business performance crucial. Furthermore, performance measurement provides management with valuable insights that enable them to monitor team performance, identify weaknesses, enhance motivation, track progress, and identify issues [23].

Fig.1. The Competitive Values Framework (source: [22])

[23; 24] highlighted that there is no universally agreed-upon definition of firm performance, as the lack of an operational definition leads to diverse interpretations based on individual experiences.

However, [24] strongly recommend enhancing organisational performance by identifying and measuring the impact of QM practices. In this context, [25] emphasised that one of the key indicators is QP, which represents the process that transforms QM into a capability that enhances competitiveness.

2.4 Previous Studies

Studies on QM in the food industry in Palestine are relatively scarce [10], particularly those exploring the impact of OC on QM implementation within the Palestinian context. To address this gap and investigate the relationship between OC practices and QM in Palestine, this study aims to assess the extent of QM practice implementation in the food industry sector and the role of OC in supporting the success of these practices. Furthermore, it examines the impact of both QM practices and OC on enhancing overall QP, thereby enabling the sector to compete, endure, and thrive in highly competitive environments. Table 1 provides a summary of the studies reviewed that address the same topic under investigation.

Table 1
Previous Studies on OC and QM

Authors	Country	Sector	Summary
[4]	Nigeria	SMEs Manufacturing	The study demonstrates that TQM and OC provide a positive direct impact on performance of SME, and TQM also shows a positive influence on SMEs through OC.
[9]	Six Countries	Manufacturing Plants	This study indicated that OC relates most strongly to infrastructure QM than to core practices of QM. Infrastructure QM practices also significantly impact manufacturing performance.
[43]	Australia	Different Organizations	The result revealed that different types of cultures determine different subsets of TQM practices, which is consistent with the pluralist view. A relationship (statistically significant) exists between TQM practices and hierarchical culture.
[2]	Pakistan	Textile Industries	OC mediates the relationship between OP and QM.
[43]	Jordan	Insurance Companies	OC affects quality management (statistically significant). A statistically significant difference was found in OC in these companies owing to differences in occupational variables (occupation, years of experience).
[3]	India	Manufacturing	The findings show that hierarchical and rational cultures prevail in manufacturing organizations (in India) where commitment of the top management and Six Sigma structures are crucial aspects of the infrastructure and core practices of QM. Additionally, infrastructure and core practices of QM are supportive to development and group culture.

2.5 Research Hypotheses

To assess the influence of OCs on QM practices for each dimension individually and in total, the following hypotheses have been formulated. Specifically, for each type of OC, nine hypotheses are presented in Table 2.

Table 2
Research Hypotheses

Clan Culture and QM Practices in Palestinian Food Industries
Ha1: Clan culture positively affects the core QM practice of quality information
Ha2: Clan culture positively affects the core QM practice of product design
Ha3: Clan culture positively affects the core QM practice of process management
Ha4: Clan culture positively affects the infrastructure QM practice of customer involvement
Ha5: Clan culture positively affects the infrastructure QM practice supplier involvement
Ha6: Clan culture positively affects the infrastructure QM practice top management support
Ha7: Clan culture positively affects the infrastructure QM practice workforce management

Ha8: Clan culture positively affects the core QM practices
Ha9: Clan culture positively affects the infrastructure QM practices
Adhocracy Culture and QM Practices in Palestinian Food Industries
Hb1: Adhocracy culture positively affects the core QM practice of quality information
Hb2: Adhocracy culture positively affects the core QM practice of product design
Hb3: Adhocracy culture positively affects the core QM practice of process management
Hb4: Adhocracy culture positively affects the infrastructure QM practice of customer involvement
Hb5: Adhocracy culture positively affects the infrastructure QM practice supplier involvement
Hb6: Adhocracy culture positively affects the infrastructure QM practice top management support
Hb7: Adhocracy culture positively affects the infrastructure QM practice workforce management
Hb8: Adhocracy culture positively affects the core QM practices
Hb9: Adhocracy culture positively affects the infrastructure QM practices
Hierarchy Culture and QM Practices in Palestinian Food Industries
Hc1: Hierarchy culture positively affects the core QM practice of quality information
Hc2: Hierarchy culture positively affects the core QM practice of product design
Hc3: Hierarchy culture positively affects the core QM practice of process management
Hc4: Hierarchy culture positively affects the infrastructure QM practice of customer involvement
Hc5: Hierarchy culture positively affects the infrastructure QM practice supplier involvement
Hc6: Hierarchy culture positively affects the infrastructure QM practice top management support
Hc7: Hierarchy culture positively affects the infrastructure QM practice workforce management
Hc8: Hierarchy culture positively affects the core QM practices
Hc9: Hierarchy culture positively affects the infrastructure QM practices
Market Culture and QM Practices in Palestinian Food Industries
Hd1: Market culture positively affects the core QM practice of quality information
Hd2: Market culture positively affects the core QM practice of product design
Hd3: Market culture positively affects the core QM practice of process management
Hd4: Market culture positively affects the infrastructure QM practice of customer involvement
Hd5: Market culture positively affects the infrastructure QM practice supplier involvement
Hd6: Market culture positively affects the infrastructure QM practice top management support
Hd7: Market culture positively affects the infrastructure QM practice workforce management
Hd8: Market culture positively affects the core QM practices
Hd9: Market culture positively affects the infrastructure QM practices
Effect of QM Practices on QP in Palestinian Food Industries
Hqp1: The core QM practice of quality information positively affects QP
Hqp2: The core QM practice of product design positively affects QP
Hqp3: The core QM practice of process management positively affects QP
Hqp4: The infrastructure QM practice of customer involvement positively affects QP
Hcqp5: The infrastructure QM practice supplier involvement positively affects QP
Hqp6: The infrastructure QM practice top management support positively affects QP
Hqp7: The infrastructure QM practice workforce management positively affects QP
Hqp8: The core QM practices positively affects QP
Hqp9: The infrastructure QM practices positively affects QP
Effect of OC on QP in Palestinian Food Industries
Hqp10: The hierarchy culture positively affects QP
Hqp11: The adhocracy culture positively affects QP
Hqp12: The clan culture positively affects QP
Hqp13: The market culture positively affects QP
Moderating Role of OC on the Relationship between QM Practices and QP in Palestinian Food Industries
Hm1: The relationship between core QM practices and QP will be stronger when adhocracy culture is high
Hm2: The relationship between infrastructure QM practices and QP will be stronger when adhocracy culture is high
Hm3: The relationship between core QM practices and QP will be stronger when market culture is high
Hm4: The relationship between infrastructure QM practices and QP will be stronger when market culture is high
Hm5: The relationship between core QM practices and QP will be stronger when clan culture is high
Hm6: The relationship between infrastructure QM practices and QP will be stronger when clan culture is high
Hm7: The relationship between core QM practices and QP will be stronger when hierarchy culture is high
Hm8: The relationship between infrastructure QM practices and QP will be stronger when hierarchy culture is high

2.6 The Proposed Conceptual Framework

As the research centres on the manufacturing sector, the study employs the widely recognised CVF model to examine OC, with its four types of culture (clan, market, hierarchy, adhocracy) [26], as a means of identifying OC [3]. Previous studies have identified the most commonly used dimensions

for measuring QM practices for both core and infrastructure, which include (quality information, process management, and product design) and (top management support, customer involvement, supplier involvement, and workforce management). Regarding QP, this study evaluates performance quality based on indicators such as reducing production costs, increasing customer satisfaction, boosting profits, making knowledge-based decisions, and improving product quality. Figure 2 illustrates the proposed conceptual framework, including the study hypotheses. Specifically, this model incorporates multiple hypotheses, as previously stated, to test the effects of the four OCs on QM practices and assess how each of these factors influences QP.

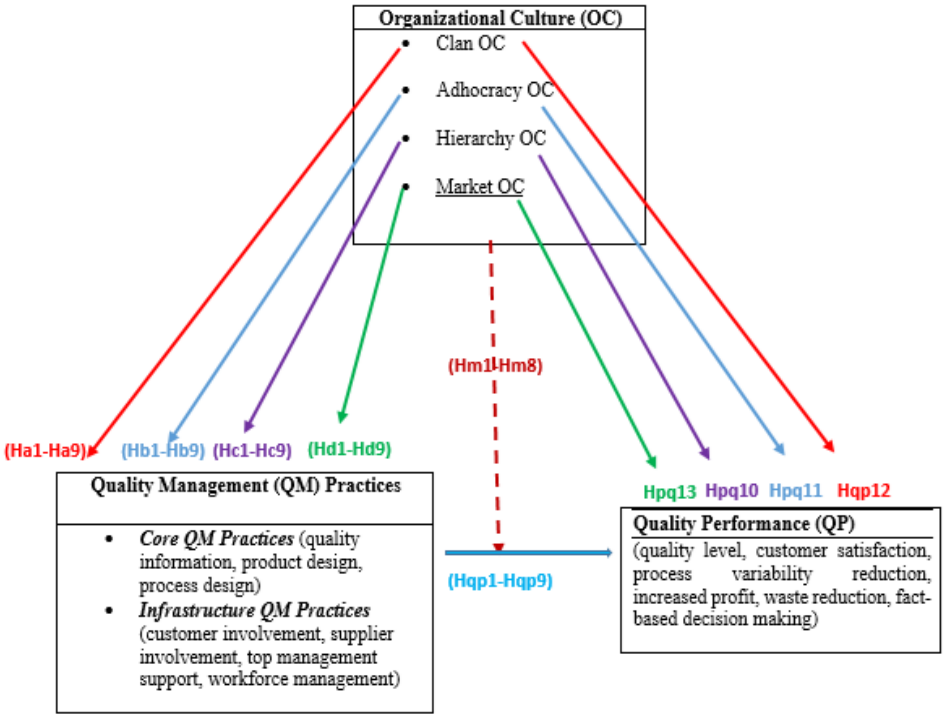

Fig.2. The Study's Proposed Conceptual Framework.

3. Methodology

3.1 Questionnaire Design

In quantitative research, researchers typically use a pre-constructed, standardised instrument or predetermined response categories to describe variations in perspectives and experiences. One of the most common tools employed for this purpose is the questionnaire. In this study, an electronic questionnaire was developed using Google Forms and distributed to the target food firms. Furthermore, the firms were contacted through phone, email, and field visits to encourage participation and ensure high objectivity in responses, thereby facilitating the collection of accurate data. The questionnaire included close-ended questions, which enabled the researchers to identify general patterns in participant reactions. These questions also provided categorised information and proved easy to administer, analyse, and code, making it simpler to explore relationships between the variables [27].

To measure the variables of OC, QM practices, and QP, a Likert-type scale (5-point scale) was employed, ranging from one (strongly disagree) to five (strongly agree) for each item. Alongside demographic questions, the questionnaire contained seventy-six items related to OC, QM practices, and QP. The final version of the questionnaire comprised five sections, starting with a cover page that included a brief overview of the study's objectives, gratitude notes to all participants for their cooperation, and contact information for any further inquiries. The five sections are as follows:

Section 1: This section gathers demographic information about the respondent and the firm, including job title, gender, number of employees, subsector, years of experience, and firm location.

Section 2: This section consists of four subsections to assess the adoption of the four organisational culture types in the CVF (clan, market, hierarchy, and adhocracy) within the Palestinian food industry. It includes 29 items, guided by [3; 7-9].

Section 3: Divided into core and infrastructure QM practices, this section uses [28] classification. Core practices include 18 items across three dimensions, while infrastructure practices consist of four dimensions with 22 items. The formulation of indicators was informed by studies by [3; 9; 11; 29].

Section 4: This section includes seven questions to assess the QP of the firms, based on the dimensions shown in Figure 2.

Section 5: This section contains an optional open-ended question, allowing participants to contribute additional ideas or comments not covered in the survey.

For ease of analysis, the 76 questions were coded, as shown in Table 4.

3.2 Study Sample and Population

The study population consists of food manufacturing companies in Palestine. According to MNE data for 2021, there are 598 registered companies in this sector, with 187 food companies listed in the Palestinian Food Industries Federation (PFIU), distributed across the West Bank and Gaza Strip. To ensure adequate participation, the sample was selected based on predetermined criteria. These criteria included companies being registered with the MNE under the Palestinian Law of Companies and the PFIU, operating in production and manufacturing (excluding those in importing or packaging), and excluding bakeries, slaughterhouses, cattle and cow farms, and companies without a department or employee focused on implementing quality standards. The criteria were applied to all firms, resulting in a final list of 82 factories that met these conditions. The sample size was then determined using Thompson's (1987) formula:

$$n = \frac{N \times p(1-p)}{[[(N-1) \times (d^2 \div z^2)] + p(1-p)]} \quad \ldots\ldots\ldots \quad [1]$$

Where, N is the population size of the study, n is the size of the sample, (82), p is the proportion of the property offers and neutral, (0.5), d = the percentage error 5%, and z represents the z-value is the upper of the normal distribution (which is 1.96 for a confidence level of 95%). Accordingly, the sample size was approximately 68. It took three and a half months to collect the responses, with 70 questionnaires submitted, all of which were valid, representing a 100% response rate. The collected data were stored anonymously on Google Forms.

3.3 Data Analysis Techniques

Smart-PLS was used for data analysis, with Excel and SPSS assisting in encoding the data and developing descriptive statistics for demographic information. Path modelling was employed to visualise the studied variables and constructs, while hypotheses were tested using PLS-SEM. Measurement and structural theories are integral to developing a path model. The variable indicators in this study are reflective for both QM practices, OC, and QP, based on prior research, particularly from [4; 30; 31].

4. Data Analysis Results

4.1 Demographic Profile

Table 3 summarises the demographic data analysis of the participating respondents and their firms from which data were collected.

Table 3
Respondents and Firms Demographic Profiles Summary

Item	Option
Gender	Male 76%, Female 24%
Work Experience (years)	Less than 5 21%, From 6-10 39% , From 11 – 15 21%, More than 15 19%
Position	General Manager 16%, Quality Manager/Engineer 63%, Production Manager 7%, Human Resources Manager 7%, Others 7%
Firm Location	West Bank 84%, Gaza Strip 16%
Subsector in Food Industry	Milk & Dairy 20%, Meat-Poultry 14%, Oil & Fats 7%, Fruits & Vegetables 6% Sugar, Confectionary & Chocolate 16%, Beverages & Mineral Water 6% Grains & Cereals 4%, Others 27%
Number of Employees	From 1-10 10%, from 11-49 26% From 50 – 250 48%, more than 250 16%
Firm's Age (years)	Less than 5 4%, from 6-10 16% From 11-15 13%, from 16-20 17% More than 20 50%
Firm's Classification	Private limited 66%, Public limited 19% Ordinary limited 11%, Public ordinary 4%
Ownership Structure	Family 80%, Non-family 20%
Export Activities	Yes 54%, No 46%
Market	Local 83%, Regional 6%, International 11%
Quality Certificates	Holding 47%, Under processing 31%, Not-holding 22%

4.2 SEM-PLS Analysis

4.1.1 Assessment of the Measurement Model

In their study, [32] outlined the steps for assessing a reflective measurement model. The first step involves analysing the indicator loadings. If the loadings are at least 0.70, the construct explains at least 50% of the variance of the indicator, ensuring acceptable item reliability. The second step focuses on assessing internal consistency reliability. While Cronbach's alpha is traditionally used, it can be conservative when evaluating PLS-SEM surveys, so "Composite Reliability" is recommended instead [33]. The value must be above 0.70, but exceeding 0.95 is undesirable [34]. The third step examines convergent validity, which measures how well the construct explains the variance among its items. The factor loading of the indicator, CR, and AVE are evaluated to confirm convergent validity. AVE values should be at least 0.50 [34; 35]. Table 4 shows that item loadings for the variables (OC, core QM, infrastructure QM, and QP) are 0.7 or higher. Additionally, Table 3 confirms that all indicators have CR values greater than the threshold of 0.7, indicating their reliability. AVE values above 0.5 further demonstrate sufficient construct validity.

(1), (2) and (3): More elaboration on these values is given below.

The final validation of the measurement model involves assessing three types of discriminant validity to determine how distinct constructs are from each other. These measures help verify that indicators for a construct are distinguishable from indicators of other constructs. The three methods used are cross-loadings, the Fornell-Larcker criterion, and the Hetertrait-Monotrait Ratio (HTMT). For cross-loading, the loading on the assigned construct should be higher than the load on any other construct, with a cut-off value above 0.70. The results confirm that the outer loading meets this criterion. The Fornell-Larcker criterion requires that the variance of a construct with its indicators is greater than any other construct's variance. For this condition to hold, the AVE of a construct must exceed its highest squared correlation with another construct [34; 37]. This requirement is satisfied, as shown in Table 5. Regarding HTMT, values should be below 0.90 [34]. In this study, all HTMT values were below 0.9, confirming that the model's discriminant validity is satisfactory.

Table 4

Variable Measurements and Coding

Variable	Dimensions	Codes	References
Organizational Culture (OC) (29 items)	Clan Culture (CC) (8 items) Composite Reliability (CR)(1) = 0.918 Average Variance Extracted (AVE)(2) = 0.692 Item Loading (IL)(3) [min,max]=[0.750,0.902]	OC_CC1- OC_CC8	[3; 7-9]
	Market Culture (MC) (7 items) CR = 0.887, AVE = 0.663 IL=[0.768,0.851]	OC_MC1-OC_MC7	
	Adhocracy Culture (AC) (7 items) CR = 0.896, AVE = 0.635, IL=[0.768,0.851]	OC_AC1-OC_AC7	
	Hierarchy Culture (HC) (7 items) CR = 0.882, AVE = 0.713, IL=[0.745,0.864]	OC_HC1-OC_AH7	
QM Practices _ Infrastructure (IQ) (22 items)	Top Management Support (TMS) (5 items) CR = 0.936, AVE = 0.744, IL=[0.822,0.907]	IQ_TMS1: IQ_TMS5	[2; 3; 9; 11; 29]
	Customer Involvement (CI) (7 items) CR = 0.909, AVE = 0.668, IL=[0.722,0.867]	IQ_CI1-IQ_CI7	
	Workforce Management (WFM) (6 items) CR = 0.883, AVE = 0.653, IL=[0.788,0.830]	IQ_WFM1_IQ_WFM6	
	Supplier Involvement (SI) (4 items) CR = 0.858, AVE = 0.668, IL=[0.757,0.851]	IQ_SI1-IQ_SI4	
QM Practices _ Core (CQ) (18 items)	Information Quality Management (IQM) (6 items) CR = 0.929, AVE = 0.666, IL=[0.781,0.861]	CQ_IQM1-CQ_IQM6	
	Product Design Management (PD) (6 items) CR = 0.895, AVE = 0.680, IL=[0.795,0.879]	CQ_PDM1- CQ_PDM6	
	Process Management (PM) (6 items) CR = 0.946, AVE = 0.778, IL=[0.856,0.908]	CQ_PM1:-CQ_PM6	
Quality Performance (QP) (7 items)	Quality Performance (QP) (7 items) CR = 0.912 AVE = 0.596, IL=[0.701,0.819]	QP1-QP7	[2; 36]

4.2.3 Assessment of the Structural Model

Upon achieving a satisfactory measurement model, the structural model is evaluated to assess the PLS-SEM results and determine the extent to which the model predicts the relationships between the constructs. In evaluating the structural model, the primary criteria include the coefficient of determination (R^2) of the endogenous variable, the standardized path coefficients, the effect size (f^2), and the predictive relevance (Q^2) [38]. The R^2 value of the endogenous constructs is examined to assess the variance explained by the endogenous constructs and to gauge the model's explanatory power. R^2, also referred to as in-sample predictive power, can range from 0 to 1, with higher values indicating greater explanatory power. According to guidelines, an R^2 value of 0.25 is considered weak, 0.50 is moderate, and 0.75 is substantial. However, the interpretation of R^2 should always be contextualised based on the study's specific focus [32]. The R^2 values in this study are provided in Table 6.

The effect size (f^2), as shown in Table 5, ranges from 0.00 to 0.16. Following [42] interpretation of effect sizes, values above 0.35 are considered large, those below 0.02 indicate no effect, and values between 0.15 and 0.35 are considered medium, while values from 0.02 to 0.15 reflect small effect sizes. Table 6 indicates that MC has a small effect on all core QM and infrastructure quality dimensions, while HC exhibits a small effect on five out of seven QM practices. CC demonstrates a small effect on product design, top management support, and workforce involvement. Adhocracy culture (AC) influences information quality, process management, customer involvement, top management support, and workforce involvement. Regarding QP, HC has a strong effect, CC shows a small effect, and the remaining cultures show no effect. For quality practices, all dimensions have a small effect, except top management support and product design, which do not have an effect. The Q^2 value is another critical factor when assessing the predictive capability of the PLS path model. Geisser's Q^2 value is derived through the blindfolding procedure. For endogenous constructs, Q^2 values greater than zero indicate higher predictive accuracy of the structural model for that construct. A Q^2 value of more than 0 is considered small, 0.25 as medium, and 0.50 as large predictive relevance [32]. Table 6 shows that all constructs, except supplier involvement, have medium predictive relevance, with the latter having a small predictive relevance with a value of 0.169.

The goodness of fit (GoF) is a global fit measure for evaluating path models in PLS [39]. The purpose of GoF is to consider both the measurement and structural models of the study, focusing on the overall performance of the model. [40] proposed that a GoF value greater than 0.36 indicates a large fit. In this study, the GoF value is 0.42, suggesting sufficient validity. To estimate the significance of path coefficients and validate the proposed hypotheses, PLS bootstrapping was employed using a resampling of 5,000 iterations [37] with a two-tailed t-test and a critical value of 1.96. Based on the results, 12 hypotheses were supported, namely Ha2, Ha6, Ha7, Hb3, Hc1, Hc5, Hd6, Hd7, Hqp1, Hqp7, Hqp10, and Hqp13, while the others were not supported.

Specifically, clan culture positively influences product design management, top management support, and workforce management with p-values of 0.04, 0.035, and 0.008, respectively, but does not affect other quality practice dimensions. Adhocracy culture has a positive effect on process management quality practices with a p-value of 0.021, but it does not influence other quality practices or quality performance management. Hierarchy culture notably impacts supplier involvement and information quality, with p-values of 0.005 and 0.043, respectively, while other hypotheses regarding QM practices are not supported. Market culture positively affects quality practices in quality information and workforce management, with p-values of 0.039 and 0.022, respectively, but has no impact on customer involvement.

Table 5
Discriminant Validity using Fornell-Larcker Criterion and HTMT

Fornell-Larcker Criterion												
	CQ_IQM	CQ_PDM	CQ_PM	IQ_CI	IQ_SI	IQ_TMS	IQ_WFM	OC_AC	OC_CC	OC_HC	OC_MC	Q_P
CQ_IQM	0.816											
CQ_PDM	0.619	0.825										
CQ_PM	0.748	0.694	0.882									
IQ_CI	0.658	0.735	0.802	0.818								
IQ_SI	0.557	0.551	0.597	0.66	0.721							
IQ_TMS	0.802	0.693	0.739	0.697	0.614	0.863						
IQ_WFM	0.688	0.744	0.768	0.718	0.572	0.721	0.808					
OC_AC	0.633	0.567	0.707	0.608	0.402	0.704	0.652	0.797				
OC_CC	0.614	0.612	0.631	0.613	0.455	0.753	0.671	0.711	0.832			
OC_HC	0.693	0.459	0.656	0.621	0.595	0.681	0.558	0.594	0.654	0.844		
OC_MC	0.739	0.625	0.719	0.657	0.581	0.781	0.700	0.738	0.762	0.731	0.814	
Q_P	0.711	0.689	0.719	0.644	0.550	0.691	0.652	0.668	0.685	0.720	0.656	0.823
HTMT												
	CQ_IQM	CQ_PDM	CQ_PM	IQ_CI	IQ_SI	IQ_TMS	IQ_WFM	OC_AC	OC_CC	OC_HC	OC_MC	Q_P
CQ_IQM	----											
CQ_PDM	0.708	----										
CQ_PM	0.810	0.777	----									
IQ_CI	0.727	0.855	0.886	----								
IQ_SI	0.576	0.646	0.575	0.725	----							
IQ_TMS	0.882	0.787	0.801	0.779	0.635	----						
IQ_WFM	0.790	0.888	0.874	0.841	0.604	0.827	----					
OC_AC	0.705	0.655	0.773	0.685	0.369	0.780	0.743	----				
OC_CC	0.672	0.699	0.691	0.684	0.438	0.825	0.764	0.804	----			
OC_HC	0.811	0.556	0.753	0.733	0.678	0.790	0.685	0.71	0.777	----		
OC_MC	0.847	0.738	0.812	0.765	0.613	0.878	0.840	0.864	0.885	0.888	----	
Q_P	0.836	0.705	0.831	0.792	0.545	0.778	0.839	0.643	0.607	0.882	0.725	----

Table 6
R^2 of the Endogenous Latent Variables, their Effect Size and Construct Cross-Validated Redundancy

R^2 and R^2_Adjusted								
	CQ_IQM	CQ_PDM	CQ_PM	IQ_CI	IQ_SI	IQ_TMS	IQ_WFM	Q_P
R^2	0.607	0.445	0.611	0.506	0.318	0.694	0.554	0.751
R^2_Adjusted	0.583	0.411	0.587	0.476	0.276	0.675	0.526	0.704
Construct Cross-Validated Redundancy								
	CQ_IQM	CQ_PDM	CQ_PM	IQ_CI	IQ_SI	IQ_TMS	IQ_WFM	Q_P
SSO	420	280	350	350	210	350	280	490
SSE	258.492	203.518	195.276	244.379	174.492	177.078	194.783	297.065
Q^2 (=1-(SSE/SSO))	0.385	0.273	0.442	0.302	0.169	0.494	0.304	0.394
The Effect Size (f^2)								
	CQ_IQM	CQ_PDM	CQ_PM	IQ_CI	IQ_SI	IQ_TMS	IQ_WFM	Q_P
OC_AC	0.025	0.016	0.128	0.031	0.015	0.037	0.041	0.001
OC_CC	0.000	0.053	0.000	0.014	0.003	0.091	0.049	0.037
OC_HC	0.109	0.004	0.062	0.057	0.1	0.037	0.001	0.166
OC_MC	0.114	0.063	0.054	0.028	0.059	0.098	0.071	0.015
CQ_IQM								0.071
CQ_PDM								0.002
CQ_PM								0.032
IQ_CI								0.016
IQ_SI								0.024
IQ_TMS								0.009
IQ_WFM								0.104

Concerning the influence of QM practices on quality performance management, quality information and workforce management positively affect it, with p-values of 0.045 and 0.024, respectively, whereas other quality practices do not. Furthermore, only hierarchy culture has a positive influence on quality performance, with a p-value of 0.009. To investigate the effects of OC on the core and infrastructure practices of QM, a second-order model was created using the repeated indicators method via the Smart-PLS package. This model was tested for both measurement and structural validation. The measurement model was reassessed for convergent validity, discriminant validity, and internal consistency, employing composite reliability, individual indicator reliability, and AVE. Discriminant validity was examined using the Fornell-Larcker and HTMT criteria. Collinearity across constructs was assessed with VIF, with all VIF values (shown in Table 7) falling below 5, indicating no critical collinearity issues, as suggested by [32]

The structural model estimation was performed using the same statistical measures applied in the previous model. The R^2 values for core QM, infrastructure QM, and quality performance are 0.716, 0.714, and 0.736, respectively, reflecting substantial effects (Table 6). The f^2 values show moderate effects for most constructs, and the Q^2 values exceed the threshold for acceptance, as shown in Table 7. With a GoF value of 0.595, the model is considered to have a large fit. Regarding the hypotheses test, the path coefficient determination indicates that market culture has a significant positive effect on both infrastructure and core QM practices, with p-values of 0.043 and 0.028, respectively.

Clan culture also has a positive impact on infrastructure practices, with a p-value of 0.013. Additionally, adhocracy culture positively influences core practices. Both core QM and infrastructure practices have a positive effect on performance quality, as indicated by p-values of 0.003 and 0.024, respectively. Consequently, Figure 3 presents the fitted proposed model for the study, illustrating the second-order construct. The final part of the analysis focuses on examining whether the four types of OC moderate the relationship between OC and QP. According to [37], a moderator is defined as a

variable that influences the strength and/or direction of the relationship between independent and dependent variables. Table 8 shows that the presence of clan culture positively moderates the relationship between infrastructure QM practices and quality performance, with a significant p-value of 0.014. Figure 4 corroborates this result. In contrast, none of the other three OC types demonstrate moderating effects on QM practices.

Table 7
VIF, R^2 of the Endogenous Latent Variables and the Effect Size, and Cross Validity Redundancy (Model-2)

Second-Order Construct	First-Order Constructs			VIF
Infrastructure QM Practices	IQ_CI			2.684
	IQ_SI			1.593
	IQ_TMS			2.502
	IQ_WFM			2.533
Core QM Practices	CQ_IQM			2.359
	CQ_PDM			2.009
	CQ_PM			2.765
Construct	Q_P	Core QM Practices		Infrastructure QM Practices
R^2	0.716	0.714		0.736
R^2 Adjusted	0.689	0.696		0.720
Construct	f^2			Q^2 (=1-SSE/SSO)
	Q_P	Core Quality	Infrastructure Quality	
OC_AC	0.000	0.091	0.07	
OC_CC	0.030	0.002	0.101	
OC_HC	0.144	0.095	0.034	
OC_MC	0.02	0.125	0.107	
Core QM Practices	0.128			0.505
Infrastructure QM Practices	0.078			0.456
Q_P				0.393

5. Discussion of Results

5.1 The Four Types of OC and the Seven QM Practices in Food Industry

This study showed that each of the four organisational culture types impacts at least one QM practice. Specifically, clan culture positively influences top management support for quality initiatives, product design management, and employee involvement. This is likely due to clan culture's emphasis on teamwork, commitment, and participation. Additionally, market culture positively affects top management support for quality initiatives and workforce involvement, as achieving goals requires empowering employees and enhancing their skills to improve performance.

Table 8
Path Coefficient of the Research Hypotheses (Model-2)

Path	Hypotheses	β	std. Error	T-Value	P Values	Result
Core QM Practices → Q_P	Hqp8	0.462	0.157	2.948	0.003	Supported
Infrastructure QM Practices → Q_P	Hqp9	0.385	0.171	2.257	0.024	Supported
OC_AC → Core QM Practices	Hb8	0.265	0.13	2.043	0.041	Supported
OC_AC → Infrastructure QM Practices	Hb9	0.112	0.132	0.847	0.397	Not Supported
OC_CC → Core QM Practices	Ha8	0.127	0.117	1.086	0.278	Not Supported
OC_CC → Infrastructure QM Practices	Ha9	0.28	0.112	2.491	0.013	Supported
OC_HC → Core QM Practices	Hc8	0.227	0.138	1.645	0.1	Not Supported
OC_HC → Infrastructure QM Practices	Hc9	0.141	0.128	1.101	0.271	Not Supported
OC_MC → Core QM Practices	Hd8	0.368	0.168	2.194	0.028	Supported
OC_MC → Infrastructure QM Practices	Hd9	0.325	0.16	2.026	0.043	Supported
The Moderating Effect Hypotheses						
Path	Hypotheses	β	std. Error	T-Value	P Values	Result
AC_core QM Practices → Q_P	Hm1	-0.127	0.373	0.341	0.733	Not Supported

AC_infrastructure QM Practices→ Q_P	Hm2	0.026	0.333	0.077	0.938	Not Supported
CC_core QM Practices → Q_P	Hm5	-0.598	0.406	1.472	0.141	Not Supported
CC_infrastructure QM Practices→ Q_P	Hm6	0.98	0.482	2.034	0.042	Not Supported
HC_core QM Practices →Q_P	Hm7	0.561	0.376	1.492	0.136	Not Supported
HC_infrastructure QM Practices→ Q_P	Hm8	-0.646	0.422	1.531	0.126	Not Supported
MC_core QM Practices → Q_P	Hm3	0.08	0.368	0.216	0.829	Not Supported
MC_infrastructure QM Practices→ Q_P	Hm4	-0.291	0.371	0.785	0.433	Not Supported

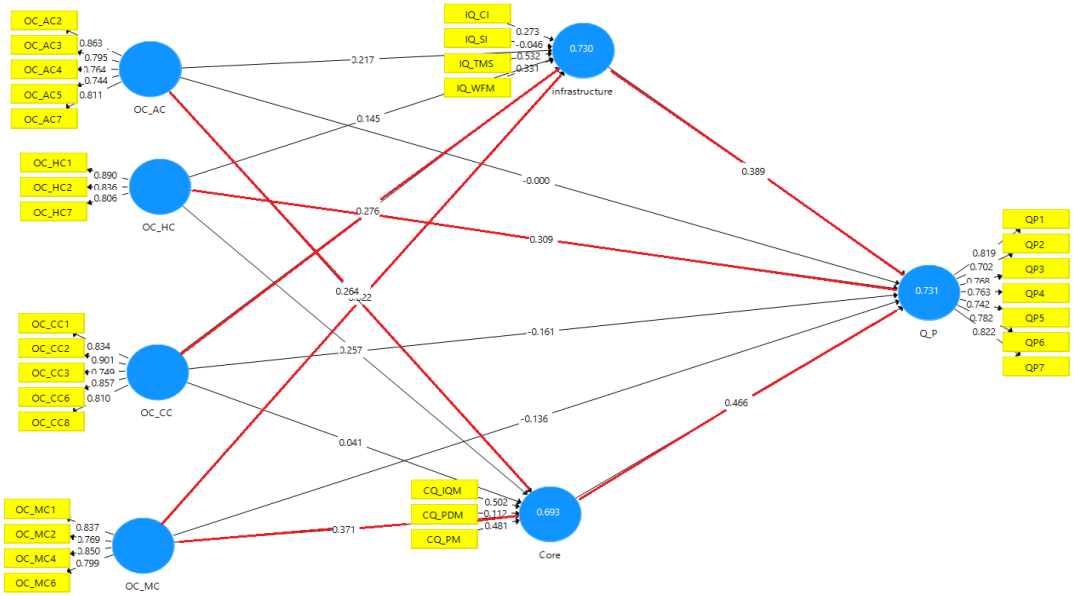

Fig.3. Model of the Second-Order Construct

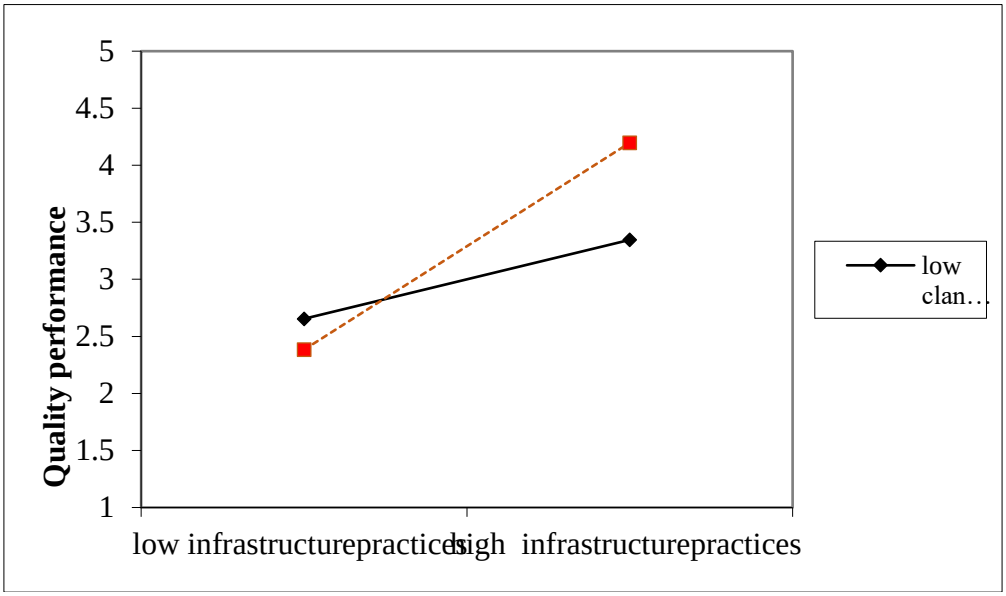

Fig.4. Moderating Effect of Clan Culture.

Additionally, market culture positively influences the quality of information, both as a tangible measure of the organisation's output and as a performance metric that identifies issues, thus facilitating more strategic decision-making. However, the study highlights that hierarchy culture specifically affects quality information practices and supplier involvement. This culture ensures organisational stability, access to accurate and timely information, and control over inputs and factors. It is important to note that, despite customer satisfaction being a key goal for any successful organisation, the study found no influence of any organisational culture on promoting customer involvement. A plausible explanation for this is that food manufacturing products in Palestine largely

consist of well-established, specific varieties, with limited potential for new diversity in the market. However, as previously discussed, customer involvement was identified as one of the quality management practices that has an impact on overall performance.

5.2 The Four Types of OC and Core and Infrastructure QM in Food Industry

A further contribution of this work is the assessment of the impact of each type of OC on both core and infrastructure QM practices in a holistic form. While each culture influences at least one of the seven quality practices, market culture is the only type that simultaneously affects both core and infrastructure QM practices. When these groups were examined collectively, rather than individually, the effect became more pronounced. This finding reinforces the idea that market outcomes and profitability drive the Palestinian food manufacturing industry, where the ultimate goal is to achieve adequate profitability and maintain a leadership position in the market. Moreover, when infrastructure QM practices were treated as a single unit, the results revealed that clan culture positively impacts infrastructure QM. This is in line with the human factor, emphasising empowerment and participation. Clan culture fosters a sense of belonging and a family-like atmosphere, enabling employees to work collaboratively, share knowledge, and function effectively as a team. This aligns with [5], who found that clan culture is strongly associated with infrastructure QM.

In contrast, adhocracy culture positively impacts core QM when its dimensions are treated as a unified entity, rather than individual items. This result aligns with the characteristics of adhocracy, which promotes innovation and the use of modern work tools. These findings partially agree with [5], who noted that adhocracy culture positively affects core quality practices. However, their study conflicted with the current research on market and clan cultures. Specifically, this study found that core quality practices are associated with market culture, while clan culture does not have an effect, contrary to [5] findings. An important finding of this study is that hierarchy culture does not promote or affect either core or infrastructure QM practices when viewed holistically.

5.3 The Four Types of OC and QM Practices and QP

The study found that both infrastructure and core QM practices positively impact QP, with their combined effects becoming stronger. This highlights the importance of integrating both hard, tangible factors and soft factors in managing a work environment for optimal results. Regarding OC, the results support the hypothesis that hierarchical culture positively affects work quality. This may be due to its focus on internal efficiency, coordination, and work stability, aligning with [41], who noted that a strong emphasis on controlling procedures improves performance. In terms of the moderating role of OC between QM practices and QP, only hypothesis Hm6 was supported. This indicates that clan culture strengthens the relationship between soft quality practices and quality performance, emphasising the need for a supportive work environment that enhances employee skills and involvement in setting work procedures.

5.4 Theoretical and Practical Implications

This work makes significant contributions to both theory and practice. Theoretically, it supports existing studies on the topic, particularly as it is one of the few addressing this issue in Palestine, especially within the food industry. The research develops and empirically tests a model that illustrates the relationships between OC, QM, and QP. The findings confirm that each of the four types of organizational culture influences different quality management practices. Additionally, it concludes that both Core and Infrastructure QM practices positively impact performance. These results reinforce the established link between OC and the success of quality practices. From a

practical perspective, the study provides valuable insights into the current state of the Palestinian food industry, highlighting the quality practices being applied and the types of OC influencing the work environment. The proposed second-order model (Figure 3) offers a useful tool for senior management in factories to assess the organization's current state concerning OC and quality practices. Furthermore, properly aligning OC with the necessary quality practices can significantly enhance performance.

6. Conclusions, Recommendations, Limitations and Future Research Directions

6.1 Conclusion

Food manufacturing is one of the fastest-growing sectors in Palestine, with an annual market worth approximately $35 million for Palestinian food products. Given the sector's importance in supporting the Palestinian economy, it was selected as the focus of this study, which investigates how OC types contribute to enhancing product quality and performance, ultimately increasing the market share of Palestinian products. The study developed a model to examine the impact of each of the four OC types on quality practices both individually and collectively, and to explore their potential moderating effect between quality practices and quality performance. The findings reveal that, although all four cultures influence workplace behaviours and attitudes, there is variation in the degree of adoption of each culture. Market and adhocracy cultures were found to be the most prominent. The study further indicated that each culture impacts specific quality practices. Market culture had the most significant overall influence, often acting as a key motivator for quality practices, particularly in the two main pillars of quality. Adhocracy culture was linked to soft infrastructure practices, while clan culture was associated with core practices. The research also emphasised the importance of implementing both core and infrastructure practices to achieve institutional quality and enhance performance efficiency. In conclusion, organisations should recognise the significant role and impact of OC in strengthening and enhancing the work environment. To achieve their objectives, organisations should foster an OC that reflects appropriate behaviours, ethics, and practices, which align with and support their underlying values and help shape their organisational identity.

6.2 Recommendations

The growing competition and customer expectations in the market have forced factories to improve product quality, lower prices, and diversify offerings. In Palestine, this challenge is exacerbated by the need to compete with imported and Israeli products, alongside complex export and import restrictions. A key strategy to overcome these hurdles is continuous product quality improvement. Implementing quality practices is a long-term process, with OC playing a crucial role. Factory leaders must understand the prevailing cultural values within their organisations and either support or cultivate a culture that facilitates the effective implementation of both core and infrastructure quality management practices. While the study found that market culture is the strongest motivator for implementing quality practices, managers should consider all four cultures—market, clan, hierarchy, and adhocracy—to create a balanced organisational culture that drives holistic business success.

An organisation’s competitive advantage heavily depends on its human resources. Therefore, organisations should cultivate a culture that encourages teamwork, enhances employee performance, rewards contributions to quality improvements, and promotes employee participation in decision-making. The study found that, despite many factories being family-owned, clan culture and a sense of belonging were less evident compared to other cultures. Additionally, companies

should adopt a customer-oriented quality management system to drive innovation and creativity. This can be achieved by improving customer participation and involvement through clear communication channels, enabling companies to better understand customer needs, expectations, and feedback. Unfortunately, the study revealed that none of the four cultures significantly enhanced customer involvement.

6.3 Research Limitations and Future Research Directions

In this study, special attention should be given to the factors that hindered the research and the aspects that were not addressed, which could provide motivation for those interested in further developing research on the same topic. Firstly, there is a scarcity of studies that examine the impact of OC on the successful implementation of quality management in the food sector in general, and specifically in Palestine. Although this study focused on the food manufacturing sector using predetermined criteria, this limits the generalisability of the results. Future research could extend the investigation to other sectors and industries to broaden the applicability of the findings. Secondly, this study employed a competing values framework to measure OC. While this framework is widely used in empirical research, future studies might consider applying alternative cultural frameworks to deepen our understanding of the relationship between culture and quality management practices, as well as their impact on performance quality.

Thirdly, the survey was completed by quality and production staff, along with senior management, which means that the identification of the OC climate and its influence on quality management was assessed from their perspectives. Future research could involve gathering data from a broader range of employees to provide a more comprehensive view of OC's impact across different organisational levels. Fourthly, the COVID-19 pandemic and the resulting lockdown, which coincided with the distribution of the questionnaire, as well as the geographical separation between Gaza and the West Bank, prevented a significant number of factories in the Gaza Strip from participating in the study.

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