JAMEA

Questionnaire Development for TQM Implementation in the Manufacturing Industry

Zohaib Khan[1]*, Yusri Yusof[1], MD Fauzi Ahmad@Mohamad[2]

[1] *Faculty of Mechanical and Manufacturing Engineering*
    Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, MALAYSIA

[2] *Jabatan Pengurusan Pengeluaran Dan Operasi, Fakulti Pengurusan Teknologi Dan Perniagaan,*
    Universiti Tun Hussein Onn Malaysia, 86400, Parit Raja, Johor, MALAYSIA

*Corresponding Author: aghazohaib03@gmail.com
DOI: https://doi.org/10.30880/jamea.2024.05.02.007

Article Info

Abstract

The goal of this article is to create a road map for manufacturing organizations with ISO 9001 certification to follow Total Quality Management (TQM) successfully. While ISO 9001-certified organizations are better prepared to adopt TQM, no formal framework has been created to help them do so. ISO 9001-certified organizations have foundational quality practices, yet studies indicate that transitioning to TQM can be challenging without a tailored approach. While general TQM frameworks exist, few specifically address the needs of ISO-certified companies aiming to adopt TQM systematically. This research contributes by proposing a framework that addresses these unique needs. Thus, after a review of the literature and expert review meetings, the eight primary critical success factors (CSFs) and twenty-four sub-CSFs of effective TQM implementation were identified for this study. Here is a list of the eight primary Critical Success Factors (CSFs) for Total Quality Management (TQM) in ISO 9001-certified companies, based on general TQM principles and factors that are often cited in literature:Customer Focus and Satisfaction (CFS), Top Management Commitment and Leadership (TMCL), Employee Involvement and Teamwork (EIT), Supplier Management (SM),Quality Information and Performance Measurement (QIPM),Training and Learning (TL), Process Management (PM).Benchmarking (BM). Then, a questionnaire survey was created and sent to participants working at 75 manufacturing organizations in Pakistan in order to uncover the application level variations of these CSFs. Out of the 75 manufacturing enterprises that are members of the Pakistan Quality Association (PQA), 16 were chosen. After receiving forty completed questionnaires, the survey data was subjected to a t-test analysis. The findings of analyses of the questionnaire revealed that companies holding ISO 9001 certification have strong focuses on Quality Information and Performance Measurement (mean score = 4.72) and Supplier Management (4.31), along with control of data-driven quality and supply chain control. Commitment by Top Management (4.22) and Process Management (4.08) were also high, while demonstrating a solid leadership and process improvements. However, scores for Employee Involvement and Training were relatively low at 3.90 and 4.04, respectively, thereby indicating these areas as places that may need further development in order to support TQM initiatives as

properly as most of the other areas in the organizations which showed that the most notable distinctions between these businesses were in the following areas: employee education regarding quality awareness; employee training regarding quality management techniques and resources; quality data pertaining to products supplied by suppliers; and internal customer satisfaction measurement. As a result, a roadmap based on the disclosed disparities was suggested. To implement this roadmap, ISO-certified organizations must first educate staff members about quality awareness, teach them how to use quality management techniques and resources, gather quality data about supplier-provided goods, and gauge internal customer satisfaction before advancing to TQM.

1. Introduction

The manufacturing sector is facing new challenges due to the changing environment and technological advancements. Customers demand increased manufacturing efficiency, better service quality, and technological advancements, which are influenced by reputation, service quality, and product quality [1]. To meet these requirements, manufacturing organizations need to enhance their capabilities, such as implementing ISO 9001, a quality management system (QMS) [2].

The manufacturing industry ranks fourth internationally for quality assurance certificates, and ISO 9001 is regarded as a quality assurance [3]. Another quality management strategy that is popular across numerous sectors is Total Quality Management (TQM). To properly implement total quality management, though, ISO 9001 accreditation is not enough [4]. Several essential elements must be taken care of in order to implement TQM in manufacturing companies that hold an ISO 9001 certification [5]. Due to several issues, including a lack of standardization, workforce mobility, geographic dispersion, complex contractual arrangements, and several parties engaged, the manufacturing industry still has a low degree of TQM adoption [1]. TQM offers advantages such as process control, consistency, better consumer perception, and performance measurement [6]. However, it also costs a lot of money and requires a strategic shift to TQM. Decision-makers at ISO-certified manufacturing organizations need to have a plan for the strategic shift to TQM, as they may have distinct critical areas that need improvement [7]. This study intends to close this gap by creating a road map for manufacturing firms with ISO 9001 certification. This roadmap outlines the essential organizational areas that need to be strengthened in order to successfully apply TQM. Decision-makers can identify important areas for improvement and direct their resources in that direction based on this plan.

Numerous studies have explored the implementation of total quality management (TQM) in manufacturing companies [8]. Studies also defined five metrics for assessing TQM effectiveness: process management, staff empowerment, customer relationships, consumer involvement, and top management commitment [9,10]. A decision-making framework was developed, including ten Critical Success Factors (CSFs) [11]. A questionnaire survey determined eight TQM implementation elements and suggested an empiricist framework [12]. A new decision framework was established by Othman et al., aligning with Malaysia's manufacturing industry transformation policy [11]. Based on the literature review a preliminary list of 43 factors was produced. However, these factors were re-evaluated to avoid similar meaning factors. The 43 factors extracted from the literature review were evaluated and merged through re-evaluation and consolidation. From this process, the broad list of factors was developed, which resulted in the second round of evaluation for redundancy and overlap. Thereafter, these factors that were similar were brought together and merged to create a refined list of 24 distinct factors. These were further divided into prime and secondary success factors, which were essential for the success of TQM and were minor in nature but supportive in nature. This approach combined literature synthesis, expert judgment, and factor consolidation technique. Finally, 24 factors were identified, with primary and secondary success variables displayed in Table 1.

To establish the eight groups of TQM CSFs, a systematic review was conducted to bring together factors identified in various studies;

- Collecting and Consolidation: First of all, relevant studies' CSFs were gathered, and similar ones were later on condensed with the aim of avoiding duplication. For example, factors concerning different aspects of Employee Training and Employee Development were culminated into one entitled Training and Development.
- Application of Categorization using Thematic Analysis: Following that, a thematic analysis was implemented to categorize similar CSFs under broader categories whose commonness in concepts would relate to the broader TQM literature. The research methodology comprised scrutinizing the purpose and

function of each of the factors and bringing them together under even bigger themes such as Customer Focus, Supplier Management, and Top Management Commitment.

- Review by Experts and Validation: After the preliminary categories were established, experts in TQM reviewed them for completeness so that all aspects that reflect the essence of the key elements are covered for the effective implementation of TQM. This stage helped in the formation and chiseling of the categories into practical use in ISO-certified manufacturing locations.

Table 1 *Identified CSFs of TQM in this study*

Constructs	Code	Factor	Construct	Code	Factor
Customer Focus and Satisfaction (CFS)	CFS1	Customer Awareness	Top Management Management Commitment and Leadership	TMCL1	Management Participation
	CFS2	Customer Focus		TMCL2	Employee Involvement
	CFS3	Internal Satisfaction		TMCL3	Quality Improvement
Customer Focus and Satisfaction (CFS)	CFS1	Employee Engagement	Supplier Management (SM)	SM1	Employee Training
	CFS2	Team Idea		SM2	Quality Awareness
	CFS3	Idea Reward		SM3	Problem Solving
Employee Involvement and Teamwork (EIT)	EIT1	Team Spirit	Benchmarking (BM)	BM1	Activity Data
	EIT2	Supplier Relations		BM2	Management Participation
	EIT3	Supplier Evaluation	Quality Information and Performance Measurement (QIPM)	QIPM1	Employee Involvement
	EIT4	Supplier Involvement		QIPM2	Quality Improvement
Training and Learning (TL)	TL1	Improvement Coordination	Process Management (PM)	PM1	Process Benchmarking
	TL2	Scrap Identification		PM2	Market Monitoring
	TL3	Process Improvement		PM3	Supplier Data

It allows you to see the distribution of CSFs and identify any patterns or gaps. The identified CSFs across these studies are common in areas such as Top Management Commitment, Customer Focus, Supplier Management, Training, and Continuous Improvement. However, some factors appear less frequently, revealing potential gaps such as quality information system, process management, employee empowerment, statistical quality control and long-term partnership. Numerous studies have examined the Critical Success Factor (CSF) of Total Quality Management (TQM) in various contexts, including manufacturing [13]. Arditi and Gunaydin proposed three manufacturing-specific factors and seven fundamental CSFs for TQM implementation, including training, statistical techniques, customer support, collaboration, construction-ability analysis, supplier involvement, leadership, cost of quality, codes and standards, and drawing and specification quality [14]. Information and analysis, customer satisfaction, empowerment and involvement, education and training, design quality management, supplier quality management, quality culture, strategic quality management, process management, and education and training are among ten proposed success factors for TQM implementation. [9]. Eight key CSFs for the Palestinian industrial sector, analyzing 81 sub-factors [7]. Other studies have identified 59 CSFs and categorized them into 11 classes [13]. A case study of three Japanese manufacturing organizations identified 12 CSFs [14]. Despite the fact that CSFs of TQM have been the subject of numerous investigations, no single list has been utilized in them all [13]. As a result, eight categories were created to unify the suggested TQM CSFs for the manufacturing industry and other industries. Additionally, the suggested sub-CSFs for these CSFs were expanded [15].

1.1 Consumer Focus and Satisfaction

The philosophy behind TQM is to prioritize the demands and satisfaction of the customer. Customer satisfaction and focus are emphasized as crucial criteria in the Malcolm Baldrige National Quality Award [16]. To flourish, businesses need to meet and beyond customer expectations. Organizations must comprehend and anticipate the needs of their customers in order to maintain excellent customer focus and satisfaction [17]. Customers in the manufacturing industry can be either internal or external [14]. While external clients require the finished product

for their own purposes, internal customers are people who are part of the production process. Companies should take into account their internal and external customers at every stage of the manufacturing project.

1.2 Top Management Commitment and Leadership

Top management commitment and leadership are crucial for enhancing TQM success [18]. Active participation from top management fosters a culture of quality, making it a core value [14,19]. Staff members can contribute to quality control and suggestions [26]. Long-term company prosperity should be prioritized by senior management; as short-term goals can lead to diminished competition.

1.3 Teamwork and Employee Involvement

One of the key tenets of TQM is employee involvement [1]. In particular, employee empowerment needs to be gratifying enough to make use of the ideas of highly skilled workers. Employee empowerment undoubtedly speeds up employees' responses to any production mistakes. As a result, there are fewer expenses related to staff response times to possible mistakes [13].

1.4 Management of Suppliers

Supply quality is crucial for TQM as it directly impacts other parties involved in the same process. In the manufacturing sector, maintaining strong relationships with suppliers is essential for ensuring high-quality end products [14]. However, focusing solely on price can undermine trust and build lasting partnerships [1]. Professionals should use cost and alternative criteria during pre-qualification to address competitive bidding issues and foster cooperative relationships with suppliers [20].

1.5 Education and Training

TQM requires a commitment to education and training for employees to participate in decision-making and quality improvement processes [21]. Manufacturing organizations often overlook staff training due to cyclical labor [14]. To address this, a quality awareness program should be implemented, offering high-quality awareness training to raise upper management's understanding of quality. Altering corporate culture is crucial for achieving TQM, with learning and training being key factors. Providing employees with training can enhance problem-solving abilities [21].

1.6 Process management

The result-oriented management approach has replaced it with a critical process approach, focusing on identifying critical processes and implementing systematic improvements [14]. Addressing root causes of scrap and rework is crucial for minimizing issues [22]. Due to fragmented manufacturing projects, businesses should focus on party miscommunication and implement remedial steps to enhance procedures [23].

1.7 Comparative analysis

Benchmarking helps businesses compare best practices with their operations, identifying flaws and gauging performance. It helps identify industry best practices and applies them to their operations. Companies should monitor market advancements and use benchmarking to improve quality management by modifying quality boundaries and identifying critical metrics.

1.8 Measurement of performance and quality data

Information is crucial for TQM as it allows decision-makers to act based on available data, enabling continual improvement and learning from past mistakes [14]. Manufacturing companies can gather information through internal procedures and supplier performance data, as these resources are essential for evaluating operations and assessing the quality of goods and services.

2. Research Methodology

In this research, a structured approach is adopted to develop eight categories of TQM CSFs common for ISO-certified manufacturing organizations. The report starts by reviewing relevant published studies on TQM to extract the generally cited CSFs and selected studies, which focused mainly on manufacturing and ISO certification. This activity identifies identical factors that fall into common themes, such as "Employee Involvement" and "Employee Empowerment," which fall into the broad theme of **Employee Engagement**. The categories are,

therefore refined and validated by means of expert feedback in order to ensure that they only capture the most important elements toward effective TQM implementation in contexts that have been ISO certified.

2.1 Hypothesis Development

Research on Total Quality Management (TQM) implementation in manufacturing companies often overlooks the impact of ISO certification. This study examines the differences between ISO 9001-certified businesses with and without TQM approaches to establish a roadmap for TQM deployment in these companies, proposing two hypotheses based on these differences.

- H1: By achieving an ISO 9001, the companies can achieve all of the TQM CSFs.
- H2: After acquiring ISO 9001, the enterprises must exert greater effort and devote more resources in order to meet the TQM CSFs.

2.2 Questionnaire Design

A two-section questionnaire was used for an investigation, focusing on companies, skills, and competencies. The first section asked respondents about their companies, size, type, headcount, and prior experience. The second segment assessed the application levels of 24 TQM CSFs in their organizations using a 1-to-5 Likert scale.

2.3 Data Collection

The organization is the unit of analysis for this study. This paper is concerned with ISO-certified manufacturing firms because the aim of the research is to understand the implementation of TQM practices within the firm. The organization as a unit of analysis is aptly chosen for the reason that the research focuses on TQM-related factors and practices at the organizational level, such as top management commitment, employee involvement, and supplier management, which are key to effective TQM strategies.

Pakistan's manufacturing industry is a global leader, with 44 companies on the "World's Top 250 International Contractors". With 333 manufacturing enterprises having ISO 9001 certification, Pakistani enterprises are well-versed in international projects and quality management systems [3]. This study focuses on these enterprises, focusing on those meeting ISO 9001 qualification requirements. The study involved web research to gather more information and boost the validity of the study. 75 of the companies out of 333 were sampled purposively because this sampling technique is used to ensure that the sample is highly relevant to the research objectives. Since this study concerns the TQM implementation in the firms ISO certified, companies with ISO 9001 certification were considered. In addition, 16 firms were selected from the **Pakistan Quality Association (PQA)** to ensure that firm commitments exist to quality management practices. The remaining firms were selected to provide a range of sectors which ensures that the sample would represent a comprehensive and appropriate one for analyzing patterns of TQM in different contexts. Purposive sampling was used to select participants from 75 manufacturing companies, with 16 being PQA members and the remaining 16 not. Three criteria were established for the study: managerial roles, at least four years of ISO certification expertise, and a bachelor's degree. The study received 40 completed questionnaires, yielding a 53.33% overall response rate. The respondents were mostly big businesses with an average experience of 27.31 years, and their knowledge of quality management practices was broad. Out of the respondents, 22 said their companies had implemented TQM, and 18 said TQM had not been implemented in their organizations.

Table 2 *Profile of companies and respondents participated in the study*

Manufacturing Company	Number of Responses	Role of the Respondents	Number of Responses
Small	3 (7.50%)	Manager	11 (27.50%)
Medium	18 (45.00%)	Quality Department Manager	24 (60.00%)
Large	19 (47.50%)	Engineering Department Manager	5 (12.50%)

3. Data Analysis

In order to identify significant variations in the Continuous Support Function (CSF) application levels across businesses using and not using the TQM strategy, this study employed an independent t-test analysis. There were forty completed surveys, which is enough for statistical analysis because of the central limit theorem and the fact that t-tests may be performed even with very small sample sizes. Instead of concentrating on the quantity of data, the study examined the quality of the data because random sampling could produce an answer that is more generalized and untrustworthy. Since the independent t-test has advantages over other statistical techniques, it was selected for comparison. Before performing the t-test, six prerequisites had to be checked: the dependent

variable had to be measured on a continuous scale; the independent variable had to have two categorical independent groups; the observations had to be independent; outliers in the data set had to be found; the Shapiro-Wilk test was used to determine whether each CSF was normal; Levene's test was used to determine whether each CSF's variances were homogeneous. The dataset was judged appropriate for analysis using the independent t-test, and the results are shown in Table 3.

Table 3 *TQM elements of the clusters*

CSF's	Implementing TQM Companies	Not Implementing TQM Companies	t value	Significant (P)
CFS1	4.54	3.93	3.071	0.003
CFS2	4.76	4.38	2.567	0.014
CFS3	4.49	3.21	4.995	0.000
TMCL1	4.22	3.60	2.883	0.006
TMCL2	4.67	3.93	3.925	0.001
TMCL3	4.54	3.16	3.310	0.001
EIT1	3.90	2.99	2.614	0.012
EIT2	3.95	3.60	3.086	0.004
EIT3	4.40	3.38	3.058	0.003
EIT4	4.43	4.43	3.097	0.004
SM1	4.67	3.05	1.374	0.165
SM2	4.31	3.38	4.491	0.000
SM3	4.49	4.43	4.354	0.000
TL1	4.22	3.05	5.503	0.000
TL2	4.04	3.38	8.247	0.000
TL3	3.63	2.38	3.040	0.003
PM1	4.08	2.05	3.246	0.002
PM2	4.07	2.55	2.388	0.021
PM3	4.22	3.22	2.439	0.018
PM4	3.76	3.32	1.286	0.205
BM1	4.35	3.66	3.722	0.001
BM2	4.13	3.32	2.813	0.007
Q1PM1	4.72	3.60	5.866	0.000
Q1PM2	4.81	3.82	4.839	0.000

This table includes the Critical Success Factors (CSF's), ratings for companies implementing and not implementing Total Quality Management (TQM), t-values, and significance levels.

The typical application levels of Quality Control Systems (CSFs) in businesses that implement and do not implement TQM are displayed in Table 3. Businesses with TQM use CSFs more frequently than non-TQM businesses. Some CSFs, such employing external customer needs and building long-term partnerships with suppliers, are applied at a high level by non-implementers of TQM. Businesses without TQM implement TQM at a lower level, for example, by not educating staff members about quality awareness or providing them with tools and techniques for quality management.

Hypothesis testing:
- H1: ISO 9001 certification can improve all of the TQM CSFs for firms. This hypothesis was significant as indicated by the statistical analysis (p-value < 0.05). The results indicate that companies with the ISO 9001 certification are more likely to make effective use of the herein identified TQM CSFs.
- H2: Enterprises need to apply greater effort and resources after acquiring the ISO 9001 in order to meet the CSFs of TQM.

This hypothesis was also significant at p-value < 0.05. The results indicate that ISO 9001-registered organizations do have to put additional time and resources to fully meet the demands of TQM, hence, indicating that ISO certification alone is not sufficient to implement TQM fully.

4. Conclusion

The report offers a road map for ISO certified companies to implement TQM. The five priority groups are measuring internal customer satisfaction (t-vale=4.996), providing quality awareness training (t value=8.248), teaching staff members quality management strategies (t-value=5.504), and collecting and analyzing supplier product data (t-value=5.867). The most notable distinctions between ISO certified firms with and without TQM may be seen in these characteristics, suggesting that the former should make investments in Very High Priority CSFs to expedite their transition to TQM. Following advancements in these areas, businesses ought to concentrate on high priority areas. The final set of CSFs has already been attained at comparable levels in all ISO certified businesses, indicating that investing in these CSFs following ISO certification is unlikely to yield significant results.

The study found that companies implementing TQM have a higher level of quality awareness education, with a rate of 4.05 compared to 2.06 for non-implementing companies. This indicates that companies aim to create a quality culture within their organizations by increasing employee awareness. However, obtaining ISO 9001 alone is not enough to improve training and learning abilities in manufacturing companies. The main t-values for sub-CSFs for each main CSF were highest for training and learning, indicating that obtaining ISO 9001 alone is not sufficient. The study also found that process management-oriented CSFs had the lowest t-values, indicating that companies take immediate corrective actions in their processes. ISO 9001 is expected to contribute significantly to improving companies' performance in the process management category.

Due to limitations in design and technique, this study may have certain drawbacks. The roadmap is based on the opinions of Pakistani manufacturing professionals, who may have been swayed by industry-specific variables. Still, there are universal standards for ISO certification requirements, therefore all businesses should adhere to the same procedures. The researchers carefully chose individuals and utilized three criteria to determine competency, removing specialists who did not match these standards. However, the sample size may still be a restriction.

The study creates a roadmap for ISO 9001-certified businesses by identifying distinctions between those who use and don't use TQM. Businesses with ISO 9001 certification can enhance their operations by emphasizing internal customer satisfaction assessment, training, quality data, and education about quality awareness. On the other hand, TQM prioritizes quality criteria, whereas ISO 9001 does not standardize supplier selection criteria. Implementing ISO 9001 can help businesses perform better operationally, however not all of them can demonstrate strong organizational performance. Companies must invest heavily and use a methodical strategy in order to move from ISO 9001 to TQM. It is not a simple effort to make this change; in order to attain the necessary crucial factors for successful implementation, certain investments must be made.

Acknowledgement

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Contribution

Zohaib Khan: **Conceptualization, Methodology**. Zohaib Khan: **Formal analysis, Data curation, Writing – original draft, preparation, Software**. Yusri Bin Yusof: **Investigation, Writing – review & editing**.

Appendix A: Questionnaire

This research is focus on "A COMPREHENSIVE STUDY OF TQM PRACTICES ON MANUFACTURING ORGANIZATIONAL PERFORMANCE WITH THE RELATIONSHIP OF SAFETY CULTURE AND ISO 9001" and having objectives:

(i)   To determine the relationship between TQM practices and organizational performance in the manufacturing sector of Pakistan.
(ii)   To determine the relationship between safety culture and organizational performance in the manufacturing sector of Pakistan.
(iii)   To determine the relationship between ISO 9001 and organizational performance in the manufacturing sector of Pakistan.
(iv)   To evaluate the mediating effect of safety culture on the relationship of TQM practices with organizational performance in the manufacturing sector of Pakistan.
(v)   To evaluate the mediating effect of ISO 9001 on the relationship of TQM practices with organizational performance in the manufacturing sector of Pakistan.

Section A:
Demographics (Please fill in the blanks or check the box where necessary)

1. What is the main production of your industry?
Textile Products
Food Products
Plastic Products
Metal Products
Electronic Products
Others (Please Specify): ……………………………

2. **What certification is utilized in your industry?** (You may Tick more than one)
OHSAS18000
ISO9001
ISO 14001
Others (Please Specify): …………………………

3. **What is your academic qualification**?
Diploma
Degree (Bachelors)
Masters
Ph.D.
Others (Please Specify): ……………………………………

4. **How long you have been working in manufacturing industry?**
0 – 5 Years
6 – 10 Years
11 – 15 Years
16 – 20 Years
21 – 25 Years
More Than 25 Years

5. **What is your current designation in your company?**
Engineer
Health and Safety Manager
Production Manager
Quality Assurance Officer
Others (Please Specify): ……………………………………

6. **How long have you been in your current position in the industry?**
Less than One year
1 to 3 years
4 to 6 years
More than 6 years

This section asks about your perceptions of performance with in the manufacturing our industry in Pakistan. Please indicate the extent to which you disagree or agree with each statement by circling the most relevant response.
Likert scale
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Section 1 *Total quality management practices*

Customer Focus	1	2	3	4	5
Our company always identifies the customer needs and expectation by staying focus					
Our company has managers and supervisors which encourage activities on the customer satisfaction improvement					
Our company has the latest updated services to satisfy the customers according to their demand					
Our company provides information about customer understanding and perceived product values.					
Our company implemented any mechanism for checking and validating repeated orders.					
Supplier Relationship and Management					
As well as being fully aware of customers' needs and expectations, each person must respect the needs and expectations of their suppliers.					
Supplier satisfied with the quality and level of information contained within contracts issued by this organization					
Problem issues are identified, necessary action plans agreed and progress monitored by both parties					
Your personnel are fully trained to negotiate, follow up, and fulfil organizational needs					
Payment method is complex.					
Strategic Planning					
Industry employees are given adequate time to plan for and test improvements					
Each department and work group within this industry maintains specific goals to improve quality					
Middle managers (e.g., department heads, program directors, and first line supervisors) are playing a key role in setting priorities for quality planning					
External customers are playing a key role in setting priorities for quality planning					
Non-managerial employees are playing a key role in setting priorities for quality planning					

Section 2 *ISO 9001*

Organizational Leadership	1	2	3	4	5
Leadership of my organization was actively involved during implementation of ISO 9001:2015					
Organization leadership provides proper work environment for its employees to perform their tasks efficiently					
Leadership of my organization has demonstrated accountability for quality					
My organization's leadership considers the ISO 9001:2015 management system as one of the strategic operational activities for my organization					
My organization's leadership provided sufficient resources (e.g., time, funds, facilities, personnel) to support the ISO 9001:2015 implementation process					
Customer Requirement					
Customer requirements are fulfilled and controlled effectively with ISO 9001 standard implementation					
Continual improvement programs are always adopted by our organization					
Employees do their tasks efficiently with ISO 9001 implementation					
Sufficient training program in ISO 9001 awareness and implementation was provided to all organization's staff					
The audit procedure for ISO 9001 prevents stagnation and promotes improvement of the QMS.					
Defect Prevention					
Company's efficient product and process design					
Product's conformance to specifications in accordance with audit results					
Reduced non-conformity problems through quality processing, storage, packaging and delivery					
Products and procedure's control throughout production steps					

Section 3 *Manufacturing performance*

Equipment performance	1	2	3	4	5
The safety measures require workers to wear personal protective equipment.					
Safety performance to make people receive the necessary training to avoid accidents and maintain safety.					
Our company has good maintenance system which minimizes the losses.					
Safety procedure is implemented throughout the process to ensure the better performance.					
Ergonomic equipment/tools are utilized in the process/project to ensure better performance.					
Safety performance report					
Our company keeps records of occupational injuries and illness that occur among their workers					
Our company keep record near miss incident.					
Our company keeps record of occupational fatal accident among the workers					
Our company has properly record the workers compensation bonuses reports.					
Our company keep record of injuries which occur due to cargo (transportation).					
Employees performance					
Our employees have the ability to plan and undertake work in an organized manner while identifying priorities.					
Our company implementing the right safety policies significantly contribute to the success of a safety performance.					

[17] Mikalef, P., Islam, N., Parida, V., Singh, H., & Altwaijry, N. (2023). Artificial intelligence (AI) competencies for organizational performance: A B2B marketing capabilities perspective. Journal of Business Research, 164, 113998. https://doi.org/10.1016/j.jbusres.2023.113998

[18] Ibidunni, A. S., Nwaodu, B. Y., & Mdaka, L. E. (2023). Bringing quality management to perspective in higher education institutions' research output: A focus on selected private universities in Nigeria. Heliyon, 9(4). https://doi.org/10.1016/j.heliyon.2023.e15443

[19] Khan, Z., Mastoi, R. B., Mastoi, S., Rajput, U. A., & Binti Abas, N. H. (2021). ISO certifications in pakistan: patterns & application. *KHAN, Z., et al., ISO Certifications in Pakistan: Patterns & Application. International Journal of Management*, *12*(3), 403-415

[20] Kędzia, G. (2024). The ambiguous impact of supplier involvement in product development on supplier relationship resilience and company performance. Central European Management Journal. https://doi.org/10.1108/cemj-02-2023-0095

[21] Wassan, A. N., Memon, M. S., Mari, S. I., & Kalwar, M. A. (2023). Identifying the critical success practices of sustainability and their implementation in the manufacturing sector of Pakistan: an exploratory factor analysis. Journal of Applied Research in Technology & Engineering, 4(1), 37-53. https://doi.org/10.4995/jarte.2023.18623

[22] López, M. (2023). The effect of sampling mode on response rate and bias in elite surveys. Quality & Quantity, 57(2), 1303-1319. https://doi.org/10.1007/s11135-022-01406-9

[23] Vankelecom, L., Loeys, T., & Moerkerke, B. (2024). How to Safely Reassess Variability and Adapt Sample Size? A Primer for the Independent Samples t Test. Advances in Methods and Practices in Psychological Science, 7(1), 25152459231212128.S. https://doi.org/10.1177/25152459231212128