

Comparative Performance Analysis of ISO-Certified and Non-ISO-Certified Companies

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Abstract

A comprehensive review of the extant literature on ISO Management System (IMS) standards-certified companies conceded into major business performance improvement factors and elements. The worldwide activities of ISO Development of International Standards Total as of the end of December 2023 are 25111 International Standards and standards-type documents. ISO population data files for the years 2018, 2019, 2020, and 2021) show the standards used for certification in Pakistan besides world ISO population data. In 2023, a total of 1,465 International Standards and standards-type documents were published. Due to space limitations in the research paper, only one data file is attached to this paper. The most popular and populous standard among all is the ISO 9000 Quality Management System (QMS) standards adopted in Pakistan. The identified factors and elements /items were reviewed and converted into criteria set and framework. The analysis of this secondary experiential data shows that IMS standards certification improves the businesses' performance.

A survey questionnaire was designed on these business performance improvement factors and elements and pilot-tested to establish its 'Reliability and Validity'. This questionnaire was used to collect national primary empirical data from both IMS standards-certified and non-certified businesses in all chambers of commerce and industry in Pakistan, including women's chambers. The analysis of this national primary empirical data also shows an impact of IMS standards certification on businesses' performance. Hence, it supports the results of secondary ISO experiential data analysis. Also, in comparative performance analysis, the IMS standards-certified businesses outperformed the non-certified businesses. The IMS standards certification contributes to the prosperity, sustainability, technical, managerial, financial, Operational, communication, social, and environmental improvement, etc. of the businesses, thus increasing the national GDP. This improvement trend ultimately helps in attaining SDG goals set by the UN for all nations.

Keywords

ISO Management System Standards, Business Performance Improvement, Comparative Performance Analysis, Quality Management, Operational Improvement.

Introduction

The worldwide activities of Development of ISO International Standards stand total at the end of December 2023 are 25111 International Standards and

standards-type documents. In year 2023, a total of 1465 International Standards and standards-type documents were published (ISO in figures 2023, 2024). This output represented a total of 77 941 pages (ISO.org, 2024). ISO population data files for the years 2018, 2019, 2020, and 2021 show the status of ISO standards used for certification in Pakistan besides world certification status. However, due to the paucity of space in the research paper, only one data file from Pakistan is shared here (see Table 1). The most populous among all ISO standards is the ISO 9000 Quality Management System standards adopted in Pakistan ISO Survey (2018, September); ISO Survey (2019, September), and ISO Survey (2020, September).

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Table 1
Total ISO Management System Standards certificates gained by Pakistan in the year 2018, 2019 & 2020

Standards	Total Certificates 2018	Total Certificates 2019	Total Certificates 2020	Growth Rate (2018–2019)	Growth Rate (2019–2020)
ISO 9001	2264	2388	2016	5%	–18%
ISO 14001	473	543	532	13%	–2%
ISO IEC 27001	34	32	35	–6%	9%
ISO 22000	225	217	140	–4%	–55%
ISO 45001	22	76	212	71%	64%
ISO 13485	339	354	303	4%	–17%
ISO 5001	13	16	5	19%	–220%
ISO 20000-1	3	4	4	25%	0%
ISO 22301	2	2	2	0%	0%
ISO 28000	1	1	1	0%	0%
ISO 39001	0	0	0	0%	0%
ISO 37001	0	1	0	100%	100%
TOTAL	3376	3634	3250	7%	–12%

In today's business environment, the pursuit of business excellence is imperative for sustainability, growth, and competition. IMS standards certification, especially the ISO 9000 QMS standards, being a basic quality standard, is to achieve higher quality, efficiency, productivity, and competitiveness. ISO 9000 is a globally recognized populous quality management system standard. It provides a framework for organizations to establish robust quality assurance systems. Attaining the ISO 9000 quality management system standards certification not only signifies a commitment to quality but also unlocks new market opportunities. Many industries now mandate ISO certifications, thus initiating significant quality improvement efforts as shown in Table 1.

In essence, IMS standards certifications serve as transformative tools, propelling businesses towards higher market share and financial robustness. IMS standards certification practices are reported in the literature of reputed journals as case studies (Nawar et al., September 2022 and March 2023).

Matradi and Mounir (2022) delved into the significance of ISO 9000 QMS certification for businesses, considering the substantial expenses involved. They explored the growing emphasis that decision-makers place on attaining/maintaining this certification and the financial advantages it could yield for their companies. The research focused on the attainment of Quality

Management Systems (QMS) standards certification received in management circles, particularly examining the impact of ISO 9000 QMS certification on firms' financial performance. This approach aimed to establish a clear connection between ISO 9000 QMS certification and firms' financial performance by analyzing existing empirical research data on the topic.

Kartha's (2022) study identifies a critical research gap in the lack of direct comparison between companies with and without ISO standards certification. Numerous studies focus on pre-and post-implementation financial assessments, while few delve into direct comparative performance analyses. (aimed to create a roadmap for ISO 9000-certified construction firms transitioning to an effective Total Quality Management (TQM) philosophy.

Saputra and Zulkifli's study (2023) illustrates the financial prowess of companies certified to ISO 14001 Environmental Management System (EMS). Their analysis of financial data spanning several years reveals that ISO 14001 EMS certified companies demonstrate superior financial performance compared to non-certified counterparts. This financial strength emanates from a holistic commitment to integrating business interests with environmental concerns, thus showcasing how environmental management standards profoundly influence financial outcomes.

Table 2 shows the synthesized criteria set of major business performance improvement factors and elements/items from the secondary experiential IMS certification data source.

The most relevant publications were used to develop the initial propositions for this large-scale research study which are:

- IMS standards certification has a positive improvement impact on the businesses' performance
- In comparative performance analysis, the IMS Stan-

dard Certified companies outperform the Non-IMS Business Companies.

A survey questionnaire was designed to collect national-level primary empirical data of both IMS-standards-certified and non-certified companies to carry out its comparative performance analysis. This questionnaire is based on the synthesized and reviewed criteria/framework of business performance improvement factors and elements already identified, reviewed, and synthesized by the ISO focus group.

Table 2
Synthesized Criteria Set of Business Performance Improvement Factors and Elements

S. No	Factors	Elements/items	No of Elements	Frequency
1	Financial Performance	Finance Performance improved, Reduce Cost, Reduced manufacturing cost, Business efficiency, Sales Increased	5	124
2	Quality Assurance	Quality Awareness, Quality of Product/ Service, Develop Quality Management, Quality Management Practices	4	94
3	Customers' Satisfaction	Customer Satisfaction increased	1	68
4	Employees' Satisfaction	Employee motivation, Employee Satisfaction, Employee skills (Training), Human Resource Management, Job satisfaction	5	66
5	Market Potential	Market potential, Access to the international market, competition internationally, Market Efficiency, Exports increased, market share increased, Marketing tool, Goals Achieved	8	68
6	Operational Improvement	Operational Improvement, Operational efficiency, Productivity, Growth of Production, Growth rate, Safety Performance	6	56
7	Company Performance	Company performance, Company image, Company Size, Company Reputation, Company culture / Organizational culture improved.	5	66
8	Continuous Improvements	Continuous Improvement, Reduction in Complaints, reduction in Waste, Delivery on-Time, Reduce Errors, Risks Minimize, Process improvement.	7	56
9	Top Management Performance	Top Management Performance, Top Management Support, Top Management Commitment, Administration Improved.	4	42
10	Communication	Documentation, Communication.	2	32
11	Stakeholders Relations	Stakeholders Relations, Build relations with suppliers	2	28
12	Environmental Improvement	Environmental improvement, performance improvement, Environmental sustainability, Environmental Awareness, Reduction of Pollution, Environmental Management	6	16
13	Competition	Competition, Competitive Advantages	2	9

TOTAL FACTORS = 13 ELEMENTS = 57 FREQUENCIES = 740

Materials & Methods

This research project comprises both qualitative and quantitative data analysis. The quantitative part includes a collection of primary national-level data from all chambers of commerce and industries of Pakistan and its summary is shown in Table 3.

Table 3
Summary of Chambers of Commerce and Industry of Pakistan

Total Chambers Identified: 71	Federal Chambers – FPCCI: 2	Provincial Chambers: 69
Total Chambers Contacted: 71	Responsive Chambers: 54	Non-responsive Chambers: 17
Total Provincial Chambers: 69	Male Chambers: 52	Women Chambers: 17
Total Male Chambers: 52	Male Chambers Responsive: 39	Male Chambers Non-responsive: 13
Total Women Chambers: 17	Women Chambers Responsive: 13	Women Chambers Non-responsive: 4

Recently, the number of chambers has significantly increased, with a chamber now established in each division of a province, resulting in a total of 71 chambers of commerce and industries, including 17 women's chambers. This setup represents the entire business community of Pakistan in the commercial sector. Junior, middle, and senior managers in the commercial business sector directly experience the impact of ISO certification. It is the most justified and logical platform for collecting Pakistan national data from both IMS-certified and non-certified commercial companies in a systematic manner.

Members of these chambers of commerce and industries were approached via emails, telephonic calls, and a survey form provided on Google link. The survey questionnaire was administered after conducting the pilot tests with participants from both IMS and non-IMS-certified companies within provincial and federal chambers of commerce and industries. The questionnaire was then served via a dedicated Google platform and emails to all 71 chambers of commerce and industries in Pakistan, including women's chambers. Respondents to the survey questionnaire included junior, middle, and senior managers from both the IMS and non-IMS-certified companies. The data collected was subjected to descriptive verification tests and analysis.

This research paper is based on a major project spanning over two and a half years by the HEC of government of Pakistan. Therefore, the Chamber of Commerce and industries were the most appropriate formal platform to represent both IMS-certified and non-IMS-certified businesses. In the past, each province had only one chamber of commerce and industries (a total of four chambers in Pakistan). However, the number of chambers has recently significantly increased, with a chamber now established in each province division, resulting in 71 chambers of commerce and industries, including 17 women's chambers. This setup represents the entire business community of Pakistan in the commercial sector. Junior, middle, and senior managers in the commercial business sector directly experience the consequences and impact of the ISO certification. It is the most justified and logical platform for collecting official data from both IMS-certified and non-certified commercial companies in Pakistan in a systematic manner.

A brief description of the sequence of action of a long, tedious, and cumbersome research process is narrated here for data collection, testing, and analysis. After uploading the survey questionnaire to the dedicated link, persuasion continued in a cascaded manner to all chambers of commerce and industries in Pakistan. Five rounds of written reminders followed by personal telephone calls made to the key appointment holders in each chamber of commerce and industry. Each round was conducted after a time break of one week. Then, the received data were downloaded in three separate streams/formats. One data stream was for the IMS standards-certified companies' performance analysis. The second data stream was for non-IMS-certified companies' performance analysis. The third data stream was a mix of both IMS standards-certified and non-IMS companies' data for comparative performance analysis. A total of 379 valid responses were received, out of which 192 belonged to IMS standards-certified companies, and 187 were from non-IMS business companies.

Conceptual Research Framework

The research design is based on the proposition that IMS standards certification has a higher performance than the non-IMS standards-certified businesses' performance. The secondary experiential data analysis provided sufficient information to conclude that IMS standards certification (act as independent variable) positively impacts business performance (act as dependent variable), as reflected in Figure 2. However, no holistic Pakistan national-level primary data is available to support this notion. Also, there is no

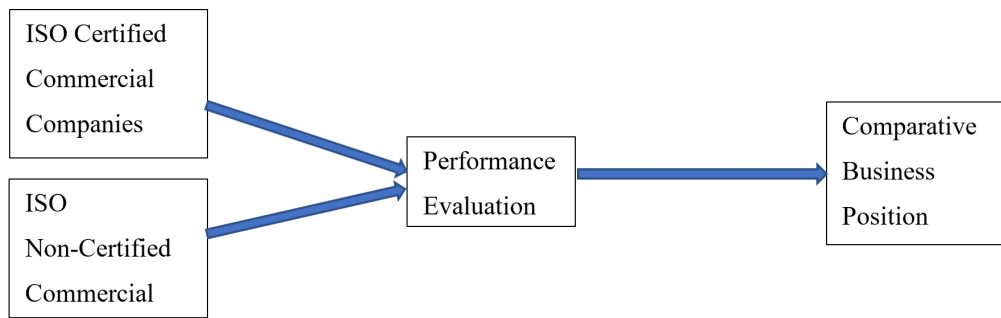


Fig. 2. Research procedure

published secondary data reflecting the performance analysis of non-IMS companies for comparison with IMS standards-certified companies. This research gap is filled by the present mega research project, which is of great academic and commercial importance.

Data Analysis and Results

The survey data was converted into Excel sheets. Then, the Excel sheets were converted into an SPSS variable view and codified for treatment and analysis. Finally, the 'SPSS data view file' was extracted in CSV format for SmartPLS analysis. At this stage, the survey data was ready for the performance of many test analyses, a brief comment on each test performed is also narrated here.

Test No 1: Confirmatory Factor Analysis (CFA) Level 1

Confirmatory Factor Analysis (CFA) is a statistical technique used to verify the factor structure of a set of observed variables. CFA allows the researcher to test the hypothesis that a relationship exists between observed variables and their underlying latent constructions. The threshold value should be greater than 0.75. In this case, all values are greater than 0.75 and no item was deleted. There is no need to add results of CFA level 2 here.

Test No 2: Normality Test (Skewness and Kurtosis)

A normality test determines whether sample data has been drawn from a normally distributed population or otherwise. The threshold value of Skewness is ± 2 , and kurtosis is ± 7 . All the results fall within the specified range. Hence, the data collected is normally distributed.

Test No 3: Reliability (Cronbach's Alpha)

The threshold value of Cronbach's alpha is 0.7 and above. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. It is a measure of Scale Reliability. The values in both IMS-certified data and non-IMS-certified data are above the threshold value. Hence, it can be concluded that the research variables are Reliable. The Average Variance Extracted (AVE), is commonly used to validate constructs. In statistics, AVE measures the amount of variance a construct captures about the amount of variance due to measurement error. The range of AVE should be higher than 0.50. The Survey Questionnaire is Reliable.

Test No 4: Construct Reliability and Validity

The threshold value of Cronbach's alpha is 0.7 or above. This test is also performed on SmartPLS to calculate the Reliability and Validity of the constructs. All the values fall within the permissible range, which means the questionnaire is understandable to the respondents.

Test No 5: Path Coefficient (Correlation)

Correlation is used to validate the survey questionnaires. It has been proven that both IMS-certified and non-certified companies have significant values. If the coefficient value lies between ± 0.50 and ± 1 , then it is said to have a Strong Positive Correlation. For moderate degree correlation, the value falls between ± 0.30 and ± 0.49 , a Medium Positive Correlation. For a low degree correlation, the value falls below ± 0.29 , which is said to have a weak correlation.

Correlation is significant at the 0.01 level (2-tailed).
Correlation is significant at the 0.05 level (2-tailed).

Test No 6: HTMT

The discriminant validity using the HTMT criteria is set at 0.85. The discriminant validity assessment aims to ensure that a reflective construct has the strongest relationships with its indicators (e.g., in comparison with any other construct) in the PLS path model (Hair et al., 2021). This indicates the presence of collinearity in the latent constructs (multi-collinearity). There is no collinearity in both data sets. Hence, the collected data is Reliable.

Test No 7: Two Pair Test – Factor-To-Factor and Element-to-Element Comparison

The Paired Samples T-Test compares the means of two measurements taken from the same individual, object, or related units. These “paired” measurements can represent things like measurements taken at two different times. As the means of IMS-certified companies is greater than that of non-IMS-certified companies, hence the IMS certified companies perform better than non-IMS-certified companies.

Test No 8: R Square

The threshold value of R Square is 0.7. R-squared is the Coefficient of determination. It is a statistical measure of fit that indicates how much variation of a dependent variable is explained by the independent variable. An R-squared of 60% reveals that 60% of the variability is observed in the target variable, which the regression model explains.

Test No 9: Model Fit

Goodness-of-Fit (GoF) has been developed to measure model fit for PLS-SEM. However, as the GoF cannot reliably distinguish valid from invalid models and its applicability is limited to certain model setups, researchers should avoid using it as a goodness of fit measure. The GoF may be useful for a PLS multigroup analysis (PLS-MGA).

$SRMR < 0.08$ and $NFI > 0.90$

The values of SRMR are < 0.08 , which shows a good fit, and the values of NFI < 1 also show a good model fit.

Discussion

The overall results of the numerous tests performed provide ample primary empirical evidence to support the propositions presented by the secondary experiential data analysis that implementation of IMS standards certification has a positive impact on a business

overall performance. Also, in comparative performance analysis, the IMS standards-certified businesses perform better than the non-IMS standard-certified businesses in all tests.

The following are the main recommendations offered.

- To improve business performance, all stakeholders – commercial business companies, customers, employees, stakeholders, academicians, and the government – should create awareness and training programs for all employees and management on implementing and certifying ISO management system standards in all types of businesses.
- The businesses' performance improvement due to IMS standards certification shall encourage, motivate, and facilitate the implementation of IMS standards certification in all public and private sector companies, irrespective of the nature and size of businesses operating all over Pakistan.
- To attain the accrued benefits, all stakeholders – commercial business companies, customers, employees, stakeholders, academicians, and the government – should make it mandatory (indirectly) for all non-certified local and export-oriented commercial businesses to implement the ISO management system standards certification.
- The boundary of knowledge on business performance improvement due to IMS standards certification and its comparative edge over non-IMS certified businesses have been extended to new heights by collecting national empirical data, analyzing, and disseminating information in seminars, conferences, and publications.
- The reports of this research project have been shared with FPCCI and all chambers of commerce and industry of Pakistan, including women's chambers in provincial workshops/seminars, national conferences, and emails for their information and necessary actions.
- The comparative performance improvement results shall inspire non-IMS business companies to opt for implementing IMS standards certification. This decision can lead to a win-win situation for all stakeholders: commercial business companies, customers, employees, stakeholders, government, and the UN.

Conclusions

This research project has extracted evidence from the world literature on business performance improvement factors and elements due to IMS standards certification. This secondary experiential data analysis yields 13 significant factors and 60 elements/items of business performance improvement to make a framework.

The secondary experiential data of IMS standards certification shows a positive impact on the performance improvement of business companies.

A reliable and validated questionnaire was developed to collect national-level empirical data on IMS standards-certified and non-certified companies from all chambers of commerce and industries in Pakistan. This national primary empirical data analysis also shows a positive impact of IMS standards certification on business performance improvement. Also, in comparative performance analysis, the IMS standards-certified commercial companies have shown an edge over the non-certified commercial companies in Pakistan. The IMS standards certification contributes to improving businesses in terms of prosperity, sustainability, technical, managerial, financial, operational, and environmental improvement, etc., thus increasing the national GDP. This trend ultimately helps attain SDG goals set by the UN for all nations.

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