



Sustainable Development Initiatives Through ISO 9001:2015

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and extent of control.

Abstract

After addressing the risk and opportunities an ISO 9001 certified organizations strive for sustainability. Sustainable development initiatives could be achieved by the effective implementation of ISO 9001:2015. The *Quality Management System* eventually improves the capability of the certified organization to yield consistent services and products that fulfil customer requirements along with applicable regulatory and statutory requirements. The Research data was collected by conducting an onsite assessment of 533 ISO 9001 certified organizations in ten countries. This research study is focused on those elements of the standard which indicate the organizations' abilities to demonstrate consistency in delivering services and product such as understanding the expectations and needs of the identified interested parties, customer focus, control of externally availed services, process, products including the type and extent of control. The extent of conformance to the criteria is quantified using a five-point Likert scale and the primary data collected by visiting onsite was analyzed using *Jamovi* software. Specific elements of the standard were focussed in this research study to conduct a cross-country examination with respect to the classification of organizations, their maturity level of the management system. This study indicates that 81.9% of the sample demonstrate adequate evidence to determine that ISO 9001 Certified organizations effectively implementing Quality Management Systems.

Disciplinary: Industrial, Productivity, and Quality Management, Business Management, Organization & Reliability Management.

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1 Introduction

The sustainable development goals established by the United Nations are partly supported by the *Quality Management System* through ISO 9001:2015 standard and other relevant ISO standards such as ISO 14001:2015 *Environmental Management System*, ISO 45001:2018 *Occupational Health & Safety Management System*, ISO 50001:2018 *Energy Management System*, etc. This research study is confined to the ISO 9001:2015 standard and its influence on the organizations towards sustainable development. Adoption of the criteria determined in the ISO 9001 standard would provide a firm ground for sustainable development initiatives to the certified organization. One of the potential benefits to the certified organization with the implementation of the *Quality Management System* is its ability to consistently deliver services and products which would fulfil customer requirements and applicable regulatory and statutory requirements.

International Organization for Standardization (ISO) publishes standards and the most popular among the ISO Standards is the ISO 9001 *Quality Management System*. ISO has published the very first standard on *Quality* in 1987 and ever since then the standard has undergone revisions to meet the changing requirements and market scenario. The current version of the *Quality Management System* is ISO 9001:2015. This standard has gained the attention of every business sector irrespective of the nature, size, complexity of the organization this standard provides the greatest flexibility to adapt the requirements to suit the scope of each business.

To get certified for ISO 9001:2015 the organization adopting *Quality Management System* should demonstrate compliance with the requirements of the standard and the organization should be a legal entity. The Compliance to the regulatory and statutory requirements applicable to the ISO 9001 certified organization ensure the fulfilment of the Sustainable development goals determined by the United Nations such as Industry Innovation and Infrastructure, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Gender Equality, Reduced Inequalities, Decent Work and Economic Growth, Affordable and Clean Energy, Life on Land, Life Below Water.

The evidence of conformance is determined through an onsite assessment of the certified organization. The regulatory and statutory requirements would to a great extent vary for each country and state hence this research study is limited to the jurisdiction of India. Given below are some of the examples of evidence of compliance demonstrated by the certified organizations:

Factory License 2) Provident Fund Returns, 3) Employee state insurance corporation Returns, 4) Minimum Wages Form-III Annual Returns, 5) Form IV Annual Return of Payment of Wages Act, 6) Gratuity Renewal, 7) Employee Health Insurance, 8) Form 22 Factory Act Half Yearly Returns, 9) Form 21 Factory Act Annual Returns, 10) Form-A List of Holidays, 11) Testing and Examination of Pressure Vessels under Factory Act, 12) Form L, M, N, O Annual Return Maternity Benefit Act, 13) Form XXIV Half Yearly Return by Contractor under Contract and Labour Act, 14) Form XXIV Annual Return by Contractor under Contract and Labour Act, 15) Form VIII License Renewal by Contractor under Contract and Labour Act, 16) Form C Bonus Register, 17) Form D

Bonus Return, 18) Form ER-2 under Employment Exchange Act, 19) Form APP-2 under Apprentice Act, 20) Form-V Annual Environmental Returns, 21) No Objection Certificate from Fire Department, 22) Form-1 (A) Certificate of Stability, 23) Form-29 Register of accidents and dangerous occurrence, 24) Safety Committee and Canteen Committee, 25) Appointment of Safety Officer, 26) Appointment of Medical Officer and Occupational Health Centre, 27) Conducting Emergency Mock Drill, 28) Consent to Operate under Water Act, 29) Effluent Treatment at Source and Testing inlet and treated effluent from an accredited laboratory, 30) Stack Emission monitoring, 31) Ambient Air monitoring, 32) Lux level monitoring, 33) Noise level monitoring, 34) Display Board on Hazardous Waste Generated and Hazardous Chemicals Used, 35) Registration of Bore Well under Central Ground Water Authority, 36) Hazardous Waste Authorization, 37) PESO License, 38) Building Stability Certificate, 39) Sanitary Certificate.

According to the ISO 9001:2015 standard the Organization has to identify, determine and demonstrate compliance to the applicable state and central regulations, acts, directives. Some of them are

- 1) The Factories Act, State Factory Rules, Central Pollution Control Board, State Pollution Control Board, Petroleum and Explosives Safety Organization, Atomic Energy Regulatory Board, Ministry of Environment, Forest and Climate Change, Central Ground Water Authority, Directorate General Fire Services, Chief Electrical Inspector to Government, Indian Electricity Act & Rules, Batteries Management Handling Rules, Central Motor Vehicle Rules, The E-Waste Management Rules, IS 14543 – Packaged Drinking Water Specification, IS 1646 – Fire Safety of Buildings, IT Act, National Building Code, Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act and Rules, The Lift Act, The Noise Pollution Control and Regulation Rules, The Water Cess Act, Fire Safety and Fire Prevention Act, The Environment Protection Rules, Manufacture, Storage, Handling and Import of Hazardous Chemicals Rules, Petroleum Act, Gas Cylinder Rules, Labour Welfare Fund Act, The Bio-Medical Waste Rules, The Plastic Waste Management Rules, etc.

This research study does not specifically evaluate the compliance to regulatory and statutory requirements; however, during the assessment of the organization for ISO 9001:2015 standard the above-mentioned regulatory and statutory compliance is verified to determine the conformity with the requirements of the quality management system.

At the Outset, the *Quality management system* bridges the Technical Barriers To Trade across the globe. Plan-Do-Check-Act and Process Approach are the two fundamental integral concepts of most of the ISO Standards which are now incorporated with the Risk-Based Thinking in the *Quality Management System*. It is getting difficult to imagine and accept the business world without the Quality Management System as the same is now inbuilt in millions of organizations' business models across the world. The recent survey conducted by the International Organization Standardization in the Year 2019 reveals that 8, 83,521 valid ISO 9001 certificates were being issued by accredited certification bodies. There are many schools of thought on *Quality* that are well

debated time in again in various contexts and regions. Off late, the business sector is moving towards the improvement in their processes, products, reducing lead time of production and delivery, reducing non-conformity and rejections from the shop floor, and ultimately pushing the limits of their overall performance to enhance customer satisfaction. On top of the baseline of Plan-Do-Check-Act, the *Quality Management System* enforces the criteria on “Risk-based-Thinking”. Identifying the associated Risk in the Business Processes will provide adequate information, time, and resources to determine controls for mitigating the *Effect of Uncertainty* leading to the Organization’s capability to provide services and products that consistently meet customer and applicable regulatory and statutory requirements.

2 Literature Review

Bravi et al. (2019) surveyed a sample size of 493 ISO 9001 certified small and medium and large-sized organizations in Italy to determine the benefits from the quality management system. This research study was confined to mostly service sectors within Italy and the European region. Molinéro-Demilly et al. (2018) analyzed various aspects of implementing a quality management system in a Research Laboratory in France, using the Ishikawa technique to explain the 7M’s required to conduct a research process and determined a positive correlation between ISO 9001 and improvement of the processes. Khan et al. (2017) surveyed through a questionnaire in a sample size of four manufacturing organizations of Pakistan to determine the impact of ISO 9001. The feedback is collected from 176 respondents and the data was analyzed to conclude the results. Behnam (2017) conducted a literature review between 2002 to 2017 and selected a sample size of 19 empirical studies to determine the correlation between ISO 9001 and organizational performance. Dalmau (2016) used a questionnaire to get feedback from 37 respondents to determine the effectiveness of the quality management system in construction projects in Manila, to determine the significance of implementing a quality management system in construction projects. Behnam (2016) conducted second-party audits on 90 suppliers of the Windpower sector and highlighted the benefits of auditing suppliers to enhance the quality and identify opportunities for improvements. Having collected primary data through second party audit allowed analysis to determine some string implementation and some weakly implemented criteria of ISO 9001 standard. Simões et al (2016) conducted a literature review to determine the benefits of ISO 9001 and ISO 14001 standards. This work reviewed 82 articles to conclude 13 benefits out of the literature review just because those elements were commonly discussed in the review papers. Auer et al. (1996) studied an R&D division of an electronic embedded company to determine the improvement gained after successful implementation of the quality management system. Auer claim significant improvement in terms of gaining customer satisfaction and improvised R&D documentation. Alwerfalli et al. (2016) studied the significance of the quality management system in the construction industry and indicated the changes in the quality management system from the earlier version of the standard. The applicability in the construction industry is explained; however, there is no objective evidence to support the information provided in their study. Nguyen et al (2018) conducted an empirical

study on a sample size of 144 organizations and received responses for his questionnaire in Vietnam. Nguyen considered an integrated management system approach to establish the correlation between the quality management system and sustainable development. Nguyen considered eight elements to establish a relationship between sustainability and quality management such as Support from Top management, Training on quality, Design, Quality Data Analysis, Process, Continual Improvement, Solving Problems, and Rewards. Mishra (2015) has conducted a research study to establish a correlation between the quality management system and environment management system with sustainability. This study is based on a conceptual framework and based on secondary data. Mishra concluded that the quality and environment management system has significant contributing factors for sustainable development. Roy (2016) has conducted a literature review comparing ISO 9001 and ISO 14001 standards to establish the positive correlation between these two standards. Roy has suggested techniques to enhance the benefits of implementing a quality and environmental management system based on secondary data. Ferreira et al (2019) has conducted a literature review to compare quality management system and environment management system. Ferreira has established a correlation between environmental, economic, environmental-economic, social, social-environmental, dimensions.

3 Method

A thorough assessment of the ISO 9001 standard in accordance with the *Guideline for auditing management system* is conducted to collect the research data. The number of days spent on-site for an assessment was determined by the certification bodies based on various factors such as the size of the organization, number of employees, nature of work, complexity of the processes, type of assessment, number of locations (document review, certification assessment, surveillance assessment, re-certification assessment, special assessment, follow-up assessment) in accordance with the accreditation norms. The sample size is 533 Organizations which makes a heterogeneous random sample across India, United Arab Emirates, Sultanate of Oman, Kingdom of Saudi Arabia, Bahrain, Qatar, Kuwait, Australia, Malaysia, and New Zealand. The sample Organizations were categorized in various sectors as per European Accreditation codes which include: Mining and Quarrying, Food Products, Textiles, Wood Products, Paper Products, Publishing Companies, Printing Companies, Chemical Products, Pharmaceutical, Rubber and Plastic Products, Non-metallic Mineral Products, Concrete and Cement, Basic Metal and Fabricated Metal Products, Machinery and Equipment, Electrical Equipment, Aerospace, Other Transport Equipment, Manufacturing Not Elsewhere Classified, Recycling, Electrical Supply, Gas Supply, Water Supply, Construction, Wholesale and Retail Trade, Hotels, Transport, Storage and Communication, Financial Intermediation and Real Estate, Information Technology, Engineering Services, Other Services, Education and Other Social Services.

Table 1: indicate the reliability of the questionnaire used for determining conformance to the assessment variables is 0.743 which indicates an acceptable level of consistency of the questionnaire used during the onsite assessment.

Table 1: Scale Reliability Statistics

	Cronbach's α
Scale	0.743

4 Result and Discussion

Table 2 describes the statistical analysis of the selected conformity assessment variables: *Needs and expectations of the interested parties, Customer focus, Type, and extent of control*. The outcomes of the onsite assessment were gauged on a five-point Likert scale where Point-1 indicate Major non-conformance, Point-2 indicate Minor non-conformance, Point-3 indicate Neither Conform nor non-conform (Inadequate evidence to determine either conformity or non conformity), Point-4 indicate Conformance, Point-5 indicate Strong Conformance (With Effectiveness of actions evidenced). The sample size is 533 (Organizations).

Table 2: Descriptive statistics

	Needs and Expectation of the Interested Parties	Customer Focus	Type and Extent of Control
N	533	533	533
Mean	3.88	3.93	3.80
Median	4	4	4
Standard deviation	0.344	0.539	0.480
Variance	0.118	0.291	0.231
Minimum	3	3	3
Maximum	5	5	5
Skewness	-1.83	-0.0526	-0.497
Std. error skewness	0.106	0.106	0.106
Kurtosis	3.33	0.397	0.178
Std. error kurtosis	0.211	0.211	0.211
Shapiro-Wilk W	0.431	0.716	0.643
Shapiro-Wilk p	< .001	< .001	< .001

For the conformity assessment variable on *Needs and expectations of the interested parties*, Table 3, 86.9% of the sample organizations indicate Likert scale point 4; conformance to the requirement of the criteria. Only 0.8% of the sample organizations exhibited Likert scale point 5; exceptional conformance with the effectiveness of the actions. 12.4% of the sample organizations produced inadequate evidence to determine either conformity or non-conformity and hence researcher required further objective evidence to determine conformance.

Table 3: Frequencies of Needs and Expectation of the Interested Parties

Levels	Counts	Total	Cumulative
3	66	12.4 %	12.4 %
4	463	86.9 %	99.2 %
5	4	0.8 %	100.0 %

For the conformity assessment on *Customer focus* Table 4, 70.5% of the sample organizations indicate Likert scale point 4; conformance to the requirement of the criteria. Only 11.4% of the sample organizations exhibited Likert scale point 5; exceptional conformance with the effectiveness of the actions. 18% of the sample organizations produced inadequate evidence to determine either conformity or non-conformity and hence it is required further objective evidence to determine conformance.

Table 4: Frequencies of Customer Focus

Levels	Counts	% of Total	Cumulative %
3	96	18.0 %	18.0 %
4	376	70.5 %	88.6 %
5	61	11.4 %	100.0 %

For the conformity assessment variable on *Type and extent of control* Table 5, 72.8% of the sample organizations indicate Likert scale point 4; conformance to the requirement of the criteria. Only 03.4% of the sample organizations exhibited Likert scale point 5; exceptional conformance with the effectiveness of the actions. 23.8% of the sample organizations produced inadequate evidence to determine either conformity or non-conformity and hence this requires further objective evidence to determine conformance.

Table 5: Frequencies of Type and Extent of Control

Levels	Counts	% of Total	Cumulative %
3	127	23.8 %	23.8 %
4	388	72.8 %	96.6 %
5	18	3.4 %	100.0 %

Figure 1 represents the correlation heatmap with each coloured square indicate the correlation between the conformity assessment variables on each axis. The values close to +1 indicate that the conformity assessment variable is positively correlated.

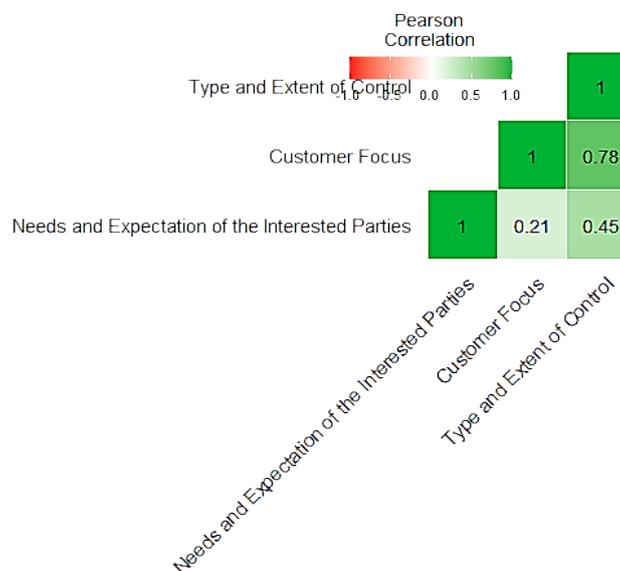


Figure 1: Correlation Heatmap

Table 6: indicate the Exploratory factor analysis for the structure of conformity assessment variables to determine the relationships between the criteria on Needs and Expectation of the Interested Parties, Customer Focus and Type and Extent of Control. The five-point Likert scale is adopted to measure the extent of conformity to the requirements of the standard. The Conformity assessment variables are associated with each other. The Uniqueness for the conformity assessment variable on *Needs and Expectation of the Interested Parties* is 0.60; The Uniqueness for the conformity assessment variable on *Customer Focus* is 0.22 and The Uniqueness for the conformity assessment variable on *Type and Extent of Control* is 0.06. 'Minimum residual' extraction method was used in combination with a 'oblimin' rotation.

Table 6: Exploratory Factor Analysis Factor Loadings

Item	Factor		Uniqueness
	1	2	
Needs and Expectations of the Interested Parties		0.590	0.6094
Customer Focus	0.936		0.2201
Type and Extent of Control	0.801	0.302	0.0604

5 Conclusion

Out of 533 Organizations assessed; 81.9% of the sample demonstrated adequate evidence to determine that ISO 9001 Certified organizations effectively implementing *Quality management systems* possess the ability to provide services and products consistently meeting customer, applicable regulatory, and statutory requirements which provides a concrete foundation for sustainable development initiatives. Only four organizations could demonstrate the conformance with the effectiveness of the actions on the criteria “Needs and Expectation of the Interested Parties”. Only sixty-one organizations demonstrated evidence of conformity with the effectiveness of the actions taken on the criteria “Customer focus”. Only 18 organizations could demonstrate conformance with the effectiveness of the actions on the criteria “Type and extent of control”. The conformity assessment variable factor on the *Needs and expectations of the interested parties* was found to be 0.590. The conformity assessment variable factor on the *Customer focus* was found to be 0.936. The conformity assessment variable factor on the *type and extent of control* was found to be 0.801 & 0.302.

There are definite positive correlations between other criteria determined in ISO 9001 standard which are interconnected and interdependent within the identified *Processes* irrespective of the scope of certification. This research study has emphasized the three detrimental variables which were Identification of Needs and Expectation of the Interested Parties, Customer Focus, Type and Extent of Controls determined for External Provided Process. Determining short term objectives aid to improve the process performance and extend significant contribution towards achieving organizational sustainable goals. The effective implementation of the requirements of

the quality management system provides a strong basis for sustainable development. Integrated management system fulfil a larger extent of the United Nations Sustainable Development Goals in which along with the quality management system; Environmental management system, Occupational health, and safety management system, and Energy management system ensure the compliance to the majority of the elements by the organizations certified for multiple standards like ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 & ISO 50001:2018. Some of the common requirements of the multiple ISO Standards could be addressed by the organization without repeating them due to the flexibility provided within the high-level structure of the clauses.

6 Availability of Data And Material

Data can be made available by contacting the corresponding authors.

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