

A Study of Critical Success Factors for ISO9001 Implementation in the Manufacturing Sector of Punjab, Pakistan

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ABSTRACT

Manufacturing organizations strive to obtain ISO9001 certification because of several associated benefits. Achieving ISO9001 certification is however not easy as organization has to give attention to several factors. The current study is about identifying such factors within the manufacturing sector. The study is based on quantitative approach and used the survey method for data collection. By sampling approach, it generated a usable sample of 84 participants belonged to the thirty manufacturing organizations located in the Punjab province of Pakistan. Through literature, we identified fourteen critical success factors for ISO9001 implementation which we used as an independent variable in regression. We used the forward method of regression, and result indicate that the top critical success factor for ISO9001 are middle management commitment, services and support from the certification body, and the top management commitment. Together these three factors explain up to 35% change in the dependent variable of favorable ISO9001 outcomes. The implication of our findings are that besides focusing on hard aspects of quality such as quality tools, the soft aspects such as management commitment also need to be given attention for the proper implementation of ISO9001.

KEYWORDS: ISO9001, Quality Implementation, Critical Success Factors, Manufacturing, Punjab, Pakistan.

INTRODUCTION

The ISO refers to the International Organization for Standards which came in to existence on 23rd of February, 1947. It is a federation of national standard bodies based on 176 countries around the world [1]. The ISO has different families of certification such as ISO14000 series, ISO22000, and ISO9001 which deals with different type of standards. Within ISO9001 family, there are standards such as ISO9000, ISO9001, and ISO9004. The ISO9000 only covers the basic quality management system; ISO9001 provides a comprehensive framework for evaluating quality management system within an organization; and ISO9004 provides guidelines for continuous performance improvement. Among these standards, ISO9001 is the most common and famous among the organization and if obtained then it signals that organization has achieved certain required level of quality [1]. It is a generic type of standard which any organization regardless of its size, type, and nature can obtain after fulfilling the necessary conditions [2].

Problem Statement

Pakistani organizations need to get the ISO9001 certification as it is helpful for not only improving the quality of the products and processes, but also a requirement for exporting products to most of the International countries. Pakistani organizations however remains very reactive in getting the ISO9001 certification for example based on ISO record, in year 2012 there were only 2132 Pakistani organizations which obtained the ISO9001 certification; which increased to 2369 certifications in year 2013; and 2512 in year 2014. The slow progress is due to the strict requirements and the procedure for the ISO9001. Furthermore, there are several organization related factors which if present can improve the ISO9001 implementation process; while their absence may result in difficulties in implementing and achieving the ISO9001 framework. So the specific problem which this study wants to investigate of quality tools frequently used and their benefits in the manufacturing sector of Pakistan.

Background

ISO9001 is a quality based certification based on certain requirements which an organization needs to fulfill in order to get the certification [3]. The environment within an organization can be supportive or non-supportive for ISO9001 implementation based on different factors. Literature suggests that different factors such as existence of already

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developed quality management system, top management commitment, middle management commitment, effective internal auditing, ISO related training, and availability of external consultants facilitate the ISO9001 implementation [4, 5, 6, 7, 8]. Other similar factors include resource allocation, employee involvement, and support from the certification body [3, 8, 9]. The critical success factors may vary from context to context and identification of these factors within the local manufacturing sector is the main theme of this study.

Objectives

The objective of the study is;

- To identify the critical success factors for the successful implementation of ISO9001 among the manufacturing sector of Punjab, Pakistan

Critical Success Factors for ISO9001 Implementation

Literature on quality management points towards different critical success factors for ISO9001 implementation. For example, existence of already developed quality management system and subscription to some common quality frameworks such as ISO9000 or BS5750 is highly important for successful implementation of ISO9001 framework [3]. If such system exists, then it provides a solid background about quality management requirements and thus proves highly useful [4]. Commitment from top and middle management is also an important factor. It is the responsibility of top management to devise quality related policies and devote resources [6]. Middle management is also important as they can influence important decisions regarding quality management; creates a bridge between the top management and lower level employees; communicate necessary information; and implement strategy [6, 25]. Effective internal auditing is also useful technique for preparing organization for the ISO9001 certification [11]. It means that management should focus on utilizing self-assessment tools to figure out that whether organization's quality related efforts are up to the required level [3]. Having a sufficient ISO related training program within an organization is also crucial factor. When employees are given training and education based on the ISO framework, it results in successful changes in the whole system [12]. Availability of the ISO published material is another key factor [3]. Availability of such material provides necessary guidance; while, non-availability of such material may result in situation where managers doing things from their own understanding which can undermine the implementation process [3].

Availing advice from the external consultant is also crucial factor for successful ISO9001 implementation. A lot of organization does not possess the necessary knowledge of implementing the system; therefore, they seek help from outside consultant. Normally, consultants charge some fee and provide their expertise to upgrade the system for making it ready for certification purpose. Availability of such external guidance reduces organization's efforts as right action can be taken at the right time [8]. Employee involvement is also necessary for successful ISO9001 implementation as without employees' involvement, no quality management program can be successful [5, 13]. Resource Allocation is also important factor for ISO9001 implementation. It is necessary that during the planning phase, top management devote enough physical, financial, and human resources for ISO9001 implementation [11, 12]. All quality gurus such as Deming, Juran, and Crosby have also emphasized on organization to devote enough resources for quality. Existence of appropriate communication system is also a crucial factor for successful ISO9001 implementation [9]. Cooperative attitude of customer is another key factor for successful implementation of ISO9001 framework. Customer attitude is important as if customers are cooperative; they will highlight issues related to the products, give their feedback, and provide valuable suggestions for improvement in the system. Therefore, organizations are required to maintain good relationships with customers and take necessary steps to monitor feedback from the customers [3, 8]. Cooperative attitude of suppliers is another key factor or successful implementation of ISO9001 framework. This factor requires that suppliers and organization build long lasting relationships so that the information can be shared; processes can be aligned; and good quality input can be procured [3, 14]. Service and support from the certification body is also important. If such support is given, it can result in making the process smooth for both parties [11]. Similarly, in case of a subsidiary, assistance from the parent company is also very important. Parent company can provide guidance, resources, and expertise which provide support for successful implementation of ISO9001 certification [8, 9]. In sum, different internal factor related to the management, operations, employees; and external factors related to the customer, suppliers, or certification body can be critical success factor for successful implementation of ISO9001.

Benefits from Implementing ISO9001

Literature suggests that there are a lot of benefits from implementing the ISO9001. The internal benefits of implementing ISO9001 include but not limited to the increased operational performance, improved processes, minimized production losses, low level of rework and less defects, better process flow, reduced time wastage, raw

material and labor saving, and development of quality culture [15, 16, 26]. The outcomes in terms of employees are that employees become more aware towards quality, are highly motivated, and loyal towards the organization which result in controlling the turnover and related cost [2]. Further, the marketing advantage is that it result in gaining greater market share, a marketing tool for promotion, helps in beating competitor, and better organizational image in the public [17]. A specific example of benefit of implementing ISO9001 is based on a study conducted in Iran which where it is found that its implementation in health services result in increase in bedridden patient's satisfaction and decrease in work-related mistakes by hospital staff (27). Overall, it can be concluded that implementing ISO9001 certification and framework result in a lot of favorable outcomes for organization in terms of customers, markets, financial, and employees.

MATERIALS AND METHODS

Research Design

The design of the current study is descriptive and explanatory. It is based on the cross-sectional nature of data means data is only collected at one time interval. The design of the study is non-experimental means the study is not based on any experiment or altering the conditions of the participants. Furthermore, it is based on the quantitative approach.

Survey Measure

Survey is used for data collection which is based on previously developed measures. Critical success factors for successful implementation of ISO9001 implementation is based on 14 statements adapted from previous researcher [18]. The perceived benefits of implementing ISO9001 were measured by 17 statements and adapted from previous researcher [19].

Reliability and Validity

Reliability is the degree to which measures adapted are free from error and therefore yield consistent results [20]. Reliability can be measured using methods such as internal consistency, test-retest, and split-half method. In current study, we used the internal consistency method by calculating the Cronbach alpha for both variables. In our data, the Cronbach alpha for critical success factors was .811; and Cronbach alpha for perceived benefits was .793. Thus both variables had Cronbach alpha of above 0.70 which can be considered satisfactory as per the cut-of value suggested [20].

Validity on the other hand refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. Different methods for establishing validity are available such as face, content, construct, discriminant, and criterion validity. In current study, we established the validity of the survey measures adapted using the face validity and the content validity. For face validity, the instrument was compared with the literature and found to be in line with the concepts found in literature, therefore, establishing its face validity. Content validity on the other hand refers to when there is general agreement among subject matter experts that the items in the survey are adequately measuring the variables involved in the study [21]. For this purpose, the instrument was presented to a panel of two university professors who were expert in related fields. The panel agreed that the items are adequately measuring the concepts involved. Overall, both reliability and validity were satisfactory in our data.

Population and Sampling Procedure

The study is based on manufacturing sector of Punjab, so all manufacturing organizations in Punjab make the population of the study. Since population is large, so we used the sampling approach. The study draw sampling frame from four main cities located in the Punjab province. The sample consisted of 30 manufacturing organizations in which total of 150 survey questionnaires were distributed. These manufacturing firms were related to the manufacturing of textile products, construction material, and household goods. These survey were distributed in the sample firms by the researcher by visiting physically. Later these surveys were picked up by the researcher. A total of 84usable surveys were returned making a response rate of 56%. The data was analyzed using the descriptive statistics and the regression analysis. The exploratory regression analysis is used while number of control variables was also added in the model.

RESULTS

Our results are as under which are based on demographic characteristics, descriptive statistics, and regression analysis.

Demographic Characteristics of the Survey Participants

The demographic characteristics of the survey participants are given in the table below.

Table I: Demographic Characteristics of the Survey Participants

Label	Category				
	Male		Female		
Gender	68		16		
Age Group	18 to 25 Years		25 to 40 Years	40 to 60 Years	
	36		41	7	
Educational Level	Intermediate or Less		Bachelors	Master or Above	
	1		65	18	
Work Experience	Less than 1 Years		1 to 5 Years	5 to 15 Years	Above 15 Years
	8		29	37	10

There were total of 84 survey participants out of which, 68 were male, and 16 were female. Age wise, 36 participants belonged to the age group of 18 to 25 years; 41 belonged to the 25 to 40 years; and 7 belonged to the 40 to 60 years. In terms of education, 1 participant had qualification of intermediate or less; 65 had bachelor qualification; and 18 had master or above level qualification. In terms of work experience, 8 participants had less than 1 years of work experience; 29 had 1 to 5 years of work experience; 37 had 5 to 15 years of work experience; and 10 had above 15 years of work experience.

Descriptive Statistics

The results based on respondent’s response are given in the table below and arranged in descending order.

Table II: Critical Success Factors for ISO 9001 Implementation

Important Factors for Successful Implementation of ISO 9001	Minimum	Maximum	Mean	S. D
Top management commitment	4	5	4.78	0.419
Middle management commitment	2	5	4.44	0.606
Resource allocation	3	5	4.28	0.648
Sufficient ISO training programs	2	5	4.18	0.889
Effective internal auditing	2	5	4.16	0.937
Employee motivation and involvement	2	5	4.04	0.68
Existence of appropriate communication	2	5	3.84	0.687
Pre-existence of ISO 9000 standards	2	5	3.72	0.75
Co-operative attitude of suppliers	2	5	3.65	0.882
Assistance from the parent company	2	5	3.42	0.918
Services and support from the certification Body	2	5	3.25	0.815
Availability of external consultants	1	5	3.14	0.861
Co-operative attitude of customers	1	5	3.09	0.971
Availability of ISO published materials	1	5	3.01	0.893

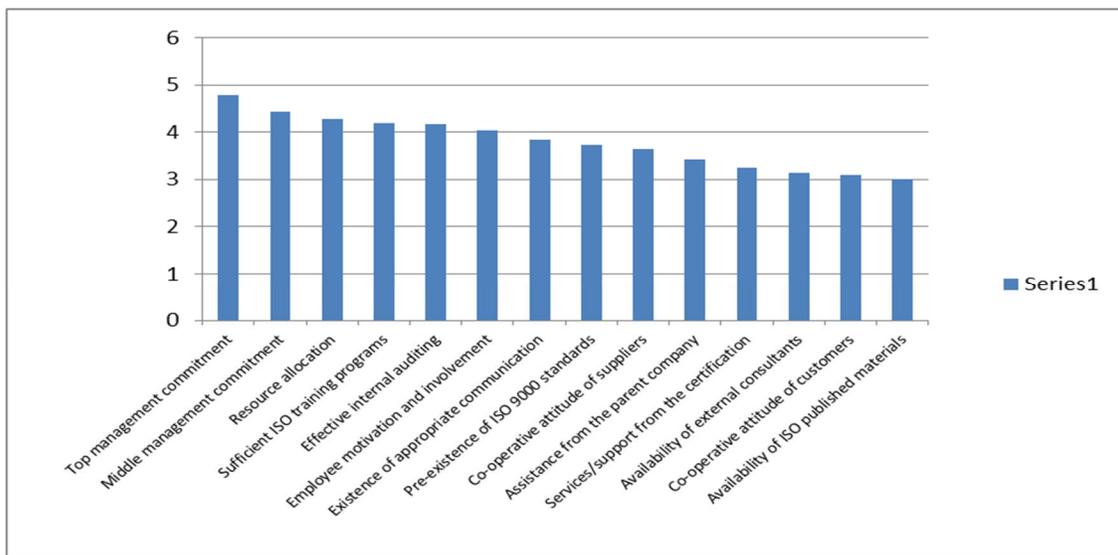


Figure 1: Descriptive Statistics for CSF for ISO9001 Implementation

The results based on descriptive statistics are given in table and chart above. The results shows that most important factor successful implementation ISO9001 based on mean value of is top management commitment (M=4.78, S.D=.41); followed by middle management commitment (M=4.44, S.D=.60); followed by resource allocation (M=4.28, S.D=.64); followed by sufficient ISO training programs (M=4.18, S.D=.88); followed by effective internal auditing (M=4.16, S.D=.93); followed by employee motivation and involvement (M=4.04, S.D=.68); followed by existence of appropriate communication (M=3.84, S.D=.68); followed by pre-existing of ISO9000 standards (M=3.72, S.D=.75); followed by cooperative attitude of suppliers (M=3.65, S.D=.91); followed by assistance from the parent company (M=3.42, S.D=.91); followed by service and support from the certification body (M=3.25, S.D=.81); followed by the availability of external consultants (M=3.14, S.D=.86); followed by the cooperative attitude of customers (M=3.09, S.D=.97); and finally followed by the availability of ISO published material (M=3.01, S.D=.89).

Regression Analysis

We used the Forward method of regression analysis to identify which factors among these 14 factors are the most critical one for the successful implementation of ISO9001. For this purpose, we used the benefits of ISO9001 as a dependent variable and all these critical factors as an independent variable. Additionally, we used three control variables including the presence of already achieved ISO certification, organizational size (medium), and organizational size (large). Further, we also tested the four assumptions of regression including the normality of error term using the graphical method of NPP plot of regression standardized residual; no multicollinearity using VIF(cut of value <5); no autocorrelation using the DW statistics (cut of value around 2); and homoscedasticity using the Park test. All these four assumptions were satisfied in our data. The results for the forward method of regression is given as under.

Table III: Regression Analysis

	Model 1	Model 2	Model 3	Model 4
ISO Certification Dummy	.117	.132	.100	.073
OrganizationalSizeDummy1	-.008	.039	.084	.184
OrganizationalSizeDummy2	.052	.060	.062	.121
Middle Management Commitment		.266***	.268***	.186**
Services & Support from the Certification body			.147**	.162**
Top Management Commitment				.319**
R-square	.028	.187	.270	.357
Change in R-square		.158	.083	.087
FStat	.781	4.541**	5.778***	7.119***
Change in F-Stat		15.400	8.908	10.360
DW Statistics				2.346

*P<0.05, **P<0.01, ***P<0001

The forward method of regression used iterative approach and produced solution for four models in which the model 4 was the best model based on model fitness. Further, out of the 14 independent variables only three variables turned out to be significant. The rest of the independent variables were excluded due to the non-significance value. The results indicate that middle management commitment is the most significant factor associated with the perceived benefits ($\beta=.186$, $P<0.05$); followed by the services and support from the certification body ($\beta=.162$, $P<0.05$); followed by the top management commitment ($\beta=.319$, $P<0.05$). Further, based on the model 4, the three independent variables and the three control variables explained up to 35.7% change in the dependent variable of perceived benefits (Rsquare=.357). Overall, model 4 shows high fitness based on the F-statistics compare to the other models (Fstat=7.119, $P<0.05$).

DISCUSSION& CONCLUSION

The objective of the study was to identify the critical success factors for the successful implementation of the ISO9001 framework. For this purpose, we collected data from sample of 84 participants belonged to the 30 manufacturing based organizations from the Punjab province of Pakistan. For identifying the most critical factors, we used the exploratory method of regression using the forward method. Our results indicate that the critical factor for the successful implementation of the ISO9001 framework are middle management commitment, services and support from the certification body, and the top management commitment. Middle management commitment is important since they are highly influential and present at shop floor level where they makes important quality related decisions, and act as a bridge between the top management and lower management as well as between the

management and the workers. The significance of the role of middle management is also recognized by previous studies [6, 22]+. The service and support from the certification body is also highly important since certification body conduct the audit, provide guidance, and finally issue the certification. If certification body is supportive, then it can greatly facilitate the certification process; while, absence of support may hinder or even discourage organizations from obtaining the certification. Support from certification body is also found important in previous study [3, 11]. Finally, top management commitment is found to be significant in our study. This is a factor which is consistently reported in the literature and its importance is due to the fact that top management makes policies, devote resources, and act as a role model for quality implementation. All quality gurus also stressed on the role of top management commitment in quality management. Previous studies also found it as an important factor for ISO9001 implementation [3, 14, 25]. Furthermore, our findings that the ISO9001 implementation is associated with favorable internal and external outcome is also consistent with the literature [2, 15, 16, 17, 23, 27, 28].

Recommendations

Based on the findings of the study, we present the following recommendations.

- Organization should give attention to the implementation of ISO9001 framework and achievement of the certification as it is associated with several favorable employees, customer, suppliers, and strategic benefits
- For implementing the ISO9001 framework, top management should play a very active role in devising quality policy, devoting resources, and monitoring the entire process of implementation
- The middle management role should not be ignored during the ISO9001 implementation process. Further, proper training should be given to the middle management so that they can manage different activities related to the ISO9001 implementation.
- The certification body should also more support and guidance to the certification seeking organizations.
- Government should also give attention to create more awareness for ISO9001 certification among the manufacturing organization. Further subsidies in fees, support, and training should also be made available to the manufacturing sector as it has larger benefits in terms of exports, jobs, and the taxes.

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