

# Organization Development and Performance: The Impact of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 Interventions on Product Quality in Manufacturing Organizations of Pakistan

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## Abstract

*Product quality is a major business dilemma in Pakistan. Organizations are dependent on Organization Development (OD) interventions to help them enhance their product quality to sustain in the global market. OD is a systematic organizational change process. The models of OD are helpful in designing state-of-the-art production systems to achieve the quality defined by customers. The current mixed methods explanatory sequential research study has tested a mediated model and investigated the impact of three structural OD interventions (ISO 9001:2015, ISO 14001:2015 & OHSAS 18001) on the product quality. Quantitative data from 146 manufacturing units, collected through a questionnaire, and qualitative data from five management systems experts are merged. Quantitative and qualitative findings show the positive and significant impact of ISO 9001:2015 on the product quality. The quantitative findings show the positive impacts of ISO 14001:2015 and OHSAS 18001 on the product quality. However, the qualitative findings reject any positive contribution of ISO 14001:2015 and OHSAS 18001 in product quality. The findings further revealed that the Integrated Management System (IMS), top management commitment and an effective monitoring system are essential strategies to make the systems more effective and efficient. The paper also discusses the compliant role of high performance corporate culture during the OD change process. The results have implications for corporate managers and management representatives.*

**Keywords:** Organization development, integrated management system, corporate culture, product quality and structural OD interventions, ISO 9001:2015, ISO 14001:2015, OHSAS 18001

## 1. Introduction

Low level quality is an unresolved business problem in Pakistan. Kemal (2006) have discussed the “Key issues in Industrial Growth in Pakistan” and highlighted that slow growth rates of productivity and high costs are due to poor quality of products and

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inefficiencies. Productivity, profitability, revenue and loyalty are not possible without high-quality products. To produce high-quality products, structural OD interventions are the strategic tools in the current business environment. We have examined the impact of three structural OD interventions (ISO 9001:2015, ISO 14001:2015 & OHSAS 18001) on product quality in the manufacturing organizations of Pakistan.

ISO 9001:2015 certification is an important structural OD intervention and a quality management system. The system help organizations in achieving quality products. Previous research studies have investigated the impact of ISO 9001 intervention on the various aspects of organizational performance (Debby, Vaughan & Trigunarsyah, 2015; Vasileios & Odysseas, 2015). Organizations have implemented the ISO 9001 quality system to improve the quality of products (Casadesus & Karapetrovic, 2005; Corbett, Montes-Sancho & Kirsch, 2005; Terziovski & Guerrero, 2014). Furthermore, ISO 9000 certification is an effective structural intervention that leads to enhanced product quality. Debby et al. (2015) stated that many organizations have not achieved the desired performance due to poor management of the certification process. The framework of ISO 9000 changes after each five years. So, there is a need to investigate the impact of ISO 9001:2015 new version on product quality and also to explore the mediating role of the corporate culture.

ISO 14001:2015 is a systematic approach to minimize the negative significant impacts of an activity or operation. ISO 14001:2015 provides a framework for developing an environmental management system for sustainable environmental performance. Research studies have highlighted the various benefits and outcomes of ISO 14001 certification (Vries, Bayramoglu & Wiele, 2012). Environmental sustainability, operational efficiency, corporate image and enhanced product quality are the potential benefits of ISO 14001 certification (Arena et al., 2012). Puvanasvaran, Tian and Vasu (2014) have integrated lean principles with ISO 14001 to make the system more sustainable, efficient and effective. The certification of ISO 14001 is more beneficial in the presence of high performance corporate culture. Kloepfer (1997) argues that the compatibility of system with the existing corporate culture is essential to achieve the desired benefits. The current study has also investigated the impact of IMS on the product quality.

OHSAS 18001 establishes requirements for occupational health and safety. OHSAS 18001 provides a set of tools that enhance safety risk management and encourage employees to participate in health and safety programs (Puvanasvaran, Tian & Vasu, 2014). The OHSAS 18001 certification is beneficial to comply legal requirements and to establish production standards (Santos, Barros, Mendes & Lopes, 2013; Granerud & Rocha, 2011). The objective of OHSAS 18001 certification is to control occupational health and safety risks, consistent with occupational health and safety

policy and objectives (OHSAS 18001:2007). OHSAS 18001 enhances the organizational image, goodwill, reputation and performance (Fernandez-Muniz, Montes-Peon & Vazquez-Ordas, 2012b; Koivupalo, Sulasalmi, Rodrigo & Vayrynen, 2015).

Corporate culture is a significant aspect of any OD process because it has a major impact on productivity and product quality. A high performance work culture is critical to corporate success (Kelepile, 2015). High performance work culture facilitates the implantation of OD interventions in a better way. On the other hand, research studies have explored that quality management initiatives do not always yield the desired results (Beer, 2003; Rad, 2006). Gambi, Boer, Gerolamo, Jorgensen and Carpinetti (2013) have investigated the relationship between organizational culture and quality techniques and its impact on operational performance and suggest further research studies to develop insight into quality systems and various aspects of organizational culture.

Product quality is a major corporate dilemma because high-quality products are vital to organizational success. Poor quality causes potential sales losses. To achieve quality, business firms need innovative manufacturing processes and programs. The role of state-of-the-art manufacturing programs and tools are now strategic to achieve customer satisfaction (quality) and to enhance safety, health and environmental performances. Structural OD interventions like ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 address various aspects of quality management (Fura, 2013; Koivupalo et al., 2015; Fonseca, 2015; Gaureanu, Weinschrott, Dumitrescu & Jitarelu, 2016; Djofack & Camacho, 2017). The role of operating and operational procedures is important in improving the quality. Quality related issues are significant in developing countries. The major reason of Pakistan's poor export performance is the low quality products. Pakistan need to upgrade production capabilities and quality (Irfan ul Haque, 2014; Anjum, 2016).

Literature shows few studies on ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 and product quality. The role of corporate culture has not been examined in Pakistani context. The academic world has also ignored the strategic role of OD, ISO Systems and their relationship with product quality. Previous research studies have investigated the isolated role of ISO 9001 (Koh & Low, 2010; Khanna, 2009; Bhat & Jagadeesh, 2009; Lau & Tang, 2009; Zaramdini, 2007), ISO 14001 (Darnall, Henriques & Sadorsky, 2008) and OHSAS 18001 (Koivupalo et al., 2015) and performance.

This current mixed methods explanatory study has two objectives. The first is to investigate the impact of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 on product quality in manufacturing organizations in Pakistan. Second significant aspect of the current study is that corporate culture is taken as a mediating variable.

The findings of this study can be used to understand the nature of impact of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 on product quality in organizations in Pakistan. Furthermore, how high performance culture accelerate quality management process. The following research questions are formulated.

Research Question 1: What is the nature of the impact of ISO 9001:2015 on product quality in the manufacturing industry of Pakistan?

Research Question 2: What is the nature of the impact of ISO 14001:2015 on product quality in the manufacturing industry of Pakistan?

Research Question 3: What is the nature of the impact of OHSAS 18001 on product quality in the manufacturing industry of Pakistan?

Research Question 4: How corporate culture mediates the relationships of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 and product quality?

## **2. Literature Review**

### **2.1. OD**

OD is a process of continuous diagnosis, designing and implementing interventions to improve organizational performance. Beckhard (1969) have defined OD as “an effort that is: 1) planned 2) organization-wide 3) managed from the top 4) increase organization effectiveness and health 5) through planned interventions in the organization’s “processes,” using behavioral-science knowledge”. OD is an organizational change process. The various models of OD are now the emerging tools of performance improvement. Corporate World has already initiated OD interventions to enhance performance at each level. Structural interventions are the re-alignment of the corporate culture, vision, values, strategy, structure and management systems (Khandwalla, 2001). ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 are the three structural interventions. OD is an emerging field in Pakistan. The concepts of OD have not been leveraged to their full potential by the practitioner.

The role of corporate culture is significant during any OD change process. Organizations cannot survive without a high performance work culture, HPWC. HPWC culture facilitates the re-alignment and re-development of management systems and processes.

The remaining section presents a brief discussion on product quality and various ISO standards. Sub-section 2.2 discusses the relationship of ISO 9001:2015 with product quality. Next sub-section 2.3 presents ISO 14001:2015 and subsequently ISO

18001 discussed in sub-section 2.4.

## **2.2. ISO 9001:2015 and product quality**

International Organization for Standardization (ISO) was established in 1947 with the major objectives to develop intellectual, scientific, technological and economic cooperation between the member countries. The head office of ISO is in Geneva, Switzerland. “ISO is an independent, non-governmental international organization with a membership of 162 national standards bodies. ISO develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges” (ISO Central Secretariat, 2019).

ISO 9001 is an International Standard and its requirements provide a framework for quality management system (QMS). As discussed earlier, quality is a major characteristic to penetrate in the global market. Organizations implement quality programs to achieve products of superior quality. The one objective of quality products is to create delighted customers. The second objective of quality products is to avoid the high cost of poor quality. Organizations should address issues related to preventive costs, appraisal costs, internal failure costs and external failure costs to retain the loyalty. Many organizations have faced lawsuits due to deliveries of poor quality products. Khanna, Laroiyaa & Sharma (2010) argued that quality in manufacturing process and business excellence attract loyal customers and highlighted that many studies (Koh & Low, 2010; Khanna, 2009; Kumar, Garg & Garg, 2009; Bhat & Jagadeesh, 2009; Lau & Tang, 2009) have investigated the relationship between quality management and performance. Many quality tools and practices are universal and not industry specific.

Reliable quality products attract global customers. The demands and expectations of customers are changing. ISO 9001:2015 certification ensure product quality and support quality manufacturing programs. ISO 9001:2015 is the latest version of ISO 9000 family which provides requirements for a Quality Management System, QMS. Literature shows many research studies on ISO 9001:2015 and corporate performance (Corbett et al., 2005). ISO 9001:2015 certification guides to achieve product quality. Organizations use ISO 9001:2015 as a benchmark. ISO 9001 certification is a major tool to achieve superior quality (Willar, Vaughan & Trigunarsyah, 2015; Basir & Azmi, 2011). Manufacturing industry in Pakistan is implementing ISO 9001:2015 to improve the capabilities of production processes. The QMS helps organizations to produce quality products in a way to better serve the customers. ISO 9001:2015 certification helped organizations to reduce production cost and rejection rate (Ataullah, Sajid & Khan, 2014; Memon, Abro & Memon, 2011; Awan, Raouf, Ahmed & Sparks, 2010).

ISO 9001:2015 is a set of guidelines for the development of a quality management

system. Literature shows that many organizations are not interested to implement ISO 9001:2015 QMS because the actual change in the entire production system is too expensive and it is difficult to change the work behavior of employees. Organizations feel that the current operational procedures and sub-procedures are working well and no change is required (Nurre, Gunaman & De-Almeida, 2000). The implantation of the quality program is a systematic process that requires consideration of company's staff and strategy. Organizations should implement and enforce training programs, effective hiring system and total company commitment to continuous commitment (Piskar, 2007). Zaramdini (2007) has stated that ISO 9001 certification is the first step toward quality improvement but organizations should work more for organizational excellence. ISO certification is more beneficial for internal benefits than external ones. Many other studies have also criticized the certification process.

### **2.3. ISO 14001:2015 and product quality**

The ISO 14001:2015 provides a comprehensive framework for developing an Environmental Management System, EMS. Objectives and targets' program is developed to minimize and control the negative significant impacts of an activity or operation. The system reduces the harmful impacts and ensures continuous environmental improvement (Christini, Fetsko & Hendrickson, 2004). ISO 14001:2015 certification is beneficial to improve financial and economic performance. The system also reduces operational costs (Morris, 2003; Dick, Gavin, Saizarbitoria, Inaki & Molina-Azorin, 2011). According to a report of ISO Central Secretariat (2009), organizations are aware of the need for environmentally friendly behavior. The proactive approach is strategically important for organizations to manufacture products of sustained quality. ISO 14001 family of standards provide tools for environmental performance. Other economic benefits include the reduction of wastages of raw material, energy and also improve process efficiency.

Stroufe (2003) has investigated that there is a need to integrate the cross-function activities and resources to develop an effective and efficient system. Firms have adopted ISO 14001 certification to comply environmental regulations and to manage environmental practices. According to Fura (2013), organizations should establish targets and objectives programs for a maximum performance. ISO 14001:2015 certification improve sales growth and financial results. Many studies have confirmed the positive impact of environmental management system on operational performance, production performance, product quality, process and product innovation (Darnall et al., 2008).

### **2.4. OHSAS 18001 and product quality**

Occupational Health and Safety Assessment Series (OHSAS 18001) is a British

Standard. The standard provides guidelines to identify, control and decrease the risks associated with health and safety at workplace. “Organizations of all kinds are increasingly concerned with achieving and demonstrating sound occupational health and safety (OH&S) performance by controlling their OH&S risks, consistent with their OH&S policy and objectives” (OHSAS 18001:2007). Research studies have concluded that OHSAS improve the organizational image, reputation and safety performance. OHSAS 18001 certification positively affect operational efficiency and productivity (Fernandez-Muniz et al., 2012b; Koivupalo et al., 2015). Organizations are interested to adopt OHSAS 18001 as a best practice to improve health and safety performance at workplaces (Idris et al., 2012). However, the findings of many research studies show that adaptation of OHSAS 18001 is less effective. It creates management issues and focuses only on paperwork (Granerud & Rocha, 2011). A new standard ISO 45001:2018 has been developed to replace OHSAS 18001. ISO 45001:2018 provides requirements for an occupational health and safety (OH&S) management system. The approach of the system is proactive and applicable to any organization.

ISO 9001 is reviewed every five years. The system is revised, if needed. The new version of ISO 9001 is ISO 9001:2015. ISO 9001:2015 helps to assess the organizational risks and opportunities in a better way. Previous research studies have investigated the relationship between ISO 9001 and organizational performance (Piskar, 2007; Willar, et al., 2015; Basir & Azmi, 2011). The findings of the previous research studies also revealed that ISO 9001 is an important tool to improve quality of products. Many researchers have recommended that ISO 9001 certification is more beneficial for manufacturing industries. The system helps to achieve quality at each level (Willar, et al., 2015; Vaughan & Trigunarsyah, 2015). Ataullah et al. (2014) have investigated that quality issues resulting in decline in growth of Textile Industry of Pakistan and suggested quality practices to enhance competitiveness. ISO 9000 certification enhances efficiency and reduces customers’ complaints and reduces production cost and reject rate (Awan, et. al., 2010; Memon, et al., 2011).

Findings of the previous research studies have also highlighted the ineffective role of ISO 9001 quality management system (Galetto, Franceschini & Mastrogiacomio, 2017). Previous studies have also ignored the major role of corporate culture in implementing and sustaining the system which is a major gap. We are also interested to investigate the impact of ISO 9001:2015 on product quality in Pakistani context. The current study has tested a mediated model and the following hypotheses were developed in the light of proposed model and previous research studies:

*Hypothesis 1:* There is a positive relationship between ISO 9001:2015 and corporate culture.

*Hypothesis 2:* There is a positive relationship between ISO 9001:2015 and product quality.

*Hypothesis 3:* There is a positive relationship between corporate culture and product quality.

*Hypothesis 4:* Corporate culture positively mediates the relationship between ISO 9001:2015 and product quality.

ISO 14001:2015 version is designed to respond to the current industrial trends. The new version also ensures the compatibility with other systems. *Pakistan* is a fast moving *business* sector and business managers are not satisfied with the performance of the system. The prime role of ISO 14001 certification is to decrease the negative impacts of operations. However, many studies have also suggested the certification for quality improvement (Fonseca, 2015). Previous research studies have tested the impact of ISO 14001 on the various aspects of corporate performance (Morris, 2003; Dick et al., 2011; Darnall et al., 2008) and to explore the relationship with product quality has been ignored. Research studies recommended that future research should explore the strength of the system in different contexts (Arena et al., 2012). The aim of the current study is to explore the impact of ISO 14001 certificate on product quality in organizations in Pakistan. The current study has used a specific driver of corporate culture that mediates the impact. The findings of the current study will fill the gap of uncertainty about the system. The corporate managers and management representatives will understand the behavior and strength of ISO 14001:2015. In the light of the previous studies, the following hypotheses were developed to be tested:

*Hypothesis 5:* There is a positive relationship between ISO 14001:2015 and corporate culture.

*Hypothesis 6:* There is a positive relationship between ISO 14001:2015 and product quality.

*Hypothesis 7:* Corporate culture positively mediates the relationship between ISO 14001:2015 and product quality.

Research studies are carried out to study the various aspects of Health, Safety and Environment (EHS) in most European countries and their possible relationship with OHSAS 18001 system. Researchers have recommended the system to improve EHS at workplaces (Santos et al., 2013; Fernandez-Muniz et al., 2012b; Koivupalo et al., 2015). Previous studies have also highlighted the important and significant role of OHSAS 18001 in integration with ISO 9001 and ISO 14001 (Valadimirovna, 2015). Literature shows rare studies on OHSAS 18001 system and product quality which is

a major gap. This study aims to identify the benefits of OHSAS 18001 certification especially how the system improve the quality of product and how the corporate culture accelerate the implementation and management of the system which is the ignored area in the previous research studies. In the light of the previous studies, the following hypotheses were developed to be tested:

*Hypothesis 8:* There is a positive relationship between OHSAS 18001 and corporate culture.

*Hypothesis 9:* There is a positive relationship between OHSAS 18001 and product quality.

*Hypothesis 10:* Corporate culture positively mediates the relationship between OHSAS 18001 and product quality.

Figure 1 shows the conceptual framework. There are three independent variables (ISO 9001:2015, ISO 14001:2015 & OHSAS 18001), one dependent variable (Product Quality) and one is the mediator (Corporate Culture).

### 3. Research Methodology

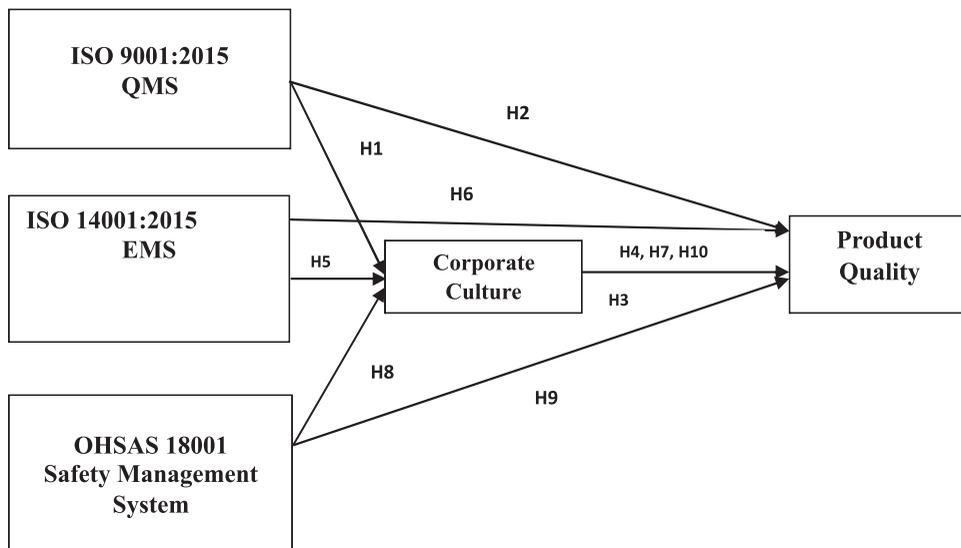


Figure 1: Conceptual Framework of the Research

### 3.1 Research approach

The mixed methods explanatory sequential research approach is used for the current research study. The design focuses on the completion of the quantitative phase and then the subsequent qualitative phase and the qualitative findings are used to explain the quantitative findings (Creswell, 2003). Mixed methodology is a useful approach to address the challenge of uncertainty during the entire research process (O’Cathain, Murphey & Nicholl, 2007). Four important dimensions of mixed methodology are participant enrichment, instrument fidelity, treatment integrity and to maximize the significance of the data (Collins, Onwuegbuzie & Sutton, 2006). The data were merged to achieve useful findings.

### 3.2. Population and sampling strategy

For quantitative study, the population consists of all industrial manufacturing units in Pakistan where ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 systems (IMS) are implemented. The quantitative data was gathered through a random survey from Quality Assurance Managers. The list of industrial units was taken from the office of Bureau VERITAS, Lahore, Pakistan. The list comprised of those industrial units which have implemented the IMS. A sample of 175 industrial manufacturing units was selected using simple random sampling technique. For the qualitative study, a sample of five ISO systems and industrial experts was taken using snowball sampling technique.

### 3.3. Instrumentation

A closed-ended questionnaire is used for the collection of quantitative data. Responses of the participants are obtained on five-point Likert-type Scale (1=strongly disagree to 5=strongly agree). A focus group was conducted to discuss and develop a draft and final measurement instrument for this study. The focus group comprised of technical experts in the areas of ISO systems and Management Representatives. Experts review the draft instrument and a final version was developed. Items associated with variables are mentioned in Table 1.

For qualitative data, face-to-face interviews with five Quality Assurance Managers (QAMs) and Management Representatives (MRs), selected through snow-ball non-probability sampling technique, were conducted and the questions were asked as mentioned in section 1.2. The qualitative study was conducted to explain the quantitative results. Before conducting interviews of the experts, the quantitative results were shared with them. The qualitative data was evaluated and the useful themes were extracted. Findings of quantitative and qualitative studies were integrated and

**Table 1:** Items, Variable and Determinants

S.no	Variable	Items adopted	Determinants
1.	ISO 9001:2015	Mangula (2013)	ISO 9001 certification improve quality and quantity. Top management commitment, regular trainings and teamwork are essential aspects for quality improvement.
2.	ISO 14001:2015	Arena et al. (2012)	The implementation of ISO 14001 required considerable investments and sustainability to ensure competitiveness. Impact on environmental performance and product quality is positive.
3.	OHSAS 18001	Gaureanu et al. (2016)	The Integrated Model establishes positive safety attitude. The goals of quality are achieved.
4.	Corporate Culture	Gambi et al. (2013)	Quality management techniques should be implemented according to the cultural characteristics. Quality initiatives based on “one sizes fit all” is not encouraging philosophy.
5.	Product Quality	Gambi et al. (2013)	Quality techniques improve the quality of the products. The culture plays the main role.

Note: This table presents description of items adopted from research studies, variables and determinants associated with independent variables i.e. ISO 9001:2015, ISO 14001:2015, OHSAS 18001, dependent variable i.e. product quality and mediating variable i.e. corporate culture

presented using data merging approach.

### 3.4. Data analysis techniques

The IBM Statistical Package for the Social Sciences (IBM SPSS Statistics) is used for processing and analyzing of the quantitative data. Reliability and internal consistency among items of each construct are determined to check the reliability and internal consistency. Multiple regression analysis is conducted to examine the effect of the bundle of independent variables on mediating variable and the dependent variable. Direct and simple regression analysis is conducted to examine the strength and direction of the relationship between variables. The estimated strength of hypothesized causal relationships is estimated by regression coefficients. The standardized regression coefficient  $\beta$  (beta) is determined to calculate the size and direction of the association between variables for significance and to make sure that the conditions of mediation analysis are satisfied as stated by Baron and Kenny (1986). The mediation analysis using Baron and Kenny (1986) method is conducted to check the impact of the mediator on the association of independent variables and dependent variable. Baron and Kenny (1986) proposed a four-step method in which significance of the

coefficients is determined at each step. Thematic analysis was conducted to analyze the qualitative data and the important themes and ideas were captured. The recorded and transcribed data was processed and analyzed. We applied Braun and Clarke (2006) six-phase guide to analyze the qualitative data.

#### 4. Results and Analyses

This section discusses the analysis of the quantitative data in sub-section 4.1, reliability of measures in sub-section 4.2, regression analysis in sub-section 4.3 and the analysis of qualitative data in sub-section 4.4. The quantitative section has explained the demographic profiles of the respondents and presents a descriptive summary. Results and findings of the quantitative study are explained by the qualitative results.

##### 4.1. Quantitative analysis

A total of 175 questionnaires were distributed to Quality Assurance Managers of 175 manufacturing industrial units in Pakistan out of which 146 questionnaires were received back. The demographics of participants are presented in Table 2 which contains information related to gender, age, qualifications, total experience in the profession and experience in the organization.

##### 4.2. Reliability of measures

**Table 2:** Demographic Profile of Participants

Demographics	Frequency	Percentage %
Gender (N=146)		
Male	100	68.4%
Female	46	31.5%
Age (N=146)		
Below 25	40	27.3%
26-35	06	4.1%
36-45	33	22.6%
46-55	67	45.8%
Qualification (N=146)		
MBA	05	3.4%
M. Phil	30	20.5%
M.Sc. Chemistry	100	68.4%
PhD	00	00%

Others	11	7.5%
Total Experience in the Profession(N=146)		
1-10	31	21.2%
11-20	54	36.9%
Above 20	61	41.7%
Experience in this Organization (N=146)		
1-10	51	34.9%
11-20	44	30.1%
Above 20	51	34.9%
	00	00%

Note: This table presents the demographic profile of participants i.e. gender, age, qualification, total experience in the profession and experience in this organization. Legend: PhD: Doctor of Philosophy, M.Sc.: Master of Science, M.Phil. Master of Philosophy, MBA: Master of Business Administration

Reliability and internal consistency among items of each construct are determined and the values of Cronbach’s alpha are presented in Table 3 which show a high degree of reliability and internal consistency. ISO 9001:2015 (alpha=0.944), ISO 14001:2015 (alpha=0.710), OHSAS 18001 (alpha= 0.798), Corporate culture (alpha=0.876) and Product quality (alpha=0.856).

### 4.3. Regression analysis

**Table 3:** Reliability of Measurement

Constructs	Valid N	Number of Items	Cronbach’s alpha
ISO 9001:2015	146	05	0.944
ISO 14001:2015	146	03	0.710
OHSAS 18001	146	03	0.798
Corporate Culture	146	04	0.876
Product Quality	146	06	0.856

Note: This table reports values of Cronbach’s alpha of variables

Multiple regression analysis is conducted (see Table 3) to examine the effect of the bundle of the independent variables (ISO 9001:2015, ISO 14001:2015 and OHSAS 18001) on mediating variable (Corporate Culture) and the dependent variable (Product Quality). The standardized regression coefficient  $\beta$  (beta) is determined to calculate the size and direction of the association between variables for significance.

Table 7 shows the results of mediation analysis. Direct effects of ISO 9001:2015,

**Table 4:** Multiple Regression Analysis

Independent Variables	Dependent Variables	
	Corporate Culture	Product Quality
ISO 9001:2015	0.480*	0.584*
	(6.55)	(8.77)
ISO 14001:2015	-0.260	-0.057
	(-2.872)	(-0.697)
OHSAS 18001	0.438*	0.289*
	(5.083)	(3.69)
Adjusted R <sup>2</sup>	0.362	0.473
F-Statistic	26.87*	42.49*

Note: This table presents the results of multiple regression analysis i.e. the aggregate effect of the independent variables (ISO 9001:2015, ISO 14001:2015 and OHSAS 18001) on mediating variable (corporate culture) and the dependent variable (product quality).  $\beta^*$  represent significance at less than 0.05, Value in parentheses represents t-ratios

Simple regression analysis is conducted to examine the strength and direction of the relationship between variables.

**Table 5:** Simple Regression Analysis

Independent Variables	Dependent Variables	
	Corporate Culture	Product Quality
ISO 9001	0.496*	0.640*
	(6.85)	(10.00)
R <sup>2</sup>	0.246	0.410
F-statistic	46.989*	100.078*
ISO 14001	0.208*	0.359*
	(2.554)	(4.618)
R <sup>2</sup>	0.043	0.129
F-statistic	6.521*	21.330*
OHSAS 18001	0.407*	0.414*
	(28.531)	(5.456)
R <sup>2</sup>	0.165	0.171
F-Statistic	28.531*	29.767*

Note: This table presents the results of simple regression analysis i.e. the separate effect of the independent variables (ISO 9001:2015, ISO 14001:2015 & OHSAS 18001) on mediating variable (corporate culture) and the dependent variable (product quality).  $\beta^*$  represent significance at less than 0.05, Value in parentheses represents t-ratios

**Table 6:** Simple Regression Analysis

Mediating Variable	Dependent Variable
	Product Quality
Corporate Culture	0.905*
	(25.594)
R <sup>2</sup>	0.820
F-Statistic	655.043*

Note: This table presents the results of simple regression analysis i.e. the effect of the mediating variable (corporate culture) on the dependent variable (product quality).  $\beta^*$  represent significance at less than 0.05, Value in parentheses represents t-ratios

ISO 14001:2015 and OHSAS 18001 on corporate culture and product quality have been investigated in order to make sure that the conditions of mediation analysis are satisfied as stated by Baron and Kenny (1986). The estimated strength of hypothesized causal relationships is estimated by regression coefficients Results of regression analysis in Table 5 and Table 6 show that the direct effects of ISO 9001 on product quality ( $\beta= 0.640$ , sig. <0.01) and corporate culture ( $\beta= 0.496$ , sig. <0.01) are significant. Similarly, the direct effect of corporate culture on product quality ( $\beta= 0.905$ , sig. <0.01) is also significant (see Table 6).

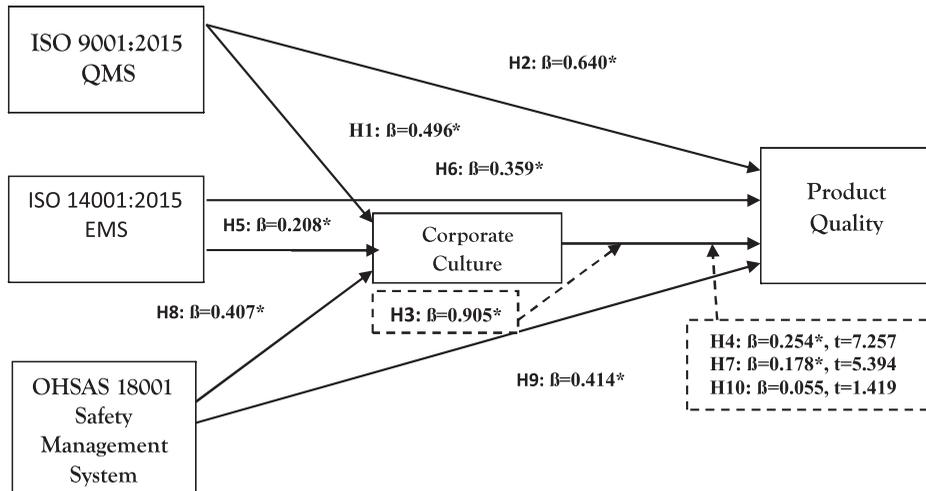
**Table 7:** Mediation Analysis

Independent Variables	Dependent Variable		
	Product Quality		
ISO 9001:2015	0.254*		
	(7.257)		
ISO 14001:2015		0.178*	
		(5.394)	
OHSAS 18001			0.055
			(1.419)
Corporate Culture	0.780*	0.868*	0.883*
	(22.305)	(26.244)	(22.887)
Adjusted R <sup>2</sup>	0.868	0.850	0.822
F-Statistic	471.347*	405.974*	330.833*

Note: This table presents the results of the mediation analysis.  $\beta^*$  Represents significance at less than 0.01 and value in parentheses represents t-ratios

### 4.3.1. Analysis for ISO 9001:2015

Results of regression analysis show that ISO 9001:2015 has a positive and significant effect on corporate culture ( $\beta = 0.480$ ,  $p < 0.001$ ) and product quality. ( $\beta = 0.584$ ,  $p < 0.001$ ). Results of simple regression analysis in Table 04 show that ISO 9001:2015 is positively and significantly affect corporate culture ( $\beta = 0.496$ , sig.  $< 0.01$ ). The value of  $R^2$  (0.246) represents that 24.6% variation in corporate culture is explained by ISO 9001:2015. The F-statistic (46.989) is significant at less than 1% significant level which reveals that the model is a good fit. Relationships of ISO 9001:2015 with the product quality is positive and significant. Table 6 shows that the impact of corporate culture ( $\beta = 0.905$ , sig.  $< 0.01$ ) on product quality is positive and significant. The value of  $R^2$  (0.820) shows that corporate culture defines the 82% variation in the product quality. The value of F-statistic (655.343) is significant at less than 1% significant level which reveals that the model is a good fit.



**Figure 2:** Results of Regression Analysis and Mediation Analysis  $\beta^*$  Represents significance at less than 0.01 and values of t statistic

Results of mediation analysis in Table 7 show that the indirect effect of ISO 9001:2015 on product quality ( $\beta = 0.254$ , sig.  $< 0.01$ ) is significant and the value of  $\beta$  decreases which shows that corporate culture (mediator) partially mediates the relationship between ISO 9001 (independent variable) and the product quality (dependent variable). Partial mediation exists when an independent variable exerts some of its effect on the dependent variable through the mediating variable. Results of regression analysis, Table 5 and Table 6, and mediation analysis, Table 7, confirmed the mediations and the null hypotheses are rejected and alternate hypotheses H1, H2, H3 and H4 are accepted in all cases (see Figure 2).

*Hypothesis 1:* There is a positive relationship between ISO 9001:2015 and corporate culture.

*Hypothesis 2:* There is a positive relationship between ISO 9001:2015 and product quality.

*Hypothesis 3:* There is a positive relationship between corporate culture and product quality.

*Hypothesis 4:* Corporate culture positively mediates the relationship between ISO 9001:2015 and product quality.

The results of regressions analysis (Table 5 and Table 6) and mediation analysis (Table 7) indicate the positive and significant association between ISO 9001:2015 and corporate culture, ISO 9001:2015 and product quality, corporate culture and product quality. Corporate culture positively mediates the relationship between ISO 9001:2015 and product quality.

#### 4.3.2. Analysis for ISO 14001:2015

The direct effects of ISO 14001:2015 on product quality ( $\beta = 0.359$ , sig.  $<0.01$ ) and corporate culture ( $\beta = 0.208$ , sig.  $<0.01$ ) are significant. Similarly, the direct effect of corporate culture on product quality ( $\beta = 0.905$ , sig.  $<0.01$ ) is also significant (see Table 05 and Table 06). Results of mediation analysis in Table 7 show that the indirect effect of ISO 14001:2015 on product quality ( $\beta = 0.178$ , sig.  $<0.01$ ) is significant and the value of  $\beta$  decreases which shows that corporate culture partially mediates the relationship between ISO 14001:2015 and the product quality. Results of regression analysis (Table 5, Table 6 and Figure 02) and mediation analysis (Table 7) confirmed the partial mediation. So, the null hypotheses are rejected and alternate hypotheses H5, H6 and H7 are accepted.

*Hypothesis 5:* There is a positive relationship between ISO 14001:2015 and corporate culture.

*Hypothesis 6:* There is a positive relationship between ISO 14001:2015 and product quality.

*Hypothesis 7:* Corporate culture positively mediates the relationship between ISO 14001:2015 and product quality.

The results of regressions analysis (Table 5, Table 6) and mediation analysis (Table 7) show that the impact of ISO 14001:2015 on corporate culture and product quality is positive and significant. Corporate culture positively mediates the relationship

between ISO 14001:2015 and product quality.

#### 4.3.3. Analysis for OHSAS 18001

The direct association of OHSAS 18001 with product quality ( $\beta = 0.414$ , sig.  $< 0.01$ ) and corporate culture ( $\beta = 0.407$ , sig.  $< 0.01$ ) are positive and significant. However, the indirect relationship of OHSAS 18001 with product quality ( $\beta = 0.055$ ,  $t = 1.419$ , sig. = 0.158) is insignificant which shows that corporate culture fully mediates the relationship between OHSAS 18001 and the product quality. Results of regression analysis (Table 5 and Table 6), and mediation analysis (Table 7) confirmed the mediations and the null hypotheses are rejected and the below alternate hypotheses H8, H9 and H10 are accepted.

*Hypothesis 8:* There is a positive relationship between OHSAS 18001 and corporate culture.

*Hypothesis 9:* There is a positive relationship between OHSAS 18001 and product quality.

*Hypothesis 10:* Corporate culture positively mediates the relationship between OHSAS 18001 and product quality.

The quantitative analysis establishes the positive relationship between OHSAS 18001 and corporate culture and product quality. Corporate culture positively mediates the relationship between OHSAS 18001 and product quality.

## 4.4. Qualitative data analysis

Thematic analyses are conducted to analyze the qualitative data. Various significant themes of the transcribed data are captured and presented below.

**Research Question 1:** What is the nature of the impact of ISO 9001:2015 on product quality in the manufacturing industry of Pakistan?

Experts shared that ISO 9001:2015 is an important structural intervention and organizations have adopted ISO 9001:2015 to improve the quality dimensions. ISO 9001:2015 has presented a framework for product realization from design to delivery. The focus of the new version ISO 9001:2015 is to enhance the application of process approach. The positive impact of ISO 9001:2015 and other quality management systems on the product quality has been accepted globally. However, organizations should address the issues of system sustainability. A comprehensive corporate strategy, management commitment, strong internal control are organizational aspects that make the system more effective and efficient.

**Research Questions 2:** What is the nature of the impact of ISO 14001:2015 on product quality in the manufacturing industry of Pakistan?

ISO 14001:2015 focuses on efficient utilization of organizational resources, control of wastages, and continual improvement. The system ensure the better environmental performance of organizational components to gain strategic business objectives. The impact of ISO 14001:2015 on product quality is not encouraging. However, the requirements of the system are development to minimize the negative significant impacts of aspects in organizations. The system has a little contribution to improving the product quality. The role of certification, monitoring, and regulatory bodies is instrumental to implement a strong check and reviewing procedures. The system has yield better results in Multi-National Corporations due to well-defined processes, visionary leadership and commitment.

**Research Questions 3:** What is the nature of the impact of OHSAS 18001 on product quality in the manufacturing industry of Pakistan?

Experts pointed out that OHSAS 18001 provides a framework for structured approach. The system focuses on commitment to health, safety and business performance. The requirements of the system are developed to keep a workplace safe and productive. The association between OHSAS 18001 and product quality is debatable and not encouraging. However, the integration of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 demonstrates positive impact on product quality.

## **5. Conclusions**

The major objective of the current research study was to explore the impact of three structural OD interventions (ISO 9001:2015, ISO 14001:2015 & OHSAS 18001) on product quality in the manufacturing industries of Pakistan. Findings and results of the research study are presented in this section. Sub-section 5.1 explain the nature of impact of ISO 9001:2015 on product quality, sub-section 5.1 highlighted the nature of impact of ISO 14001:2015 on product quality, sub-section 5.3 explain the nature of impact of OHSAS 18001 on product quality and sub-section 5.4 elaborate how corporate culture mediates the relationships of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001and product quality?

### **5.1. ISO 9001:2015 and product quality**

The quantitative findings indicate that the impact of ISO 9001:2015 on product quality is positive and significant. Product quality receives maximum impact from ISO 9001:2015. Previous research studies also revealed that ISO 9001 is a strategic tool and used to help organizations to minimize cost of production, rejections and to

improve quality. The impact of ISO 9001 certification on product quality is positive and encouraging. ISO 9001 certification is more suitable for manufacturing industries to improve product quality and performance (Willar, et al., 2015; Ataullah, et al., 2014; Vasileios & Odyseas, 2015; Debby, Vaughan & Trigunarsyah, 2015).

Many research studies have also highlighted the ineffective role of ISO 9001 certification (Debby, Vaughan & Trigunarsyah, 2015; Galetto et al., 2017). According to the claim of experts of the qualitative study, ISO 9001:2015 is a systematic way of achieving organizational excellence. Sustainability of the system is a major issue in Pakistan. The effective and efficient system requires a comprehensive corporate strategy aligned with the business strategy. The success of any quality program depends upon the level of management commitment and a rich business culture accelerates quality programs. ISO 9001:2015 certification is fruitful if the set of quality standards are implemented and maintained in the true sense. The process needs a commitment from top to bottom. Findings show that Pakistani firms acquired the ISO 9001:2015 certification as result of external pressure. Firms are not interested to develop a culture of quality and excellence. In Pakistan, another issue is the commitment of top management. Saleem et al. (2011) have examined the impact of ISO 9000 on organizational performance in Pakistan and highlighted the low commitment of management. Successful implementation of the system is not possible without the top management commitment. Shafiq (2012) has studied the role of quality management systems in textile sector of Pakistan and stated that ISO 9000 is widely adopted by textile manufacturers. Firms need to integrate the system with other management systems to achieve better performance.

Organizations wishing to improve product quality need to develop a strong internal and monitoring system. Quality Assurance experts recommended ISO 9001:2015 certification for both internal and external benefits. However, Djofack and Camacho (2017) say that organizations prefer ISO 9001:2015 certification to achieve internal benefits like processes, procedures and the product quality. In Pakistan, firms fail to achieve the desired results from any quality program due to lack of professionalism, lack of quality attitudes of the employees and poor cooperative culture

## **5.2. ISO 14001:2015 and product quality**

The quantitative findings of the current study show positive and significant impact of ISO 14001:2015 on product quality. Previous research studies also have investigated the impact of ISO 14001 on various aspects of performance. According to Fura (2013) and Fonseca (2015), ISO 14001 reduces negative impacts; improve financial and economic performance, improve product quality and reduces operational costs.

Experts of the qualitative study stated that the prime objectives of ISO 14001:2015 certification are to control industrial wastages and environmental hazards. The certification helps organizations to do business in the global market. On the other hand, organizations in Pakistan have adopted ISO 14001:2015 to qualify external audits requirements. The impact of ISO 14001:2015 on product quality is not encouraging. The system has a little contribution to improving the product quality. Organizations are not penalized for their poor operational and environmental procedures. Organizations are not interested to move forward to adopt a systematic approach to control industrial effluents. However, the system has enhanced many aspects of the quality in Multi-National Corporations.

Anjum and Imran Ullah (2016) have discussed the trends and scope of ISO certification in Pakistan and highlighted the main drivers. Globalization is a major challenge. Compliance to quality is also a major business dilemma. If we compare Pakistan with developed countries, Pakistan need more environmental sustainability to achieve the corporate objectives. Currently, organizations are not interested to develop the capacity to minimize the negative operational impacts. Organizations need more work to develop green culture.

### **5.3. ISO OHSAS and product quality**

The quantitative findings of the current study reveal that the direct association of OHSAS 18001 between the product quality is significant. Previous research studies have also explained the nature of the association between OHSAS 18001 and various performance parameters. OHSAS 18001 certification improve productivity and encourages employees to attend health and safety programs (Gaureanu et al., 2016; Koivupalo et al., 2015). The views of the Quality Assurance Managers are worth mentioning. They shared their views that the objectives of OHSAS 18001 certification are to reduce the risk of accidents and to promote the safety culture. In Pakistan, incident cases are not reported. Although, OHSAS 18001 provides a framework to mitigate the potential risks at workplaces (Ehsan, Anwar & Talha, 2009). Experts stated that the direct link between OHSAS 18001 and product quality is not encouraging. Employees of the manufacturing organizations face many health and safety challenges. The majority of workers lack knowledge about health and safety issues in Pakistan. The incidents rate at workplaces is high. Organizations should incorporate green practices and innovative technologies to promote health and safety culture. Ineffective legislations and weak enforcement are the major aspects of poor health and safety situation in Pakistan (Hassan, 2012). Generally, OHSAS 18001 certification promotes safety culture and improves operational control that leads to an effective manufacturing process and product storage.

Experts also recommend the integration of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 into a single Integrated Management System (IMS). The integrated models are more helpful in organization development. Previous research studies also revealed that IMS reduces cost and helps to improve operations. The IMS model enhances the efficiency of multiple functions. However, training and development of top management on integration issues is mandatory (Dahlin & Isaksson, 2017; Ismyrlis, 2017; Domingues, Sampaio & Arezes, 2017).

#### **5.4. The mediation role of corporate culture**

The second objective of the current study was to investigate the role of high performance culture in implementing and sustaining of ISO 9001:2015, ISO 14001:2015 and OHSAS 18001 systems. The findings of the current study concluded the strategic and compliant role of the corporate culture. Corporate culture partially mediates the association of ISO 9001:2015 and ISO 14001:2015 with the product quality. Corporate culture fully mediates the relationship of OHSAS 18001 with the product quality. Results show that high-performance corporate culture facilitates the implementation of OD initiatives and quality improvement efforts. Corporate culture plays a major role in any OD change process. A high-performance culture is a set of behaviors. Behaviors are applied within organizations to achieve superior objectives. A culture where employees gain the clarity on corporate business interests. A high performance culture accelerate the performance because employee share knowledge and innovative ideas. Employees know their responsibilities and goals and they are rewarded for achievements. High performance culture is one of the major drivers of any management process. However, the components of a high performance work culture are unique to each company.

#### **6. Limitations and Future Research Directions**

Findings of this research study are limited by its focus and scale. This research study has utilized a mixed methods explanatory design which is a costly and lengthy process. Further research should extend the study to cover other methodologies to explore the phenomena in more detail. However, the design enhanced the worth of findings. As discussed, OD is an emerging field in Pakistan and still organizations have not achieved the sustained benefits from ISO certification. Research studies on OD, ISO systems and corporate culture are rare. In literature, qualitative research studies on the topic are uncommon.

The results of the current research study provide valuable contributions to theory and practice and will create knowledge in the area of “*OD structural interventions*” in Pakistan. Findings are also beneficial for corporate managers, policy makers and

Management Representatives (MRs) to design and implement ISO systems for quality improvement. The study is more strategic in nature and will encourage research on OD and ISO systems in Pakistan. Findings of the current study provide empirical support that structural interventions, aligned with high-performance work culture, are helpful to achieve high quality products.

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