

INTEGRATED QUALITY AND ENVIRONMENTAL MANAGEMENT
FRAMEWORK FOR SMALL AND MEDIUM FOOD PROCESSING
ENTERPRISES IN PAKISTAN

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INTEGRATED QUALITY AND ENVIRONMENTAL MANAGEMENT
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ENTERPRISES IN PAKISTAN

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DEDICATION

This thesis is dedicated to my (late) father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

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ABSTRACT

Food is an essential component for our daily dietary needs. The demand for food is increasing as with the increasing population. Undoubtedly, the significance of food industry to the countries' growth is well recognized. However, as reported in the literature, majority of food industry players are Small and Medium Enterprises (SMEs), where they are confronted with limitations and constraints to succeed in the business growth due to limited resources. Nowadays, food industry has been reported to consume abundant resources of water and energy, and pollute the environment through water waste, solid wastes, and air pollution. Therefore, further study on these related issues should be explored particularly in the developing countries. Thus, the research was decided to be conducted among food processing SMEs in Pakistan. Pakistan is a developing country where the implementation of quality and environmental management practices is far behind. The awareness and implementation of environmental regulations are also reported weak, especially by the Pakistan's SME. Currently, the country is facing hindrances in global food trade due to the lack of environmental concerns. To date, there are no empirical studies on quality and environmental management in food processing SMEs of Pakistan, and the extent of integrated quality and environmental management practices is still a grey area. Moreover, the important role of organization culture is also less studied in developing countries such as Pakistan. To fill the research gaps, this study aims to identify the Critical Success Factors (CSFs) of Integrated Quality and Environmental Management (IQEM) and examine their impact on the performance of food processing SMEs in Pakistan. The moderating role of organizational culture on the relationship between IQEM practices and the organizational performance is also examined. Seven constructs are used to measure IQEM whereas the organizational performance is measured by operational and environmental performances. A questionnaire was developed and distributed to food processing SMEs operating in Punjab, Pakistan, which is 65.27 % of the total SMEs are in Pakistan. The unit of analysis is SME company and the respondents of the questionnaire are those who possess knowledge about the subject matter. Purposive with snowball sampling techniques were used for data collection. A total of 302 food processing SME owners or managers responded to the survey but only 288 are useable for further analysis. IBM-SPSS version-23 and SmartPLS-3 were used for data analysis and hypothesis testing. The results show that CSFs of IQEM have significant impact to the performance of food processing SMEs in Pakistan. Moreover, the organizational culture moderates the relationship between IQEM and the organizational performance. This study has succeeded to fill the research gap identified, especially on the CSFs of IQEM for food processing SMEs in the developing countries such as Pakistan. It is believed that by practicing CSFs of IQEM, food SMEs can improve their performance and increase their competitiveness. Furthermore, organizational culture is also revealed as a key factor that is significant on organizational performance. The research findings will help the SMEs to increase their implementation awareness on IQEM practices to gain success in business. Indirectly, this study will be able to help food processing SMEs especially in Pakistan to improve their holistic organizational performance. It will also be able to motivate and expose a role of organizational culture to be imposed by SME food industry especially in Pakistan in order to gain competitive advantage.

ABSTRAK

Makanan adalah komponen penting bagi keperluan diet harian. Permintaan untuk makanan semakin meningkat seiring dengan peningkatan populasi penduduk. Tidak dinafikan, kepentingan industri makanan terhadap pertumbuhan negara telah diiktiraf dengan baik. Walau bagaimanapun, seperti yang dilaporkan dalam literatur, majoriti pemain industri makanan adalah Perusahaan Kecil dan Sederhana (SMEs), di mana mereka menghadapi pelbagai batasan dan kekangan untuk berjaya dalam perniagaan disebabkan oleh sumber-sumber yang terhad. Pada masa kini, industri makanan juga telah dilaporkan menggunakan banyak sumber air dan tenaga, dan mencemarkan alam sekitar melalui sisa air, sisa pepejal, dan pencemaran udara. Oleh itu, kajian lanjut tentang isu-isu berkaitan perlu diterokai terutamanya di negara-negara sedang membangun. Dengan yang demikian, kajian ini diputuskan untuk dijalankan dalam kalangan SMEs pemprosesan makanan di Pakistan. Pakistan adalah sebuah negara yang sedang membangun yakni pelaksanaan pengurusan kualiti dan alam sekitar adalah jauh kebelakang. Kesedaran dan pelaksanaan peraturan alam sekitar juga dilaporkan lemah, terutama oleh SMEs di Pakistan. Pada masa ini, negara menghadapi halangan dalam perdagangan makanan global disebabkan kurang memberi perhatian terhadap alam sekitar. Sehingga kini, tiada kajian empirikal tentang pengurusan kualiti dan alam sekitar SMEs pemprosesan makanan di Pakistan, dan sejauh mana integrasi pengurusan kualiti alam sekitar diamalkan masih kabur. Selain itu, kepentingan peranan budaya organisasi juga kurang dikaji di negara-negara membangun seperti Pakistan. Untuk merapatkan jurang kajian, kajian ini bertujuan untuk mengenal pasti Faktor Kejayaan Kritikal (CSFs) Intergrasi Pengurusan Kualiti dan Alam Sekitar (IQEM) dan mengkaji impaknya terhadap prestasi SMEs pemprosesan makanan di Pakistan. Peranan penyederhanaan budaya organisasi ke atas hubungan antara amalan IQEM dengan prestasi organisasi turut dikaji. Tujuh konstruk digunakan untuk mengukur IQEM manakala, prestasi organisasi diukur oleh prestasi operasi dan persekitaran. Soal selidik telah dibangunkan dan diedarkan kepada SMEs pemprosesan makanan yang beroperasi di Punjab, Pakistan, iaitu 65.27% daripada jumlah SMEs di Pakistan. Unit analisis bagi soal selidik ini adalah syarikat SMEs dan responden yang berpengetahuan tentang perkara ini. Teknik pensampelan bola salji digunakan untuk pengumpulan data. Sejumlah 302 pemilik atau pengurus SMEs pemprosesan makanan telah menjawab kaji selidik tersebut namun hanya 288 sahaja yang boleh digunakan untuk tujuan analisis selanjutnya. IBM-SPSS versi-23 dan SmartPLS-3 digunakan untuk menganalisis data dan menguji hipotesis. Keputusan menunjukkan semua CSF IQEM mempunyai impak yang signifikan terhadap prestasi SMEs pemprosesan makanan di Pakistan. Selain itu, budaya organisasi menyederhanakan hubungan antara IQEM dengan prestasi organisasi. Kajian ini telah berjaya mengisi jurang penyelidikan yang telah dikenalpasti, terutamanya pada elemen CSF bagi IQEM untuk SMEs pemprosesan makanan di negara-negara membangun seperti Pakistan. Adalah dipercayai bahawa dengan mengamalkan CSFs bagi IQEM, SMEs makanan dapat meningkatkan prestasi dan daya saing. Tambahan pula, budaya organisasi juga telah dibuktikan sebagai faktor utama yang signifikan ke atas prestasi organisasi. Dapatan kajian ini akan dapat membantu SMEs meningkatkan kesedaran terhadap pelaksanaan amalan IQEM untuk mencapai kejayaan dalam perniagaan. Secara tidak langsung, kajian ini juga dapat membantu SMEs pemprosesan makanan terutamanya di Pakistan meningkatkan prestasi organisasi secara holistik. Ia juga dapat memotivasikan dan mendedahkan peranan budaya organisasi yang akan dilaksanakan oleh SMEs makanan terutamanya di Pakistan untuk mencapai kelebihan bersaing.

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LIST OF ABBREVIATIONS

BC	-	Before Christ
BOD	-	Biochemical Oxygen Demand
CBM- SEM	-	Covariance based Structural Equation Modelling
CI		Confidence interval
CMB		Common Method Bias
CR	-	Composite Reliability
COD	-	Chemical Oxygen Demand
CSFs	-	Critical Success Factors
DP	-	Deming Prize
EFQM	-	European Foundation for Quality Management
EM	-	Environmental Management
EU	-	European Union
FBS	-	Federal Beuro of Statistics
FSM		Food Safety Management
GDP		Gross Domestic Product
HACCP		Hazard Analysis Critical Control Point
HRM		Human Resource Management
HTMT		Heterotrait-Monotrait Ratio
IPMA		Importance performance Map Analysis
IQEM		Integrated Quality Environmental Management
ISO		International Organization for Standardization
MBNQA		Malcolm Baldrige National Quality Award
MDPR		Ministry of Planning, Development and Reforms
MOCC		Ministry of Climate Change
PBS		Pakistan Bureau of Statics
PDCA		Plan, Do, Check, Act
PLS- SEM		Partial Least Squares-Structural Equation Modelling
PNAC		Pakistan National Accreditation Council

PSQCA	Pakistan Standards and Quality Control Authority
QM	Quality Management
RBV	Resource-based View
SBP	State Bank of Pakistan
SCM	Supply Chain Management
SECP	Securities and Exchange Commission of Pakistan
SEM	Structural Equation Modelling
SHT	Stake Holder Theory
SMEs	Small and Medium-Sized Enterprises
SMEDA	Small and Medium-Sized Enterprises Development Authority
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Mean Square Residual
TQM	Total Quality Management
UNIDO	United Nations Industrial Development Organization
UTM	Universiti Teknologi Malaysia
WB	World Bank
WTO	World Trade Organization

LIST OF SYMBOLS

α	-	Cronbach alpha
β	-	Path coefficient
f^2	-	Effect size
Q^2	-	Predictive relevance
R^2	-	Coefficient of determination

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Food is an important component for our body and used in daily life for its dietary needs. Safe food keeps us healthy and prevents foodborne diseases. Food processing is a technology which adds value to increase the shelf-life of the products (Fellows, 2009). The food processing industry mainly converts agro-materials into the final products by using several process design techniques (Jonkman *et al.*, 2017). The history of food processing and preservation techniques starts from around 3000-1500BC where the Egyptians first developed techniques such as sun drying for poultry and fish, ovens for baking, fermentation and cereal grinding. Later, some pastoral societies preserved food for use in times of famine. With the passage of time, food technologies developed in many places such as China, Japan, Europe and India, where they invented different kinds of food processing technologies according to their needs and food preferences (Fellows, 2009).

The demand for processed food is increasing globally due to its unique characteristics, such as easy cooking, which requires less time and consumes less energy, and the provision of products with a longer shelf-life and a range of different varieties and flavours (Boyue and Arcand, 2010; Chukwu, 2009). Augustin *et al.* (2016), stated that the world population is growing fast and is estimated to be 9 billion in 2050; besides the other challenges, the production of food is believed to be a big challenge as the growing population will need more food, water and resources. This is supported by Oldfield, White, and Holden (2016), who note that, due to increasing demand for food, meeting the sustainability needs of the population is a big challenge.

Food systems are at the heart of the 2030 Agenda for Sustainable Development (UN, 2015), a global commitment to eradicate poverty and hunger while ensuring reduction of environmental and socio-economic impacts (Sala *et al.*, 2016). The developments in resource availability, consumer trends and legislation require the food industry to regularly evaluate its mode of operations in order to remain competitive in global markets (Jonkman *et al.*, 2017). Food processing is considered as one of the solutions that reduces food wastage and provides longer shelf-life to the products.

Pakistan is an agrarian country and its food industry is considered the country's largest with an export potential of 13% of total exports (Trading Economics, 2018). The food and beverage processing industry accounts for approximately 27% of total production, 16% of the total manufacturing industry manpower is employed in this sector (SMEDA, 2010b). Pakistan's Small and Medium-Sized Enterprises (SMEs) make up 90% of the country's businesses and play an important role in socio-economic development, (Khan, Awang, and Zulkifli, 2013). Food and beverage SMEs make up 20.09% of total manufacturing and come second after the textile sector (Ahmad, Naz, and Majid, 2018; SMEDA, 2009).

Pakistan's SMEs have great export potential, however, currently, SMEs are facing different kinds of problem such as a shortage of skilled labour, lack of infrastructure, lack of education and training, non-compliance with standards, export barriers, fierce international competition and an energy crisis. These problems and issues are hindering the performance of SMEs (Dar, Ahmed, and Raziq, 2017; Khan and Khalique, 2014; Khattak, Arslan, and Umair, 2011). According to Dar *et al.* (2017) and Rehman (2016), little research and development work has been conducted in the SME sector. According to the best of the researcher's knowledge, no noteworthy studies on food processing SMEs in Pakistan have been conducted. Therefore, food processing SMEs are a grey area.

Beside the advantages of processed food, this industry is considered as one of the major sources of environmental pollution through solid waste, air pollution, noise pollution and waste water (Pipatprapa, Huang, and Huang, 2016). Numerous authors

highlighted the environmental problems/issues in food processing such as inefficiencies in food production by producing more waste, consumption of abundant resources of water and energy, food losses in different supply chains, food packing and the transportation of food. These inefficient production practices are imposing negative impacts on the natural environment (Abeelee *et al.*, 2017; Alsaffar, 2016; Goot *et al.*, 2016). Moreover, Adeyeye (2017) stated that the world is facing food security challenges due to inefficient production practices; therefore, countries need to be more focused on sustainable production practices since a country's economic growth and sustainability is highly dependent on food security. Similarly, Notarnicola *et al.* (2016) stated that there is a dire need to fulfil the fundamental human need for nutrition; hence, ensuring food security requires a revised research agenda.

Moreover, globalization, intense competition and ever-changing customer demands have dramatically changed the business environment during the last few decades (Ebrahimi and Sadeghi, 2013). In this regard, fulfilling the customer's demand for higher product quality is becoming challenging; therefore, organizations are seeking to improve their products' quality *as per* customers' requirements. Thus, adoption of quality improvement initiatives is increasing day-by-day. Similarly, the sustainability issues and environmental pollution have influenced organizations to reduce their environmental burden and focus more on sustainable production (Mezinska and Strode, 2015). According to Ali and Suleiman (2016), in the food sector, consumers are now demanding more stringent quality control, food safety and healthy food along with environmental compliance.

According to Singh, Jain, and Sharma (2015), a growing number of companies are now recognizing the importance of sustaining the natural environment and trying to reduce environmental impacts from their operations; for that purpose, companies are developing new environmental strategies and programs in order to get higher environmental benefits since the industrial sector is considered as one of the major sources of pollution. Therefore, industries and their stakeholders are focusing more on their production practices in order to make the operations more sustainable (Alayón, Säfsten, and Johansson, 2017; de Sousa Jabbour *et al.*, 2018; Shafiq,

Lasrado, and Hafeez, 2017). In addition, Saad (2016) stated that organizations are seeking to optimize their performance in order to deliver high-quality products, reduce waste, enhance the recycling of materials, minimise operating costs, protect the environment, conserve resources and promote economic feasibility. In this regard triple bottom-line concepts such as people, planet and profit are considered vital for organizations that provide social, environmental and financial benefits (Alayón *et al.*, 2017).

In the early 2000s, the adoption of management systems for quality, the environment and safety became an important activity for many organizations since these management systems are considered as a symbol of success that provides the opportunity to control the risks, costs, environmental impacts, non-conformities and customer satisfaction whilst undertaking a continuous improvement approach (Moumen and El Aoufir, 2017). Moreover, quality management focuses on process improvement, reduction of wastage and continuous improvement. It provides superior value to the customers and improves the efficiency of the processes whereas environmental management focuses on reducing pollution, air emissions, solid waste and hazardous waste (Alayón *et al.*, 2017; Bernardo *et al.*, 2015; Miles and Covin, 2000).

The environmental performance is determined as how company improves its performance by reducing the solid wastes, reducing the water wastage, decrease the consumption of harmful material, reduce the consumption of water and energy by using efficient equipment. Moreover; quality and environmental management systems were acknowledged as important tools to put the sustainable production principles into practice (Alayón *et al.*, 2017). Implementing quality and environmental management practices within an organization helps create a sustainable business (Antony, 2015). In addition, the protection of the natural environment has become a central concern for business organizations; therefore, environmental practices are becoming key instruments and have received much critical attention from researchers and practitioners (Hamdoun, Chiappetta Jabbour, and Ben Othman, 2018). Moreover, sustainable manufacturing practices have been defined mostly from an environmental perspective, aiming at minimizing the impacts of manufacturing operations on the environment while optimizing the production efficiency of the company (Alayón *et al.*, 2017; Nordin, Ashari, and Rajemi, 2014).

Furthermore, the concepts of integration of management systems are becoming a very popular research topic they enhance an organization's efficiency and performance and provide benefit from the synergies existing among them (Simon, Karapetrovic, and Casadesús, 2012). An integrated management system (IMS) is a single management system that delivers the processes of the business through mutually supportive structured management functions configured around the wider needs of the organization (Griffith and Bhutto, 2009). Previous studies revealed that IMSs provide cost savings, avoid duplication of tasks, improve corporate image, improve performance and provide higher customer satisfaction (Molina-Azorín, Tarí, *et al.*, 2009; Rebelo, Santos, and Silva, 2016; Tarí and Molina-Azorín, 2010; Vílchez and Darnall, 2016).

Quality Management is considered to provide suitable support for the integration of sustainability considerations in the area of product development. Moreover, QM can be integrated with other management systems to achieve sustainability, such as an environmental management system (Siva *et al.*, 2016), occupational health and safety management systems (Santos *et al.*, 2013), corporate social responsibility (Khurshid, Amin, and Ismail, 2018) and supply chain management (Bastas and Liyanage, 2019). According to Oskarsson and Malmberg (2005), the most commonly integrated management systems are quality and environmental management systems that are adjusted to function together. By integrating QM and EM, an all-embracing, effective, single, integrated, quality environmental management (IQEM) system is created (Bernardo *et al.*, 2018; Molina-Azorín, Tarí, *et al.*, 2009; Tarí and Molina-Azorín, 2010).

According to Karapetrovic and Willborn (1998), an integrated quality and environmental management system improves technology development and transfer, improves operational performance, improves internal management methods, enhances the confidence of customers, provides a positive market image, reduces costs and is more efficient for re-engineering. The literature revealed that integrated quality environmental management practices provide sustainability is operations, increase performance, improve corporate image and provide higher customer satisfaction. Therefore, this study is focused on integrated quality environmental

management (IQEM) in food processing SMEs and identifies the critical success factors (CSFs) of IQEM, in order to improve the performance of food processing SMEs since Pakistan's food processing SMEs are lacking in terms of quality and environmental performance. According to Ram and Corkindale (2014), CSFs help to identify the key areas which require constant and careful attention for achieving organizational goals thereby ensuring the organizations' competitive performance.

It is important to mention that for the implementation of quality, environmental or integrated management initiatives, organizational culture plays a pivotal role. Culture has been identified as one of the key determinants of the success that provides sustainable economic and business connections among countries and industries (Nguyen and Aoyama, 2015). According to Uz Kurt *et al.* (2013), organizations seek to improve their performance and, in this regard, organizational culture has been recognized as one of the important drivers to improve a firm's performance. Furthermore, Wong-Mingji *et al.* (2014) mentioned that cross-cultural boundaries have an impact on the development of high-quality, productive, international businesses.

Discussing the role of organizational culture on quality initiatives, Jabnoun and Khafaji (2005) mentioned that culture is a key element in determining success or failure of quality initiatives, even in the adoption of QM programs which also vary from country to country and between organizations. According to Prajogo and McDermott (2011), organizational culture provides different competitive performance priorities by identifying the specific cultural dimensions. Therefore, organizations might choose to position how to compete in particular cultural characteristics. As mentioned by Prajogo and McDermott (2005), several organizations failed to achieve the expected goals of the implementation of quality management as a result of ignoring cultural factors. This is supported by Aziz, Maria, and Rahayu (2017) and Arshad, Halipah, and Omar (2018), where they noted that many companies fail to implement quality management because they do not recognize that the implementation of the procedure may require a fundamental change of direction for the values and culture of that company.

The literature review shows that organizational culture plays a key role in achieving organizational success. Therefore, any change in organizational culture can lead to the success or failure of the system. If employees of the company are willing to accept the change, especially for quality and environmental initiatives, the company will definitely achieve its targets and become competitive in the market, otherwise there is a chance of failure of the system. Rezaei *et al.* (2018), stated that organizational culture is considered as a strategic source for 21st century success in both business and the economy, it is also one of the fundamentals for sustainable competitive advantage. Thus, organizational culture plays a fundamental role in achieving sustainable environmental management practices and the implementation of sustainable practices needs proper embedding within an organizational culture (Bakhsh Magsi *et al.*, 2018). According to Tayeb (1994), 93% of studies concluded that culture is an important factor and cultural values, traditions, behaviours and attitudes play a vital role in shaping an organization. Therefore, the role of organizational culture cannot be neglected, especially for the implementation of IQEM practices where the role of organizational culture is crucial.

Moreover, this study is underpinned by two theories namely: Resource-based View (RBV), and stake holder theory (SHT). RBV is the most widely accepted theory that focuses on internal resources and capabilities of an organization; as internal resources are considered as the main source of an organization's success (Akio, 2005). Moreover, stakeholders are defined as, any group or individual who can affect or is affected by the achievement of the organization's objectives (Hadi, Abdullah, and Sajilan, 2015). Since, both RBV and SHT theories fulfil the objectives of this study, and provide support to improve the performance, provides higher customer satisfaction, and positive company image. Likewise, both QM and EM practices have significant impact on performance and provides higher customer satisfaction and positive company image.

1.2 Problem Statement

There are several quality and environment problems and issues in food processing SMEs that are affecting their performance in Pakistan. According to the Government of Punjab (2015), constraints such as access to international markets, lower levels of standardization of quality assurance as well as corruption are hindering industrial performance. The poor quality control mechanisms and applied standards create difficulties in exporting products, whilst firms seeking certification are using labs outside Pakistan in order to meet international requirements for their export orders. Furthermore, highlighting the quality problems, the State Bank of Pakistan (2017) has reported that maintaining quality in food products is a major challenge for the food processing industry since food industries need to adopt quality standards throughout their supply chains in order to achieve a competitive environment and customer satisfaction.

In addition, Kureshi *et al.* (2010) stated that the SME sector is reported to be less involved in quality management practices. Moreover, most of the SMEs in the country have minimal quality systems and their product quality is either not being ensured or being ensured with some informal practices. According to Irfan *et al.* (2014), Pakistan is considered to be a late adopter of total quality management (TQM) practices, only adopting TQM in 2010. Discussing the performance of SMEs in Pakistan, Bhutta, Rana, and Asad (2007) stated that their performance is not up to the mark, indeed it is showing a decreasing trend. This is supported by Khalique *et al.* (2015) where they stated that it is an alarming situation for the Pakistani economy because poor performance of SMEs is associated with poor performance for industrial output.

Furthermore, environmental issues have gained more attention in the last few decades due to the increasing number of global warming and climate change predictions. The media, civil society, Non-Governmental Organizations (NGOs), Environmental Protection Agencies (EPA) and governmental departments are pressurizing organizations to address their environmental issues and improve their environmental performance. For these reasons, the global community is more aware

about environmental issues and prefers the products that fulfil both quality and environmental compliance (Li *et al.*, 2017; Oliveira, Serra, and Salgado, 2010; Quader, Kamal, and Hassan, 2016; Sharma, Chandna, and Bhardwaj, 2017).

It is pertinent to mention that losses through environmental degradation in Pakistan are estimated to be around Rs.365 billion PKR per year (Sánchez-Triana *et al.*, 2014), which is almost equal to 6% of GDP (Ortolano *et al.*, 2014). The implementation of environmental regulations is considered weak (Nadeem and Hameed, 2008; Sánchez-Triana *et al.*, 2014). This is supported by Ortolano *et al.* (2014) where they stated that there is a lack of environmental awareness and that most of the firms do not know that the country has environmental regulations that they supposed to meet. Due to unavailability of authentic data related to sectorial contributions towards environment pollution, it is difficult to mention the exact contribution of food processing SMEs, however, food and beverage processing SMEs come second after the textile sector within manufacturing SMEs (Ahmad *et al.*, 2018).

The food and beverage processing industry is considered as one of the major sources of environmental pollution and the increasing demand for processed food also exerts stress on energy and water resources (Zhang and Vesselinov, 2017). Food industries produce environmental pollution through food processing losses, food waste, packaging, low energy efficiency, transportation of food, water consumption and producing more waste (Alsaffar, 2016). Furthermore, water, energy and raw materials are the main resources used in the food processing industry. The waste water from food and beverage processing industries contains lot of organic compounds, high concentrations of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solids (SS), total Nitrogen (N), total Phosphorous (P) and with some heavy metals also present, all of which are harmful for health and the natural environment (Abeele *et al.*, 2017). This is supported by Goot *et al.* (2016), where they stated that current food production practices have a large impact on the environment through inefficiencies in food production that produce more waste and pollution. According to the national round-table on sustainable, consumption and production (SCP) (Switch Asia (2016), Pakistan is

behind in resource efficiency as compared to other Asian countries in terms of poor drinking water quality, an energy crisis and also due to the inefficient production and consumption practices.

It is important to mention that the weak implementation and non-compliance with, QM and EM practices are not only hindering the performance of food processing SMEs in Pakistan; they are also considered as serious obstacles to exports, especially by the European Union (EU), the USA and Japan, which are particularly concerned about environmental compliance. Pakistan faces significant non-tariff barriers to trade related to poor performance in the area of quality, hygiene and Sanitary and Phytosanitary (SPS) measures. The country has faced a number of bans in the past; among others, fish and seafood exports were banned by the European Union in 2007, due to unhygienic conditions at Karachi fish harbour (USAID, 2007). It is evident that some countries rejected the consignments due to non-compliance with standards (Trade Related Technical Assistance, 2012). The literature reveals that the food processing industry is one of the major sources that pollute the environment. Therefore, the country needs to transform from a traditional developing country market with low quality and low-priced products to one that is high-quality, safe and healthy, with environmental compliance for food products in order to fulfil the sustainability requirements.

Moreover; organizational culture is considered an important factor towards organizational performance. It is important to mention that many of the QM failure were due to the lack of understanding of the culture of that organization. Thus, organizational culture is also a significant factor towards the organizational performance and needs to further investigate to the causal relationship on the IQEM practices among food processing SMEs in Pakistan. It is pertinent to mention that organizational culture is less studied in developing countries such as Pakistan, and food processing SMEs are the grey area. There is a dire need to further investigate this important factor since this is to reveal that organizational culture is an external factor in contributing IQEM as success factor. This study has selected organizational culture as a moderator variable since exploratory results confirmed that in Pakistan's food processing SMEs the organizational culture is weak in term of quality

management, environmental management, and performance and also the employees were found less educated. There were lack of awareness about environmental regulation and the implementations of environmental regulations were found weak. Therefore, it is hypothesized that there is a third variable that influencing the performance of SMEs. According to Baron and Kenny (1986), when the relationship between a predictor and a criterion variable is found unexpectedly weak or inconsistent, a moderating variable should be introduced. Since, IQEM is formed by the CSFs of QM and EM and the previous results of both QM and EM practices shows inconsistency in results therefore organizational culture is introduced as moderating variable, as confirmed by exploratory study and previous literature.

Thus, above mentioned issues and problem related to food processing SMEs need to be solved and given the priority, as the food sector of the country is important sector and have a great export potential. In conclusion to the above discussion, both operational and environmental performances of food processing SMEs in Pakistan are not up to the mark. Since, previous literature revealed that both quality and environmental management practices have a significant impact on both operational and environmental performance. Therefore; this study is focused on identifying the critical success factors for IQEM, in which quality and environmental aspects are covered within a single system and had an impact on organizational performance. This study examines IQEM impact on the operational and environmental performance of food processing SMEs. This study also examines the moderation role of organizational culture on the relationship between IQEM, and operational and environmental performance. By addressing quality, environmental and export issues, this study provides some valuable insights for Pakistan's food manufacturers that on the one hand address the quality and environmental issues whilst on the other hand encouraging the practise of CSFs for IQEM so that food players can enhance their trade with the rest of the world where, currently, the country is facing hindrances due to quality and environmental concerns. Similarly, by understanding the relationship of IQEM and organizational culture food players can improve the organizational performance through a good organizational culture by the involvement of all employees.

1.3 Research Questions

Research questions allow researchers to interpret the research problem into the need for investigation (Bilal, 2014; Ruane, 2005). The following research questions are guiding this study:

1. What are the Critical Success Factors (CSFs) of Integrated Quality Environmental Management (IQEM) practices among food processing SMEs in Pakistan?
2. How do the critical success factors of IQEM contribute to the performance of food processing SMEs in Pakistan?
3. Does Organizational Culture (OC) moderate the relationship between IQEM and the performance of food processing SMEs in Pakistan?

1.4 Research Objectives

The research objectives demonstrate the rationale of the study and describe the standards and ways to accomplish the research work (Bilal, 2014). The following are the objectives for this study:

1. To determine the critical success factors of IQEM among food processing SMEs in Pakistan.
2. To examine the relationship of IQEM and performance in the food processing SMEs in Pakistan.
3. To analyze the moderating role of organizational culture on the relationship between IQEM and performance in food processing SMEs in Pakistan.
4. To propose a framework for the implementation of IQEM in Pakistan's food processing SMEs by considering local organizational culture.

1.5 Research Scope

This study focuses on food processing SMEs, since the demand for processed food is increasing globally with the increasing population (Augustin *et al.*, 2016). The processed food provides products with a longer shelf-life that are available in different varieties and flavours (Fellows, 2009). Pakistan, being a developing country, is focusing on industrial development, particularly on the SME sector, and the food and beverage industry is the largest industry within manufacturing with a share of 20.09% (Ahmad *et al.*, 2018).

This study has collected data from food processing SMEs located in Punjab province, Pakistan. The reason for choosing Punjab province is due to the large number of SMEs, around 65.27% of the total SMEs of the country are located in Punjab province (Khan *et al.*, 2013; SMEDA, 2009). Moreover, 60% of food industries are also located in this province (Punjab Skill Development Fund, 2015). This study uses a quantitative methodology and the data is collected through a survey questionnaire. Purposive with snowball sampling techniques are used to select the respondents. Each SME received one questionnaire and the respondents of the study are owners, managers, chief executive officers (CEOs) or a person who have knowledge about QM, EM and the IQEM practices and performance of the company.

1.6 Significance of the Research

Like any research the aim of this study is to make a meaningful contribution at theoretical and empirical levels. The findings contribute to the body of knowledge in the field of integrated quality environmental management (IQEM), by identifying the critical success factors of IQEM practices, especially in the food processing SMEs in Pakistan. This study examines the impact of IQEM on the operational and environmental performance. Also, the moderating role of organizational culture on the relationship between IQEM and operational and environmental performance is examined. This study proposes a framework for IQEM implementation by considering local organizational culture in order to solve problems concerning

quality and the environment in the food processing SMEs and hence to reach a better level of quality and environmental management and to achieve a high quality in production.

This study is very important due to its significance in addressing the quality and environmental issues. Furthermore, by understanding the relationship of the CSFs of IQEM and organizational culture, food players would be able to implement effective IQEM and improve their operational and environmental performance. Moreover, the findings help food manufacturers to enhance their trade with the rest of the world, especially the European Union (EU), where the country is facing obstacles due to quality and environmental concerns. This study helps the country to fulfil the World Trade Organization (WTO) prerequisites for conducting international trade. Finally, the findings of the study enable the nation to achieve Pakistan's Vision 2025 targets, which require the country to reduce the population subject to food insecurity and increase the country's exports (MPDR, 2016).

1.7 Definition of Terms

a) Quality Management (QM) and Total Quality Management (TQM)

QM and TQM are customer-focused management philosophies and strategies that seek continuous improvement in businesses and processes by using different tool and techniques. The concepts of QM and TQM are almost the same and the ultimate goal of both is same such as continuous improvement and customer focus; thus this study uses the term QM instead of TQM.

b) Environmental Management (EM)

EM provides a set of management tools and principles that can help integrate environmental concerns into daily business practices, EM enhances the environmental performance by reducing the usage of natural resources.

c) Integrated Quality Environmental Management (IQEM)

IQEM is an integrated management approach that integrate quality and environmental management in order to enhance the overall operating and environmental efficiency of the organizations

d) Critical Success Factors (CSF)

CSFs are the analytical tool to evaluate the characteristics of an industry in which it competes. CSFs are the essential prerequisite to control the implementation process in order to increase the chances of success.

e) Operational Performance (OP)

Operational performance is defined as the capability of manufacturing companies to optimize the production process in order to improve product quality and assure on time delivery.

f) Environmental Performance (EP)

Environmental performance is defined as the ability of manufacturing companies to reduce their environmental impact by decreasing the consumption of hazardous and toxic materials, air emission, waste water and solid waste.

g) Organizational Culture (OC)

Organizational culture has been recognized as one of the important drivers to better the firm performance. Cultural norms, beliefs, behaviours, attitudes and customs have an important role that helps in forming a good organizational culture.

h) Partial Least Square-Structure Equation Modelling (PLS-SEM)

PLS-SEM is second-generation multivariate statistical analysis technique. It is used to test the causal relationships, it maximise the explained variance of the dependent variable

1.8 Outline of the Thesis

This thesis is organized into six chapters. The first chapter has highlighted the background of the research. It has also outlined the problem statement, research

questions, research objectives, scope and the significance of the research. Chapter Two reviews the literature on the food industry and its importance, the environmental issues in food processing, small and medium-sized enterprises, food processing SMEs and identifies the research gap. It also includes exploratory study, quality management, environmental management and integrated quality environmental management, critical success factors, organizational culture, performance and its measures and is followed by the research framework and hypotheses.

Chapter Three illustrates the methods and procedures that will be used in this study. It gives a detailed description of the research process including the research paradigm, research design and flow and the research methodologies. This chapter also explains data collection, the survey population and sampling, the sampling techniques, unit of analysis, instrument development, the constructs and their measurement, the pilot study, reliability and validity and data analysis. Chapter Four presents the data analysis including primary data analysis for screening and cleaning of data through IBM-SPSS followed by hypothesis-testing through Partial Least Squares-Structure Equation Modeling (PLS-SEM).

Chapter Five provides an overall discussion of the research findings in the light of the results of Chapter Four. Finally, Chapter Six concludes with the contributions of the study, to the body of knowledge and practice. This chapter also presents the limitations of the study and provides recommendations for future research.

1.9 Summary

This chapter has provided the background of the study, its importance and the increasing demand for food, the history of food processing, the environmental issues in food processing, small and medium-sized enterprises and food processing SMEs. It also presented the problem statement, research questions, research objectives, research scope and the significance of the research in detail. It also presented an outline of the thesis.

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Appendix A Letter to SMEDA

 UTM UNIVERSITI TEKNOLOGI MALAYSIA	UTM Razak School of Engineering and Advanced Technology UTM Kuala Lumpur	UTM Razak School of Engineering and Advanced Technology Level 7, Menara Razak Universiti Teknologi Malaysia Jalan Sultan Yahya Petra 54100 Kuala Lumpur, Malaysia
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Tel: +(6)03-21805138 Fax: +(6)03-21805380 <http://www.razakschool.utm.my>

OUR REF:

UTM.K. 40.02/13-11/14 Jid-5(69) 21 Jun 2016

SMEDA / Ministry of Industries & Production
Government of Pakistan
1st Floor, A Block Pak Secretariat,
Islamabad, Pakistan

Dear Sir,

REFERENCE LETTER : SYED ALI RAZA SHAH, MATRIC NO PRS153048

This is to certify that Syed Ali Raza Shah having Matric No. PRS153048 is a full time research student (P.hD Programme) at UTM Razak School of Engineering and Advanced Technology Kuala Lumpur.

2. He will Visit different food processing SMEs in Pakistan (July to August 2016), for exploratory /Pilot Study as a part of his research work.
3. The kind co-operation and support with the scholar from all concerned Authorities is highly appreciated.

Thanks and Regards.

"BERKHIDMAT UNTUK NEGARA"

Sincerely ,



ASSOCIATE PROF. DR. KHAIRUR RIJAL BIN JAMALUDIN
Deputy Dean (Academic)
UTM Razak School Of Engineering And Advanced Technology
Universiti Teknologi Malaysia
Kuala Lumpur

☎ 03 2180 5130
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 INTELLECTUAL PROPERTY AWARD 2010 Organisation Category 2008, 2009 & 2010	 MERDEKA AWARD 2009 Outstanding Scientific Achievement and Health Science & Technology	 Razak-UtM TRUSTED BRAND 2010 University Category
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Appendix B Letter to PSQCA



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

UTM Razak School of
Engineering and Advanced Technology
UTM Kuala Lumpur

UTM Razak School of Engineering
and Advanced Technology
Level 7, Menara Razak
Universiti Teknologi Malaysia
Jalan Sultan Yahya Petra
54100 Kuala Lumpur, Malaysia

Tel: +(6)03-21805138 Fax: +(6)03-21805380 <http://www.razakschool.utm.my>

OUR REF.:

UTM.K. 40.02/13.11 / 114 Jld-5 (68)

21 Jun 2016

PSQCA / Ministry of Science and Technology
Government of Pakistan
Sector G-5/2,
Islamabad, Pakistan

Dear Sir,

REFERENCE LETTER : SYED ALI RAZA SHAH, MATRIC NO PRS153048

This is to certify that Syed Ali Raza Shah having Matric No. PRS153048 is a full time research student (P.hD Programme) at UTM Razak School of Engineering and Advanced Technology Kuala Lumpur.

2. He will Visit different food processing SMEs in Pakistan (July to August 2016), for exploratory /Pilot Study as a part of his research work.
3. The kind co-operation and support with the scholar from all concerned Authorities is highly appreciated.

Thanks and Regards.

“BERKHIDMAT UNTUK NEGARA”

Sincerely,

ASSOCIATE PROF. DR. KHAIRUR RIJAL BIN JAMALUDIN

Deputy Dean (Academic)

UTM Razak School Of Engineering And Advanced Technology

Universiti Teknologi Malaysia

Kuala Lumpur

☎ 03 2180 5130

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✉ khairur.kl@utm.my



INTELLECTUAL
PROPERTY AWARD 2010
Organisation Category
2010, 2011 & 2012



MERDEKA AWARD 2009
Outstanding Scientific Achievement and
Health, Science & Technology



Brand's Digital
TRUSTED BRAND 2010
University Category

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Appendix C Questionnaire



Dear respondent!

I am conducting a research on “Quality and Environmental Management (QEM) Practices among Small and Medium-Sized Food Processing Enterprises in Pakistan” and have designed this questionnaire to collect data from food processing SMEs of Pakistan.

Survey Objective: The main purpose of this research is to investigate the Quality and Environmental Management (QEM) practices among SMEs of food processing in Pakistan. The responses from the questionnaire will be used to analyze the impact of QEM practices on operational and environmental performances of SMEs. The results will help in improving performance of SMEs. The outcome of the study will also help SMEs for future sustainable development.

Respondents Individuals: Owner, CEO, Manager Quality Assurance, Manager Operation, Manager Production, Senior Engineer or a most relevant person is requested to complete this questionnaire.

Data Confidentiality: The provided information will remain confidential and only be used for research purpose. Your contribution to complete the questionnaire is highly important for this study and also for the improvement of SMEs performance. Therefore, your cooperation and participation is highly appreciated.

In case of any query and concern please do not hesitate to contact the below mentioned addresses.

Sincerely,

Syed Ali Raza Shah
PhD Candidate,
UTM Razak School of Engineering and Advanced Technology,
Universiti Teknologi Malaysia International Campus,
Jalan Semarak, 54100 Kuala Lumpur.
E-mail: razadopasi@gmail.com
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Cell Phone: +60124017554 or +923313938350

Associate Professor: Dr. Khairur Rijal Jamaludin
Deputy Dean (Academic and student development) / PhD Supervisor.
Khairur.kl@utm.my

SECTION 1: DEMOGRAPHICS INFORMATION

Please tick the most appropriate answer

(A). About Respondent

1. Education Background / qualification:

Higher Secondary Bachelor's Master's other qualification (pl. specify) _____

2. Experience in this SME:

1-5 years 6-10 years 11-20 years More than 20 years

3. Current working department /unit in this SME:

Quality Engineering Production other department (pl. specify)

(B). About Small and Medium Enterprise (SME)

4. Type of Food Product Manufacture/engagement:

Food processing Beverage processing Both (Food and Beverages) processing

5. Year of Establishment/age:

1-5 years 6-10 years 11-20 years More than 20 years

6. Number of permanent employees:

1-9 10-49 50-250

7. Nature of SME ownership:

Partnership Sole Proprietorship Public Limited Private Limited

8. SME location (District and Province): _____

9. SME exporting any food items?

Yes

Exporting countries:

Exporting items and applied standards (if any):

No

SECTION 2: CRITICAL SUCCESS FACTORS OF QUALITY AND ENVIRONMENTAL MANAGEMENT (QEM)

Please indicate the degree of agreement on QEM practices by marking most suitable number based on the scale of 1 to 5 for each statement below. Kindly answer ALL questions.

(1= Strongly Disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree)

<i>A. LEADERSHIP (Top management commitment, efforts and participation towards quality and environmental improvement)</i>						
LS1	Top management creates and communicates a vision focused on quality improvement.	1	2	3	4	5
LS2	Top management pursues long-term business success.	1	2	3	4	5
LS3	Top management anticipates change and makes plans to accommodate it.	1	2	3	4	5
LS4	Top management provides rewards, bonuses to staff on best performance.	1	2	3	4	5
LS5	Top management share similar beliefs about the future direction of the company.	1	2	3	4	5
LS6	Top management encourages employee involvement in QEM (quality and environmental management) improvement activities.	1	2	3	4	5
LS7	Top management provides the necessary resources to carry out activities efficiently.	1	2	3	4	5
LS8	Top management emphasizes the importance of customers.	1	2	3	4	5
<i>B. EMPLOYEE MANAGEMENT (Employee involvement in decision making process of quality and environmental planning, provision of training, awareness and rewards)</i>						
EM1	The company has enough financial and technical resources for employees training.	1	2	3	4	5
EM2	The company provides trainings to employees for improving their competencies.	1	2	3	4	5
EM3	Employees in the company are dedicated to their jobs.	1	2	3	4	5
EM4	The company empowers employees and takes employees satisfaction in consideration.	1	2	3	4	5
EM5	The company encourages employees to find and fix the problems and issues.	1	2	3	4	5
EM6	The company promotes teamwork.	1	2	3	4	5
EM7	The company encourages employees to update their knowledge and skills.	1	2	3	4	5
EM8	The company provides a safe and healthy work environment.	1	2	3	4	5
<i>C. STRATEGIC PLANNING (Quality and environmental improvement planning, by addressing problem/issues, achieving current and future goals of the company)</i>						
SP1	The company involves employees in QEM (quality and environmental management) planning.	1	2	3	4	5
SP2	Results are evaluated with plans, in order to make improvements.	1	2	3	4	5

SP3	The company has a clear strategic objectives and plans.	1	2	3	4	5
SP4	The company developed long-term and short-term plans and corresponding actions.	1	2	3	4	5
SP5	Every employee is committed to achieve company strategic objectives and plans.	1	2	3	4	5
SP6	The company plans focused on adopting ‘Best QEM Practices’.	1	2	3	4	5
SP7	The company always incorporates stakeholder’s (customers/suppliers) requirements.	1	2	3	4	5
SP8	The continuous quality improvement is considered in the company strategy.	1	2	3	4	5
<i>D. INFORMATION MANAGEMENT (Availability of quality and environmental data, using QEM data for improvement of processes and products)</i>						
IM1	The company shares QEM (quality and environmental management) information to employees.	1	2	3	4	5
IM2	The company analyses its operational activities data for performance improvement.	1	2	3	4	5
IM3	The company uses QEM information to improve its key processes and products.	1	2	3	4	5
IM4	The company regularly measures QEM practice performance.	1	2	3	4	5
IM5	The company uses different procedures to ensure the reliability of data collection.	1	2	3	4	5
IM6	The company assesses the performance of departments and employees.	1	2	3	4	5
IM7	The information obtained in the company is used to improve QEM practices.	1	2	3	4	5
<i>E. PROCESS MANAGEMENT (Ensuring quality in production process, management of quality problems and using quality and environmental information for process improvement)</i>						
PM1	The company regularly does a quality control work.	1	2	3	4	5
PM2	The quality is measured during all processes.	1	2	3	4	5
PM3	Quality is important in the production process.	1	2	3	4	5
PM4	The company put efforts to prevent errors during the phase of process planning.	1	2	3	4	5
PM5	The company regularly monitors the quality of products and processes.	1	2	3	4	5
PM6	The company always does process improvement.	1	2	3	4	5
PM7	The company takes corrective action immediately when there is a quality problem.	1	2	3	4	5
<i>F. SUPPLIER MANAGEMENT (Quality and environmental awareness to suppliers, selecting high quality suppliers, good communication and collaboration with suppliers)</i>						
SM1	Quality is the more important criteria in selecting suppliers.	1	2	3	4	5
SM2	The company assists suppliers in improving quality.	1	2	3	4	5
SM3	The company relies on high quality suppliers.	1	2	3	4	5

SM4	The company collaborates with suppliers to improve product quality and ensure on-time delivery.	1	2	3	4	5
SM5	The company has relations with suppliers on QEM (quality and environmental management) practices.	1	2	3	4	5
SM6	The company gives a feedback on the supplier performance.	1	2	3	4	5
SM7	The company treats the suppliers as partners.	1	2	3	4	5
<i>G. CUSTOMER FOCUS (Fulfil customer needs and expectations, maintain good relationship, consider customer complaints and satisfaction on top priority)</i>						
CF1	Customer's feedback is used to improve company performance.	1	2	3	4	5
CF2	The company always maintains a close relationship with its customers.	1	2	3	4	5
CF3	The company actively seeks customer needs for product improvement activities.	1	2	3	4	5
CF4	Customer needs and expectations are effectively disseminated and understood by all staff members.	1	2	3	4	5
CF5	The company uses customer complaints as an input for process improvement.	1	2	3	4	5
CF6	The company collects complaints information from its customers.	1	2	3	4	5
CF7	Quality-related customer complaints are treated with top priority in the company.	1	2	3	4	5
CF8	Customer satisfaction is considered as a major responsibility of the company.	1	2	3	4	5

SECTION 3: ORGANIZATIONAL CULTURE

Please indicate the degree of agreement on Organizational culture by marking most suitable number.

(1= Strongly Disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree).

<i>ORGANIZATIONAL CULTURE (Mutual respect and sharing of information among team members, willingness to accept change, team work)</i>						
OC1	There is a mutual respect among team members.	1	2	3	4	5
OC2	There is sharing of information among team members.	1	2	3	4	5
OC3	There is willingness to accept change in the organizational structure.	1	2	3	4	5
OC4	There is willingness to deal with customer queries in time.	1	2	3	4	5
OC5	The company involve partners (suppliers and customers) in the decision making process.	1	2	3	4	5
OC6	There is a participation and open discussion among all staff.	1	2	3	4	5
OC7	The company considers employee ideas and concerns.	1	2	3	4	5
OC8	There is a team work and team spirit among all staff.	1	2	3	4	5

SECTION 4: ORGANIZATIONAL PERFORMANCE


Please indicate the degree of agreement on operational and environmental performance by marking most suitable number.

(1= Strongly Disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree)

<i>A. OPERATIONAL PERFORMANCE (Reduction in operational costs, increase in product quality, on time delivery and increase in company image in the market)</i>						
OP1	The company's operational cost is reducing.	1	2	3	4	5
OP2	The company's products quality is increasing.	1	2	3	4	5
OP3	The company's production quantity is increasing.	1	2	3	4	5
OP4	The company's process time is reducing.	1	2	3	4	5
OP5	The company's operational performance efficiency is increasing.	1	2	3	4	5
OP6	The company's process effectiveness is increasing.	1	2	3	4	5
OP7	The company's positive image is increasing.	1	2	3	4	5
OP8	The company's product stock is reducing due to higher product selling.	1	2	3	4	5
<i>B. ENVIRONMENTAL PERFORMANCE (Improvement in environmental performance by reducing environmental pollution, solid waste, water wastage, less energy consumption)</i>						
EP1	Environmental performance of the company is improving.	1	2	3	4	5
EP2	Environmental management practices (EMS) help to improves company's image.	1	2	3	4	5
EP3	The wastage of food items are reducing in the company.	1	2	3	4	5
EP4	The amount of water wastage in different processes is reducing in the company.	1	2	3	4	5
EP5	The consumption of the harmful material is decreasing in the company.	1	2	3	4	5
EP6	The environmental pollution is reducing in the company.	1	2	3	4	5
EP7	The consumption of water in the company is reducing.	1	2	3	4	5
EP8	The consumption of energy in the company is decreasing.	1	2	3	4	5

-END OF QUESTIONNAIRE-

Appendix D Data Collection Letter

 UTM UNIVERSITI TEKNOLOGI MALAYSIA	UTM Razak School of Engineering and Advanced Technology UTM Kuala Lumpur	UTM Razak School of Engineering and Advanced Technology Level 7, Menara Razak Universiti Teknologi Malaysia Jalan Sultan Yahya Petra 54100 Kuala Lumpur, Malaysia
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Tel: +(6)03-21805138 Fax: +(6)03-21805380 <http://www.razakschool.utm.my>

OUR REF.: UTM.K.40.02 /13.11/1/4/ Jld. 8 (93) 7 November 2017

TO WHOM IT MAY CONCERN

Dear Sir/ Madam,

DATA COLLECTION FOR RESEARCH

This is to certify that the bearer of this letter is a student at UTM Razak school of Engineering and Advanced Technology, Universiti Teknologi Malaysia, Kuala Lumpur, who is currently pursuing Doctor of Philosophy. It would be greatly appreciated if you could assist his field work in order to execute his research at your company.

Name : SYED ALI RAZA SHAH

ISID No. : 201604M10008

Matric No : PRS153048

Project title : QUALITY AND ENVIRONMENTAL MANAGEMENT (QEM) PRACTICES AMONG SMALL AND MEDIUM-SIZED FOOD PROCESSING ENTERPRISES IN PAKISTAN

Supervisor : ASSOC. PROF. DR. KHAIRUR RIJAL BIN JAMALUDIN

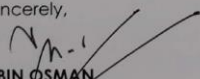
Supervisor's Email : khairur.kl@utm.my

Supervisor's Contact No. : +60321805130 / +60193862305




Please do not hesitate to contact his supervisor for further information.

Thank you for your kind support.

Yours sincerely,


NASIR BIN OSMAN
Deputy Registrar
UTM Razak School of Engineering and Advanced Technology
UTM Kuala Lumpur
For The Vice Chancellor
☎ 03-21805360
☎ 03-21805380
✉ nasir.kl@utm.my

cc. Supervisor

 INTELLECTUAL PROPERTY AWARDS 2010 Organisation Category Small, medium & large	 MERDEKA AWARD 2009 Outstanding National achievement and Innovation in Science & Technology	 TRUSTED BRAND 2009 University Category
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Appendix E Pilot Study Letter



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

UTM Razak School of
Engineering and Advanced Technology
UTM Kuala Lumpur

UTM Razak School of Engineering
and Advanced Technology
Level 7, Menara Razak
Universiti Teknologi Malaysia
Jalan Sultan Yahya Petra
54100 Kuala Lumpur, Malaysia

Tel: +(6)03-21805138 Fax: +(6)03-21805380 <http://www.razakschool.utm.my>

OUR REF: UTM.K.40.02.03/13.11/1/4 Jld. 7 (98)

29 May 2017

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

DOCTOR OF PHILOSOPHY PROJECT

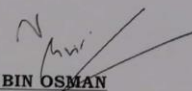
This is to certify that the bearer of this letter is a student at UTM RAZAK School of Engineering and Advanced Technology, Universiti Teknologi Malaysia, Kuala Lumpur, who is currently pursuing Doctor of Philosophy. It would be greatly appreciated if you could assist him data collection in your company.

Name : SYED ALI RAZA SHAH
NRIC No. : 201604M10008
Matric No : PRS153048
Project Title : **QUALITY AND ENVIRONMENTAL MANAGEMENT PRACTICES
AMONG SMALL AND MEDIUM FOOD PROCESSING
ENTERPRISES IN PAKISTAN**
Supervisor : **ASSOC PROF. DR. KHAIRUR RIJAL BIN JAMALUDIN**
E-mail : khairur.kl@utm.my
Telephone No: 03-2180 5130

Please do not hesitate to contact the supervisor above for further information.

Thank you for your kind support.

Yours sincerely,


NASIR BIN OSMAN
Deputy Registrar
UTM RAZAK School of Engineering and Advanced Technology
UTM Kuala Lumpur
For The Vice Chancellor
☎ 03-2180 5360
☎ 03-2180 5860
✉ nasir.kl@utm.my

c.c. Student file



INTELLECTUAL
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Organization Category
2009, 2009 & 2011



MERDEKA AWARD 2009
Outstanding Organizational Achievement and
Health, Science & Technology



TRUSTED BRAND 2010
University Category

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Appendix F Chamber of Commerce Letter

THE MULTAN CHAMBER OF COMMERCE & INDUSTRY

(RECOGNISED BY THE GOVERNMENT OF PAKISTAN)

Phone : 061-4517087 - 4543530
Fax : 061-4570463
E-mail : mcciimultan@gmail.com
Website : www.mcci.org.pk



Shahrah-e-Aiwan-e-Tijarat-o-Sanat
Multan. (Pakistan)

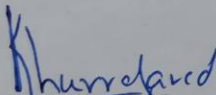
Ref. No: MCCI/2017/0054.

Date: 25-07-2017.

TO WHOM IT MAY CONCERN

This is to certify that Mr. Syed Ali Raza Shah is pursuing his PhD in Quality Management at UTM Razak School of Engineering and Advanced Technology, Universiti Teknologi Malaysia. His research objective is to investigate the quality and environmental management practices among food processing SME's in Pakistan. All the information provided will be confidential and will be used for research purpose only. Your cooperation, honest opinions and contributions to complete the questionnaire is very much appreciated.

Sincerely,


Khurram Javed
Secretary General

SECRETARY GENERAL
Multan Chamber of Commerce & Industry
MULTAN

Appendix G Summary of Experts Opinion

	Name/Position/Affiliation	Comments
1.	<p>Dr. Muslim Amin Associate Professor Department of Management College of Business Administration King Saud University Kingdom of Saudi Arabia</p>	<p><u>Section 2:</u></p> <ul style="list-style-type: none"> • Part (A) Q1; it might be SMEs communicates vision on quality but not environmental otherwise. • Part (B) Q1; you need to explain the resources means, please specify. • Part (C) Q2; please make it clear, what is results? • Part (D) Q7; Please make it clear about adjust policy. • Part (E); Q1 and Q8 are redundant. • Part (G); Q5, Q6, Q7 will make the respondent confuse. Please rewrite the sentence. <p><u>Section 3:</u></p> <ul style="list-style-type: none"> • Q1 looks the same with Q8.
2.	<p>Dr. Mohd Nizam Ab Rahman Associate Professor Department of Mechanical and Materials Engineering Faculty of Engineering & Built Environment Universiti Kebangsaan Malaysia</p>	<p><u>Covering letter to respondent's on page 1:</u></p> <ul style="list-style-type: none"> • Replace the sentence “The objective of this research” with the sentence “This research objective” and mention “investigate about”. <p><u>Section 2:</u></p> <ul style="list-style-type: none"> • Part (A) Q3; this writing is not so clear. Please improve the statement. • Part (A) Q8; this writing is not so clear. Please improve the statement. • Part (B) Format; Font (Default) Times New Roman, 12 pt. • Part (B) Q1; Need to mention “there are enough resources”. • Part (B) Q2; this is not so clear. Please improve the statement. • Part (B) Q3; not clear. Please elaborate. • Part (B) Q4; good one but please rewrite statement. • Part (B) Q6; please rewrite and

		<p>clarify statement.</p> <ul style="list-style-type: none"> • Part (B) Q8; good one. • Part (C) Q2; please rewrite with more clarity • Part (C); Q3 and Q4 should be merged, please decide as per your will. • Part (C) Q6; please rewrite. • Part (D) Q1; Please check and try to use another appropriate word. • Part (D) Q4; please rewrite more clearly. • Part (E) Q3; please rewrite more clearly. • Part (E) Q4; please rewrite more clearly. • Part (E) Q8; please rewrite more clearly. • Part (F) Q1; please rewrite more clearly. • Part (G) Q2; please rewrite more clearly. <p><u>Section 3:</u></p> <ul style="list-style-type: none"> • Q1; please double check regarding clarity. <p><u>Section 4:</u></p> <ul style="list-style-type: none"> • Part (B) Q1; please rewrite with more clarity. • Part (B) Q6; please rewrite with more clarity. • Part (B) Q8; please double check this. <p>Last para needs double check for clarity.</p>
3.	<p>Dr. Muhammad Noman Malik Assistant Professor Department of Computer Science Faculty of Engineering & Computer Science National University of Modern Languages Islamabad Campus, Pakistan</p>	<p><u>Section 1:</u></p> <ul style="list-style-type: none"> • Q5; mention province and district/cities. <p><u>Section 2:</u></p> <ul style="list-style-type: none"> • Part (C) Q1; Rephrase, not clear as users will get confusion while regarding this. • Part (C) Q2; Rephrase, grammar and understanding issue. • Part (C) Q5; not meaningful. • Part (C) Q8; item 2 and 8 seems same objective.

		<ul style="list-style-type: none"> • Part (D) Q2; mention “ its operational activities” • Part (D) Q4; needs to rephrase for more clarity. • Part (D) Q5; item 5 and 6 has contrary answers. Rephrase them. • Part (D) Q8; this should be in performance measurement. • Part (E) Q8; similar objective as item 5 and 6. • Part (F) Q4; item 4 and 2 has same objectives Rephrase them. • Part (G) Q3; item 2 and 3 has same meaning. Rephrase them <p><u>Section 3:</u></p> <ul style="list-style-type: none"> • Q8; not meaningful. Rephrase it. <p><u>Section 4:</u></p> <ul style="list-style-type: none"> • Part (A) Q1; in cost of what? Not clear. • Part (A) Q5; in term of what? Not meaningful. Rephrase it. • Part (A) Q8; not meaningful. • Part (B) Q7; need to remove or rephrase. • Part (B) Q8; not meaningful.
4.	<p>Professor Dr. Nawar Khan Senior Consultant PhD Engineering Management ISO 9000: 2015 Lead Assessor Faculty of Management Sciences Riphah International University Al-Mizan Campus, Rawalpindi Pakistan</p>	<p><u>Section 1:</u></p> <ul style="list-style-type: none"> • Part (A); mention “Please tick the most appropriate answer” • Part (A) Q2; mention the word “since”. • Part (A); Add a question related to “ export involvement” • Part (B) Q4; replace the word “organization” with “SME”. <p><u>Section 2:</u></p> <ul style="list-style-type: none"> • Correct the grammar of content. • Part (B) Q2; instead of using “our company” use “the company” • Part (B) Q4, Q5, Q6 replace “our company” with “this company” • Part (C) Q1, Q2; rephrase, correct the words for more clarity. • Part (C); Q3, Q4, Q5, Q6, Q7 and Q8 change the word “our company” with “the company”.

		<ul style="list-style-type: none"> • Part (E); replace the word “our company” with “the company” in all questions. • Part (F); replace the word “our company” with “the company” in all questions. • Part (G); replace the word “our company” with “the company” in all questions. <p><u>Section 4:</u></p> <p>Correct the grammar from “our company” to “this company”.</p> <ul style="list-style-type: none"> • Part (A) Q3; replace the word “delivery” with quantity. <p>Mention the sentence in last para.</p> <p>“Your opinion will be kept secret and mixed with other data to avoid individual bias and identity”.</p>
5.	<p>Rana Moazam Maqbool Project-Quality Assurance Manager Dutch Mill (Pvt) Ltd. Jhang Pakistan</p>	<p><u>Section 2:</u></p> <ul style="list-style-type: none"> • Part (C); Q2 is not clear. <p><u>Section 3:</u></p> <ul style="list-style-type: none"> • Q1 and Q8 have same objectives. <p><u>Section 4:</u></p> <ul style="list-style-type: none"> • Part (A) Q4; needs to be more clear.
6.	<p>Awais Ali Manager Quality Gourmet Foods Lahore, Pakistan</p>	<ul style="list-style-type: none"> • I have gone through the questionnaire you shared, it seems well to me. So I am agreed on it for further proceedings.

Appendix H Z Scores

Zscore			
	N	Minimum	Maximum
Zscore(LS1)	288	-2.95834	1.34470
Zscore(LS2)	288	-3.04331	1.31725
Zscore(LS3)	288	-2.79030	1.32548
Zscore(LS4)	288	-2.80055	1.29366
Zscore(LS5)	288	-2.86902	1.44575
Zscore(LS6)	288	-3.11867	1.43482
Zscore(LS7)	288	-2.91646	1.39093
Zscore(LS8)	288	-2.91172	1.37219
Zscore(EM1)	288	-3.03522	1.18769
Zscore(EM2)	288	-2.87163	1.25835
Zscore(EM3)	288	-3.43816	1.23806
Zscore(EM4)	288	-3.35816	1.12978
Zscore(EM5)	288	-3.13981	1.26587
Zscore(EM6)	288	-3.41080	1.23369
Zscore(EM7)	288	-3.21035	1.21878
Zscore(EM8)	288	-3.06494	1.26734
Zscore(SP1)	288	-2.84236	1.31297
Zscore(SP2)	288	-2.75480	1.25218
Zscore(SP3)	288	-2.88980	1.35103
Zscore(SP4)	288	-2.82908	1.42007
Zscore(SP5)	288	-2.80145	1.49585
Zscore(SP6)	288	-2.59190	1.34205
Zscore(SP7)	288	-2.86916	1.39021
Zscore(SP8)	288	-3.19076	1.29734
Zscore(IM1)	288	-2.92010	1.31129
Zscore(IM2)	288	-2.85643	1.33543
Zscore(IM3)	288	-2.69392	1.30530
Zscore(IM4)	288	-2.58734	1.28862
Zscore(IM5)	288	-2.54008	1.40887
Zscore(IM6)	288	-2.93406	1.40488
Zscore(IM7)	288	-2.73105	1.22142
Zscore(PM1)	288	-2.79488	1.33294
Zscore(PM2)	288	-3.03697	1.26634
Zscore(PM3)	288	-2.73933	1.27556
Zscore(PM4)	288	-2.95029	1.35736
Zscore(PM5)	288	-2.90870	1.55312
Zscore(PM6)	288	-2.92208	1.27522
Zscore(PM7)	288	-2.93785	1.28737
Zscore(SM1)	288	-2.50436	1.30174

Zscore(SM2)	288	-2.79673	1.38204
Zscore(SM3)	288	-2.80227	1.37935
Zscore(SM4)	288	-2.74408	1.37741
Zscore(SM5)	288	-2.73909	1.42375
Zscore(SM6)	288	-2.68071	1.34036
Zscore(SM7)	288	-2.84015	1.24456
Zscore(CF1)	288	-2.95993	1.33458
Zscore(CF2)	288	-3.10818	1.29062
Zscore(CF3)	288	-3.05729	1.35072
Zscore(CF4)	288	-3.02852	1.32167
Zscore(CF5)	288	-2.98600	1.25552
Zscore(CF6)	288	-3.05398	1.27876
Zscore(CF7)	288	-3.18210	1.29929
Zscore(CF8)	288	-3.07292	1.17169
Zscore(OC1)	288	-3.13857	1.21761
Zscore(OC2)	288	-3.07511	1.22407
Zscore(OC3)	288	-3.13555	1.35718
Zscore(OC4)	288	-3.03924	1.24096
Zscore(OC5)	288	-2.99776	1.26047
Zscore(OC6)	288	-3.09446	1.31199
Zscore(OC7)	288	-3.05083	1.23000
Zscore(OC8)	288	-2.91035	1.13395
Zscore(OP1)	288	-2.81974	1.23562
Zscore(OP2)	288	-3.19177	1.23825
Zscore(OP3)	288	-3.05398	1.27876
Zscore(OP4)	288	-2.98054	1.32759
Zscore(OP5)	288	-2.83525	1.28875
Zscore(OP6)	288	-3.34720	1.36670
Zscore(OP7)	288	-2.46131	1.17385
Zscore(OP8)	288	-2.93592	1.18366
Zscore(EP1)	288	-2.71893	1.13847
Zscore(EP2)	288	-2.91963	1.11808
Zscore(EP3)	288	-3.07738	2.03827
Zscore(EP4)	288	-2.79975	1.22686
Zscore(EP5)	288	-2.75566	1.13946
Zscore(EP6)	288	-2.84585	1.15222
Zscore(EP7)	288	-2.86102	1.25371
Zscore(EP8)	288	-2.95776	1.20769
Valid N (listwise)	288		

LIST OF PUBLICATIONS

Journals:

- Syed Ali Raza Shah, Jamaludin K.R, Hayati Habibah Abdul Talib, and Sha'ri Mohd Yusof. Integrated Quality Environmental Management Implementation in Food Processing SMEs: A Case Study of a Developing Country, *The TQM Journal* (Accepted for Publication) (Q2)
- Syed Ali Raza Shah, Jamaludin K.R, and Hayati Habibah Abdul Talib. Assessing Environmental Management Practices in Food Processing SMEs of Pakistan by using Partial Least Squares (PLS). *British Food Journal* (in review)(Q1)
- Syed Ali Raza Shah, Jamaludin K.R, and Hayati Habibah Abdul Talib. Quality Management Implementation and Their Impact on Operational Performance of Pakistan's Food Processing SMEs. *International Journal for Quality Research* (Accepted with minor revision, revised and resubmitted).(Scopus)

Conference Proceeding:

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