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HALAL MEAT EXPORTS ENHANCEMENT OF PAKISTAN: AN INTERMEDIATING ROLE OF GLOBAL TECHNICAL STANDARDS IN QUALITY FUNCTION DEPLOYMENT MODEL

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ABSTRACT

A lean and sustainable food supply chain is one of the major strategies that businesses all around the world have been trying to adopt to provide the customers quality food and to remain competitive in the global market. Many industrialists, researchers, and economists have focused on food quality because of the high importance of this issue in the global meat markets context. This research was conducted to investigate the mediating role of Global Technical Standards (GTS) on Voice of Customers (VOC) and Exports Enhancement (EE). Halal meat industry and exports of Pakistan were the primary focus by using a mixed methodological approach. Initially, the quality function deployment (QFD) model was generated for the identification of exports requirements and competitive Novelty Analysis. Fourteen actors (experts) of Pakistan halal meat industry had participated in the identification of requirements and standards. Likewise, exporters from nine economies, including the United States of America, Brazil, Australia, Netherlands, Poland, Spain, India, Canada, and Pakistan, participated in Competitive Novelty Analysis. Secondly, 250 responses were generated from Pakistan's halal meat industry on a five-point Likert scale. The findings of this study show a significant relationship between Voice of Customers (VOC) and Global Technical Standards (GTS). It was further highlighted that Global Technical Standards mediate the relationship between issues in exports and Exports Enhancement (EE) strategies.

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INTRODUCTION

Meat is the basic component of a diet for a healthy life. The halal meat sector is considered as one of the fastest growing markets of the world, especially in the Middle East (ME), European Union (EU), Central Asian Republics (CARs), and Africa region (Fuseini et al., 2020). World population data shows a rapid increase in the overall population, and almost 1.8 billion Muslims are living in more than hundred economies of the world. Pakistan is an Agri-based economy and has an abundance of diverse animal breeds (Almani et al., 2020). Many researchers had reported that being a Muslim country and an ideal location among ME, CARs, Africa, and Europe region Pakistan has untapped potential to get a competitive position in halal meat exports markets (Magsi et al., 2020; Ali et al., 2020) reported that red meat of Pakistan is unique due to its texture, taste, organic nature and hygienic perspectives. Almani et al. (2020) said that the livestock sector in Pakistan is one of the most climate-sensitive sectors as different factors can increase or decrease its livestock production like temperature, rains, floods, seasonal change, geographical change, diseases, and heat stress (Khan et al., 2020).

Ajay (2020) has reported that the global halal food sector is projected to grow by US\$ 3 trillion and the halal meat sector

by \$600 billion by 2030. He further reported that it would be a challenge for emerging economies to meet the demand of meat and also to get a competitive position in global meat markets. Top suppliers of halal meat are getting a high position in global markets due to value addition and quality compliance. However, due to the high population, high consumption, and lack of value addition, Pakistan has only a 0.2 percent share in global halal meat markets. Arif (2017) has reported that Pakistan has untapped potential to increase exports to ME, CARs, Europe and Africa region. In said regions, its main competitors are the USA, Brazil, Australia, Netherlands, Spain, Poland, India and Canada. They have more efficient means of transportation, promotion programs, quality compliance certifications, marketing, and an overall strong supply chain structure. Therefore, to get a competitive position in global markets, there is a strong need to learn about competitors' strategies and global standards (Sohaib et al., 2018). At the dawn of global technical standards, it was postulated that only economies with high application of quality standards would lift all boats in global halal meat exports markets. This postulation triggered expectations from halal meat industry of

Pakistan to comply with quality standards to get a competitive position in halal meat markets, especially in ME, CAR, Africa, and Europe regions. Many studies have highlighted issues in the halal meat industry, but not even a single study was supported by strategies to overcome existing issues. This study gives a new direction to the halal meat industry. Many studies have highlighted issues in halal meat industry of Pakistan. But the reason for Pakistan's low share in global halal meat markets was not supported by previous literature. Furthered QFD model was implemented by world-renowned organizations for products and service improvements. But existing literature does not support its application for exports enhancement in the halal meat industry. That is why this study contributed a novel part for stakeholders in halal meat sector. Hence, the paper's objective was to identify global technical standards and learn about strategies of global suppliers of halal meat to improve Pakistan's position in global halal meat markets. The research will be of great value to Pakistan as a nation, as it will enable the country to get a clear picture of how global technical standards have impacted the halal meat industry. The paper will also be significant to actors (experts) of the Pakistan halal meat industry, as they will become more aware of how top suppliers are getting a high position in global halal meat markets.

Increasing population and food security are the biggest threats to underdeveloped economies like Pakistan, Bangladesh, India, and many other economies. Ali et al. (2020) said that the global population is expected to increase by 9 billion in 2050, which ultimately will lead to food security challenges, especially in the livestock sector. Only economies with high production of livestock would remain at a competitive position. Khan et al. (2020a) reported that animal production is mainly dependent on three main factors (animal breeding, nutrition, and reproductive performances), and by adopting new technologies, economies would increase production, proficiency, and profitability. They further concluded that logistics operations, economic and environmental sustainability are essential components of supply chain practices and can play a vital role in improving meat productivity, meat traceability, and meat exports (Khan et al., 2020b). Pakistan is facing serious hunger issues not only because of the low level of production but also due to lack of value addition and lack of quality standards according to WTO and WHO (Arifeen, 2018). There is a strong need to learn about international standards for breeding, feeding, slaughtering, and animal husbandry and also to reduce the gap between demand and supply of meat. This study has investigated the intermediating role of global technical standards on Voice of Customers (VOC) and Exports Enhancement (EE).

Voice of Customers (VOC) "WHATs"

This is the initial stage of the QFD model, which helped the industry to identify the most relevant issues related to the sector of interest. Further, this stage converts these requirements or issues into measurable parameters (Hatsey and Sileyew, 2019). This stage is also called "WHATs" because issues are mainly based on the requirements of customers and industry. Hatsey and Sileyew (2019) reported that the meat industry is a very fluctuating industry of the world as it is

highly dependent on customer-oriented requirements (Ma et al., 2020). This research study has applied the QFD model to investigate the requirements of Pakistan's halal meat industry actors (farmers, suppliers, distributors, wholesalers, retailers, and exporters).

Naseer et al. (2019) stated that understanding the requirements of customers is an essential component of QFD model and the purpose is to make organizations more efficient. This world-renowned model was introduced by Yoji Akao and Professor Shigeru Mizuno for statistical process control for military purposes and later on was implemented by many successful organizations (Gandara et al., 2019). Grunert (2011) and Gupta and Duggal (2020) stated that during 1960-2000, many industries have successfully implemented this model to understand the requirements of their customers by meeting quality standards and to get a competitive position. It was applied by Mitsubishi Heavy Industries for processing improvements. Large, medium, and small level industries have applied this model successfully for their products, services, and statistical control matters, i.e., KFC, Nokia, Ford, Adidas, McDonald's, Chen-one, Pizza hut, many other brands, institutes, hotels, and hospitals (Mehrab-Kandsar et al., 2017). Mehrabi-Kandsar et al. (2017) reported that high-quality products directly affect customer pleasure. They further reported that to compete at a global level, companies must offer products of the highest quality in order to achieve their required goals. Many industries applied tools like statistical process control (SPC), failure mode and effect analysis (FMEA), Fuzzy Control Chart, measurement system analysis (MSA), Service Quality Furnisher Exterior (SQFE) to priorities requirements of customers. Literature has proved that QFD tool is one of the best techniques in realizing the needs and designing products and services to produce superior value based on customer preferences.

Busyra and Ardi (2020) stated that consumer preferences play a play very important role in value addition in the food sector. They further said that global halal meat producers like Australia, USA, Brazil and Germany declared them as Muslim friendly suppliers of Halal Meat to capture high position in global markets. In addition, they suggested that Halal meat suppliers must focus on marketing and promotion of their products to value their customers' preferences. Organizational trends are changing and global suppliers of halal meat mainly have focused on the application of global quality and compliance standards.

Global Technical Standards (GTS)

Fuseini et al. (2020) emphasize that the application of quality standards must be a compulsory part of the whole supply chain process. Because due to lack of quality compliance standards, halal products can easily end halal status. They stated that halal practices should be applied from livestock farms to export halal products. Trends of global innovative halal solutions are part of the top supplier's supply chain structure to improve production, logistics, transportation, processing, and packaging of halal meat products (Mohamed et al., 2020).

Previous studies also supported the requirement of quality compliance standards to improve exports and also to make the

overall supply chain process more efficient. As Arijo (2020) and Giyanti et al. (2020) stated that the global demand for halal meat products is increasing rapidly, and only the economies applying global quality standards would stand at a competitive position in global markets. Rafique et al. (2020) and Rosa et al. (2020) has highlighted that global supplier like USA, Brazil, Germany, Netherlands, Poland, New Zealand, Spain and even India are strictly making sure quality standards including WHO, WTO, ISO, QMS, GB, GSO standards, etc. Magsi et al. (2020) highlighted the issue in the halal meat industry of Pakistan and emphasized that due to the lack of global standards, the halal meat industry of Pakistan is still unable to achieve a valuable position in global markets instead of untapped potential. Ghafoor et al. (2020) said that most people from rural areas are engaged in livestock production in Pakistan and are not aware of the quality standards. Karsak et al. (2003) and Juned (2020) also supported that research and development are needed for production and exports enhancement in Pakistan's halal meat industry. They further stated that consumers of halal meat and processed products (both Muslims and Non-Muslims) are more aware of changing trends and increasing competition. Therefore, consumers demand innovative features with the best quality products. To make sure high quality with competitive features, there is a strong need to learn about global quality standards and practices of global suppliers.

Exports Enhancement (EE)

The developed economies of the world have supportive policies and supply chain systems for their halal meat actors (farmers, producers, suppliers and exporters). Literature also supported it as Thomson and Chabot (2005) stated that many developed economies have trade agreements with economies of largest import regions, i.e., Africa, ME, CAR and due to agreements, their exporters get the competitive advantage in said regions. Rafique et al. (2020) added that USA, Brazil, Australia and Germany promote their halal meat sectors through value-added products due to advanced machinery and processing units. In addition, top suppliers of halal meat industry are providing exports promotion programs, advanced training techniques, advance processing units and better transportation means to facilitate their exporters (Bisio et al., 2020).

Faraz et al. (2019) stated Pakistan's halal meat industry is based on obsolete means of production and has a very non-supportive supply chain structure for its exporters. He said that different factors are responsible for low exports of Pakistan in halal meat industry contaminated and old-fashioned slaughter houses, business mafia, lack of quality standards, lack of marketing facilities, lack of promotion at international level and traditional transportation facilities. Wani and Jafar (2019) said that packing of halal meat products in Pakistan is also one of the major reasons of low share in global halal meat markets because different regions have different requirements related to halal meat packing materials. In Pakistan's halal meat industry, foreign players like China, India and Japan are getting an advantage because domestic packing companies do not meet global quality compliance standards (Emberson and Pinheiro, 2020). Cezar

et al. (2020) emphasize that to achieve desired results, many Non-Muslim suppliers like Brazil, USA, and Australia have declared them as Muslim friendly suppliers. However, due to the lack of supportive policies by the government related to exports of halal meat, Pakistan is not meeting global standards of halal meat exports.

METHODOLOGY

Conceptualization

The independent variable for this study was the requirements of customers, also called "Voice of Customers (VOC)". It was categorized into twelve further requirements of the halal meat industry of Pakistan. The dependent variable was Exports Enhancement (EE)" which was further divided into five dimensions for this study based on requirements of Pakistan's halal meat exports. The mediating variable clarifies that the independent variable affects the mediating variable, which affects the dependent variable. In this research, the mediating variable was "Global Technical Standards (GTS)" which was further categorized into eight global quality and compliance standards.

Research Technique

A mixed methodology was applied for data collection and analysis. At the initial stage of research, the Quality Functional Deployment (QFD) model was applied to identify the most relevant requirements related to the production and exports of halal meat. Secondly, a questionnaire survey was used as a research instrument to test the results of QFD model and survey for Pakistan halal meat.

Instrumentation

At the first stage of pilot testing, the current study has designed a conceptual model based on quantitative data to generate customer requirements as VOC from Pakistan's halal meat industry actors (farmers, suppliers, manufacturers, distributors, and exporters). Further study has generated Global Technical standards (GTS) in QFD model. Existing literature also supported the application of QFD model for production and exports enhancement. Watz and Hallstedt (2020) applied QFD model for profile modeling to make sure sustainable management performance. They have concluded that it is the best quantitative tool to design and disseminate customer requirements with organizational parameters. Sirin and Gunduz (2020) applied QFD model to design a modified balanced scorecard for the allocation of management resources according. Their results show that QFD model is one of the best techniques to achieve required results in organizations.

The participants to design QFD model were fourteen actors (farmers, suppliers, manufacturers, distributors, and exporters) from Pakistan Halal meat industry. The actors were asked to identify requirements and rate the frequency of selected requirements according to Pakistan halal meat industry. Keeping in view the nature of the research, twelve requirements as VOC, five requirements as Exports Enhancement (EE) and eight Global Technical Standards (GTS) were identified. In the second part of the study, a total of 250 responses were generated from actors of Pakistan's halal meat

industry using a five-point Likert scale. Here the moderating variable "GTS" were measured with independent variables "VOC". It was a cross-sectional study, and data were collected by questionnaire from Actors (experts) of Pakistan halal meat industry. To test the reliability of the questionnaire, Cronbach alpha was applied.

Demographics

A total of 250 actors (experts) participated in filling questionnaires. Total 97% of respondents were male, and only 3% female respondents from Pakistan halal meat

industry participated in the survey (Figure 1). Most of the experts in the selected consumer panel had a university degree and were more than 30 years of age. Naspetti et al. (2015) said that the participants of the study must have a sufficient level of knowledge for the application of the QFD model and for survey analysis as well. For the current study the participants' level of knowledge about halal meat industry requirements was satisfactory. Figure 2 shows that 92% of respondents had high level of knowledge and 8% respondents had medium level of knowledge about market issues. Detail is given in Table 1.

Table 1. Actors (Experts) characteristics.

Domain Experts knowledge about halal meat industry requirements		
Characteristics	Sample Grouping	Proportion
Gender	Male	97%
	Female	3%
Age	>30	100%
Education	No Formal Education	All have university degrees
Knowledge about market issues	Medium	8%
	High	92%

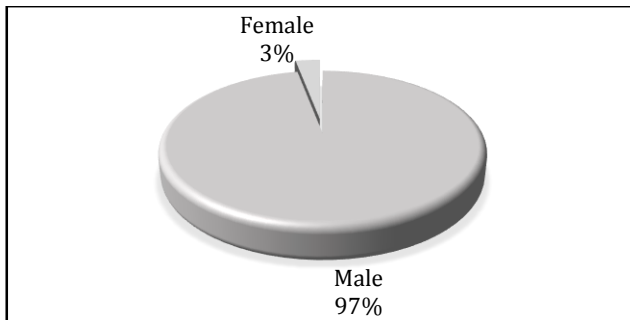


Figure 1. Gender data of respondents.

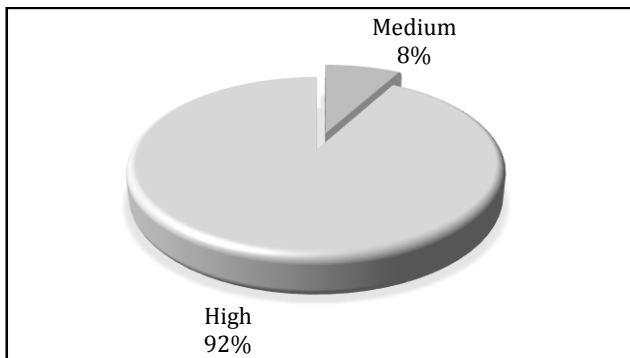


Figure 2. Knowledge about market issues.

Pre-testing of Questionnaire

Before the collection from all respondents of Pakistan halal meat industry for data analysis, a random sample of 15 actors (experts) was selected to test the reliability and validity of the data and questionnaire.

Table 2. Pre-testing analysis.

Cronbach's Alpha	No. of items
0.800	15

Table 2 Shows the results of Cronbach's Alpha for selected sample show that the value was greater than 0.7. Apparently, it shows reliability of the questionnaire for analysis.

Data Analysis Tools and Techniques

Analysis was conducted with Statistical Package for Social Sciences (SPSS) version 23 and Smart PLS.3 (Partial Least Square). Both are world renowned software. According to Sivam et al. (2020) SPSS is one of the best tools for comparing and exploring the differences between responses of hypothesis. For current study SPSS was used for demographic data. Likewise, Partial least square (PLS) is considered as an advance and authentic software for structural equation modeling (SEM), which helps users for analysis and comparison (Sirin et al., 2020). In current study PLS was applied for complete analysis. Total 250 respondents from Pakistan halal meat industry participated in data collection process. Appropriate tests were applied according to the requirements of analysis which is briefly discussed in the next chapter.

RESULTS AND DISCUSSION

First Phase: Quantitative Model Analysis

Quality Function Deployment (QFD) Model

For the first stage of the quantitative analysis method was used through three-Stage QFD model. For initial stage of QFD model, requirements of Pakistan halal meat industry as "VOC" were generated based on existing literature and in-depth interviews of actors (exporters). Twelve requirements were related to production, manufacturing, transportation and distribution of halal meat in Pakistan and five requirements were related to halal meat exportation process of Pakistan halal meat industry. Issues as VOC were also supported by existing literature. As Cardoso et al. (2015) stated that underdeveloped economies faced several challenges in their meat industry especially due to poor animal production plans and lack of financial mobility. Bergquist et al. (2015) reported that logistics operations play important role in the development of food sector and developing economies have deficiencies in their logistics management systems. Bradfield and Ismail (2020) highlighted that trade agreements of developed economies in halal meat sector is also a hurdle for developing economies to enter in major markets of halal meat i.e., ME, CARs, Europe and Africa region.

Global Technical Standards GTS																				
Meat Exports Strategies/Specifications										Competitive Novelty Analysis										
Sr. #	(WHATs) VOC	MW	Weights/ Importance																	
			USFDA standards	Environmental management standards	National Livestock Research Centers	Online Traceability Systems	Meat Safety Management Systems	Intermodel solutions (road, rail and barge)	HACCP Certifications	ISO 9001 Standards	Netherlands	Pakistan	USA	Poland	Spain	India	Canada	Australia	Brazil	
1	VOC	Animal Production (Animal Fodder/Feed)	6.75676	5	3	1	9	3	9	3	9	1	5	4	4	4	2	5	4	5
2		Animal Health Care Facilities plans and D	5.40541	4	9	3	9	9	9	3	9	2	4	3	4	3	4	5	4	5
3		Slaughter Houses Availability	6.75676	5	3	9	1	9	9	9	9	2	4	3	4	4	3	5	4	4
4		Logistics Process from farms to final exp	5.40541	4	1	9	3	9	9	3	9	1	5	3	4	3	3	5	5	5
5		Awareness about animal breeding practice	4.05405	3	3	3	9	3	3	1	9	1	4	3	4	3	2	5	5	5
6		Hygienic Environment	5.40541	4	3	3	9	9	9	3	9	2	5	4	3	4	2	5	4	5
7		Islamic Way of Slaughtering Animals	4.05405	3	1	1	1	9	9	1	3	2	5	4	2	4	2	4	4	5
8		Animal Origin information	4.05405	3	1	1	1	9	3	1	9	2	4	3	3	4	3	5	4	5
9		Bilateral Agreements Issues	6.75676	5	1	1	3	3	3	3	9	1	5	3	4	3	3	5	4	4
10		Exports/Imports Permit Certification	6.75676	5	1	9	3	3	3	9	9	2	5	3	3	4	2	5	4	5
11		Traceability of Fresh Meat	6.75676	5	1	1	3	9	9	9	9	1	5	5	5	3	3	5	5	5
12		Quality Compliance Certificates	6.75676	5	9	1	9	9	9	3	9	2	5	4	4	4	3	4	5	5
13		Quality Compliance and Assurance Certif	6.75676	5	9	1	9	9	9	9	9	2	5	4	4	3	1	5	5	5
14		Chinese Standards GB, Gull Standards GS	5.40541	4	1	1	3	3	9	3	9	2	5	3	3	3	3	5	4	5
15		Packing Materials according to WTO, VH	5.40541	4	3	1	3	9	9	9	9	2	5	5	5	4	3	5	4	4
16		Cold Storage Facilities at every stage	6.75676	5	1	1	3	9	9	9	9	2	5	4	5	4	4	5	5	5
17		Exports Promotion programs and fit for c	6.75676	5	1	1	1	9	3	3	9	3	5	4	3	4	4	5	5	5
	Total		74	51	47	79	123	123	93	101	147	31	81	62	64	61	47	83	75	82
	Absolute Weights			3774	2397	3713	9717	15129	11439	9393	14847	4557	2511	5022	3968	3904	2867	3901	6225	6150
	Relative Weights			5.3801102	3.40439425	5.27347352	13.80079251	21.48730086	16.245810258	13.34052	21.08579288	11.65	6.421	12.84	10.15	9.983	7.332	9.976	15.92	15.73

Figure 3. QFD model. Adapted from (Naspetti et al., 2015).

At second stage of QFD model in quantitative analysis study has generated House of Quality (HOQ) matrix for QFD model. Fourteen actors (experts) from Pakistan halal meat industry were asked to rate the requirements by using a 5-point Likert scale (5 for strongly agree; 1 for strongly disagree). This method was also applied by Vatthanakul et al. (2010) to improve the quality of leather products in one of the world-renowned organizations. Vanany et al. (2019) applied three phased QFD model for halal products quality and concluded that this model best fit customer requirements to disseminate with organizational characteristics. Eight Global Technical Standards (GTS) were also constructed by team of fourteen experts of Pakistan halal meat industry. Technical experts were asked to create a relationship matrix between seventeen requirements and eight global standards (Figure 3) for halal meat industry base on ranking as (strong=9, Medium=3, Weak=1). Paryani and Cudney (2010) also applied same raking criteria to design QFD model for service quality enhancements. They have concluded that the team of experts with high knowledge about markets trends and customer preferences can better design relationship matrix. Absolute Importance/ weights were calculated as follows:

$$Aw_i = \sum_{j=1}^m (pw_j * X_{ij}) \quad (1)$$

Where PW_j is the j-th customer requirement, X_{ij} is the correlation coefficient between the j-th requirement (VOC) and the i-th standard (GTS), and i = 1---n (n, total number of global technical standards) and j = 1---m (m, total number of requirements). The normalized mean value of each standard requirement was reported in the absolute weight column of the HOQ (Figure 3). Relative weights (RW) have identified the most important standards based on the highest weights to make sure production and exports. Relative Weights (RW) were calculated as follows:

$$RW_i = \frac{w_i}{\sum_{i=1}^n w_i} \quad (2)$$

The priorities for the customer requirements were estimated by multiplying the impact of global standards for halal meat industry

(Djekic et al., 2017). As an example, the USFDA standards' relative weight was calculated as follows:

$$3774 / (3774+2397+3713+9717+15129+11439+9393+ 14847) * 100 = 5.36011$$

This method was also supported by previous studies including Yuliani et al. (2019), Vatthanakul et al. (2010) and Baran and Yildiz (2015). Complete detail of QFD model is given below in Figure 3. Keeping in view the nature of the research, twelve customers' requirements as VOC, five requirements for EE and eight GTS were shortlisted on the basis of group discussions, cross conferencing and application of QFD model for phase-I (Questionnaire survey) for further analysis.

Third stage of three- stages QFD model in phase one was Competitive Novelty Analysis. CNA adds uniqueness in analysis. It has highlighted deficiencies in overall Pakistan's halal meat exports. Another important purpose of CNA analysis was to learn about competitors' strategies to increase Pakistan's exports of halal meat in the markets of ME, CARs, Europe, ASEAN and Africa by overcoming existing issues. For this purpose, nine competitor economies were selected (Figure 3). One exporter from each selected economy including Pakistan, USA, Brazil, Australia, Canada, Netherland, Poland, Spain and India had rated the frequency of requirements (VOC, EE) and level of satisfaction based on of application of global standards on a 5-point Likert scale (Vatthanakul et al., 2010).

Second Phase: Quantitative Analysis

Schematic Diagram of Overall Analysis Results

For survey analysis a total of 250 responses were collected from actors (experts) of Pakistan's halal meat industry using a five-point Likert scale. Moderating variables (GTS) were measured with Independent Variables (VOC). Analysis were generated by a cross-sectional study, and questionnaire was used for the collection of data. Schematic diagram based on results of analysis for VOC, GTS, and EE is given below in Figure 4.

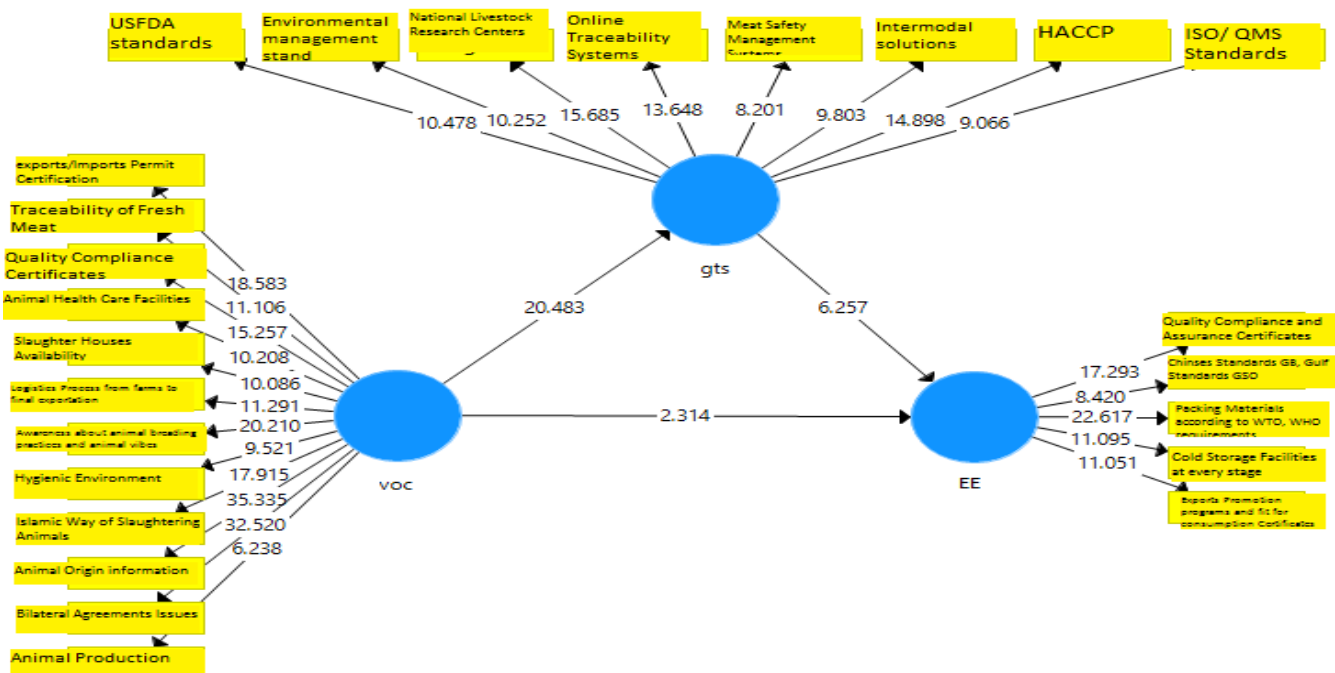


Figure 4. Schematic diagram of overall analysis results.

Analysis based on above diagram shows that customer requirements "VOC" from (1-12) were used as independent variables. Global quality and compliance standards "GTS" from (1-8) were used as mediating variables between VOC and EE. Likewise, requirements related to Exports Enhancement (EE) from (1-5) were used as dependent variable. The main purpose of presenting results through schematic diagram was to confirm the reliability of variables. Results of analysis shows that, all of requirements for VOC, EE, and GTS were greater than 0.7 which presented very strong results of composite reliability of the instrument.

Variables Measures

Construct Reliability and Validity: Cronbach's Alpha for independent variable "VOC" was (0.928) with a composite reliability of (0.938). As shown in Figure 5 Both values for independent variable (VOC) shows that results were highly reliable because values were greater than (0.7). The value of Cronbach's alpha for dependent variable Exports Enhancement (EE) was (0.800) and its composite reliability was (0.863). Both values for dependent variable (EE) were also greater than (0.7) which shows that results were highly reliable. Likewise, GTS mediates between VOC and ES, so the Cronbach's alpha for mediating variable was (0.802) and its composite reliability was (0.853). Both values for mediating variable (GTS) shows that results were highly reliable.

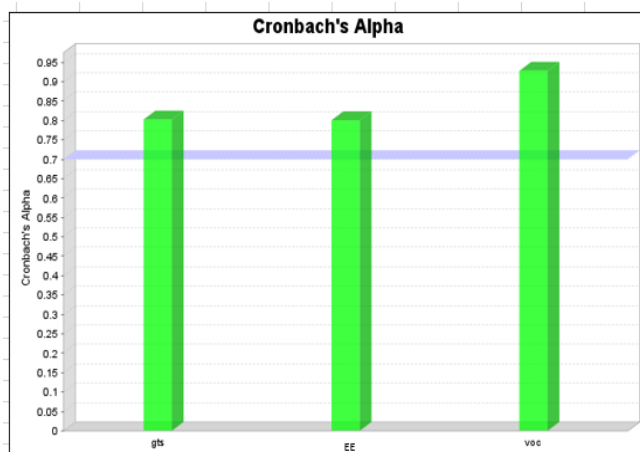


Figure 5. Cronbach's Alpha.

Structural Model Assessment

Path Coefficients: Analysis shows that the path coefficient indicated direct effect of VOC on EE and also on GTS. It further indicated that effects of mediating variable assumed to be closely interlink for production and exports enhancement. For analysis the Path coefficients were standardized because they were estimated from correlations (Susanty et al., 2020). The Path coefficient values for GTS, EE and VOC were less the (0.05) as shown in Figure 6, 7 and 8 which indicated that all values were highly significant and correlated with each other to make sure exports enhancement in Pakistan's halal meat industry. In addition, path coefficient histograms were also bell shaped which shows the normality of research data.

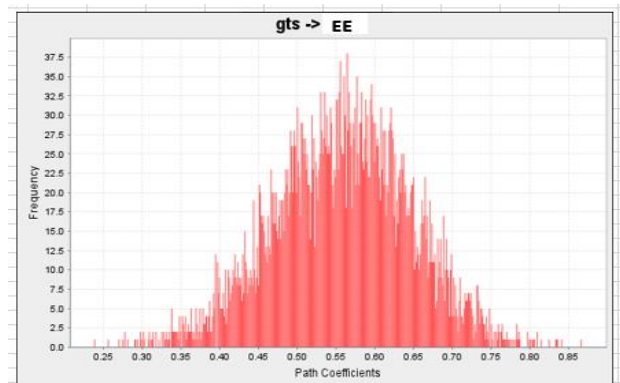


Figure 6. Path coefficient histogram.

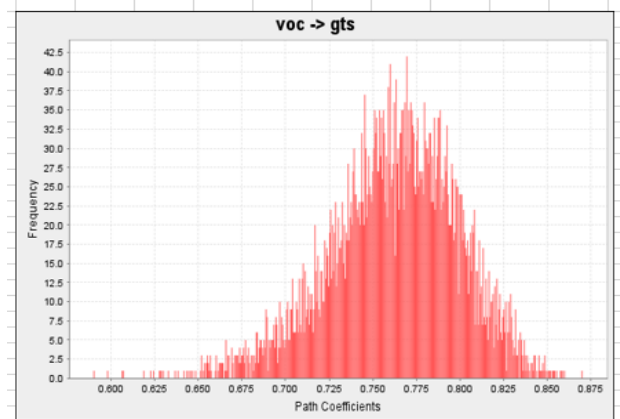


Figure 7. Path coefficient histogram.

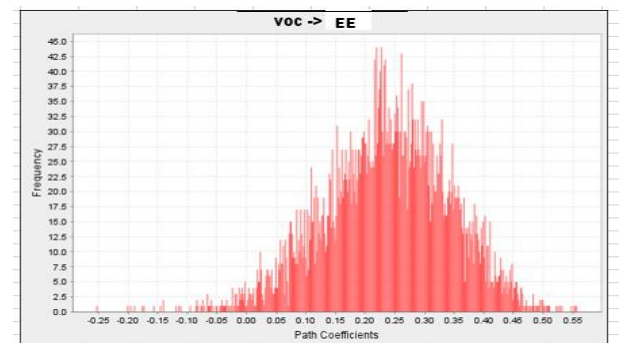


Figure 8. Path coefficient histogram.

R-Square: Regression-squared statistical tool in current analysis shows how close the data sets were to the fitted regression line (Figure 9). Regression - squared also called the coefficient of determination for multiple regression (Bisio et al., 2020). Here R-Squared represented the proportion of variance for Exports Enhancement (EE) explained by Voice of Customers (VOC) in the regression model. In general, R square analysis shows the rate of dependency of variable on an independent variable, the higher the R-squared, shows the better model fits for data (Nazari et al., 2020). Results of Figure 9 shows the percentage of the responses variable variation explained by a linear model. The values of R-Squared were greater the (0.50), which shows the highest level of dependency between dependent variables (EE), mediating variable (GTS) and independent variable (VOC).

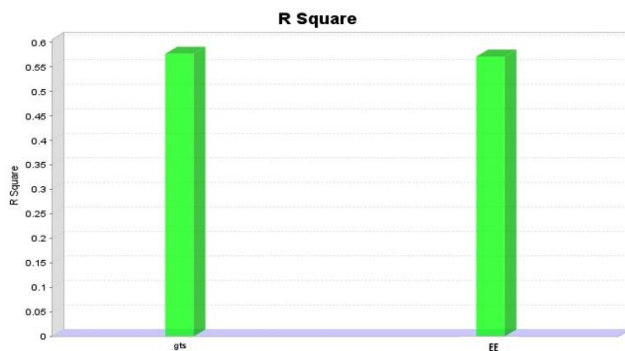


Figure 9. Regression-Squared.

Total Indirect Effects: The value of indirect path between GTS and VOC to enhance Exports (EE) was (0.419) (Table 3), it was quite less than the value of direct pathway which was (0.760). Thus, there was mediation between VOC and EE by GTS.

Table 3. Total indirect effects.

	GTS	EE	VOC
GTS	-	-	-
EE	-	-	-
VOC	-	0.419	-

RESULTS AND DISCUSSION

Results of Quantitative Analysis

First stage of HOQ in QFD model identified requirements related to exports of Pakistan's halal meat. Fourteen actors (experts) of Pakistan halal meat industry had assigned weights to VOCs and EE on a five-points Likert scaled questionnaire. Likewise, the global standards to overcome these issues were also included and rated by team of experts. Second stage of QFD model has constructed relationship matrix between requirements of halal meat industry (VOC, EE) and global quality standards (GTS). Results of the study has shown that to overcome existing issues in Pakistan halal meat industry there is strong need to implement global quality and compliance standards. The global technical standards that were strictly related to said issues with highest Relative Weights (RW) were Meat Safety Management Systems (RW=21.48), ISO/ QMS Standards (RW=21.08), Intermodal solutions (RW=16.24), Online Traceability Systems (RW=13.80), Hazard Analysis and Critical Control Points (HACCP) Certifications (RW=13.34), USFDA standards (RW=5.36), National Livestock Research Centers (RW=5.27) and Environmental management standards (RW=13.10). Detail model is given in (Figure 3). Results of relationship Matrix were also supported by previously existing literature. Hamid & Said, (2019) stated that to compete in global meat markets there is strong need to implement global standards like top suppliers of halal meat. Ali et al. (2020) also highlighted that slaughter houses have poor conditions, lack of quality standards and compliance certification, poor transportation systems are the basic reasons of low production and exports of halal meat in Pakistan. In addition, they further suggested that the government of Pakistan should facilitate halal meat exporters in quality compliance certification process.

Third stage of QFD model comprised of Competitive Novelty Analysis (CNA) Matrix which was unique and very informative

part of research. Here results have been constructed based on survey collected by nine economies including Pakistan, USA, Australia, Brazil, Spain, Poland, Netherland, India and Canada. Economies were selected based of regions of interest where competitor economies were taking high position i.e., ME, CARs, ASEAN, Europe and African economies.

Results of the study shows that among selected economies Australian's exporters were highly satisfied with the application of global standards related to halal meat exports and strategies applied by their government to facilitate exporters in all issues. Australia's relative weight was highest with a value of (RW=15.92). According to Razzaq et al. (2016) Australia has been increasingly promoting itself as a Muslim friendly destination by attract halal foods i.e., halal meat and processed halal food products. It is one of the largest exporters of halal beef, sheep and lamb. Now promoting its halal products by attracting tourists and also by attracting Muslim exporters from other economies for halal meat-expos. Zulfiqar et al. (2018) stated that Australia has very strong halal meat supply chain structure because of strong institutional arrangements. It has very strong coordination between public and private sectors. Australian government has adapted various strategies to promote halal meat due to increasing global demand of halal meat i.e., incentives for exporters, Innovative options strategies, Alliance strategy, Cost leadership strategy, Entry-barriers strategy, Differentiation strategy, Operational effectiveness Strategy, branding of their meat products, Market penetration and orientation strategies (Bohari et al., 2013). In addition, they are strictly implementing United Nations Economic Commission for Europe (UNECE) standards, ISO standards, QMS standards, Hygienic Meat Confirmation systems Certificates, Quality Compliance and Assurance Certificates (Wibowo et al., 2020). Study further has reported that Brazilian exporter rated second highest level of satisfaction among selected competitor economies about implementation of global standards to address selected issues. Brazil's relative level of satisfaction according to CNA analysis was (RW=15.73). Brazil is the second largest halal food especially halal meat suppliers globally and its exports destinations are mainly in ME, CARs and African economies (Rosa et al., 2020). Brazil has beef exports agreements with different economies like China, Saudi Arabia, UAE, Japan, and Egypt to promote professionalism in meat exports and for seeking new markets successfully (ABIEC, 2020). Emberson et al. (2020) concluded that Brazil export association is promoting their meet products by organizing meet-expos and meet promotional programs to reduce trade barriers in different economies especially in Africa region as there is high demand of halal meat products. Brazilian meet companies have attractive and favorable supply chain processes and practices which are supportive for their producers to increase meet production and also to capture high position in global meet exports (Baran and Yıldız, 2015). Brazilian government has taken various initiatives like corporate social responsibility programs, green supply chain management programs (for poultry, beef, fish, cattle farmers), industrial ecology, stakeholder responsibility programs, circular economy and sustainability measure, distribution channels, environmental sustainability programs, animal feed

and nutrition programs to increase productivity and exports of halal meat (Rosa et al., 2020). Brazilian meat companies have adapted advance methods of cattle farming to increase production and exports of halal meat as they are exporting more than 200,000 cattle every year (Ermgassena et al., 2020). Halal meat compliance is one of the major issues at global in halal meat industry (Abidin and Perdana, 2020). Brazilian government has adapted strict measures to overcome this issue like integrity of halal meat certification, online trackability of halal meat and compliance systems, block chain technology (Abidin and Perdana, 2020). In addition, they have very strong governance to handle their halal beef exports as Brazil is largest supplier of processed halal beef products (Ermgassen et al., 2020).

Competitive novelty Analysis results further highlighted that the exporter from USA halal meat industry shows the third largest scores in implementation of global standards and level of satisfaction to handle issues related to halal meat exports. USA's Relative Value was (RW=12.84). USA is the largest exporter of halal meat at global level and it is contributing 13 percent in total global exports (ITC, 2019). It is among top suppliers of halal meat to ASEAN, ME, CAR, Europe and Africa region as well. According to Competitive Novelty Analysis (CNA) in House of Quality (HOQ) the remaining competitor economies were also standing at good position according to their normalized contribution in level of satisfaction rated by their exporters i.e., Netherland (RW= 11.66), Poland (RW= 10.15), Spain (RW= 9.98) Canada (RW=9.97) and India (RW= 7.33). However, in case of Pakistan level of satisfaction reported by exporter of one of renowned meat exporting company was (RW= 6.42), which was lower than all selected competitor economies.

India also has strong position in meat exports to Vietnam, Malaysia, Indonesia, UAE, ME and African economies and it contributes approximately 3 percent in total global meat exports (UN-COMTRADE, 2019). Although it's halal meat exports have declined due to religious and political reasons but still has strong position because of high population and better cattle farming systems (Sohaib and Jamil, 2018). Jakobsen and Hansen (2020) conducted research on geographical influences on meat production and consumption in Asia and they have concluded that India is getting high position in global markets in meat because it has special focussed towards small farming, geographical distribution, regional trends, religious perspectives, animal feed development and many other perspectives. They further concluded that India is providing all categories of meat and focussing on value addition, quality Compliance certification, Animal Health Care Facilities and plans, Animal Vibes awareness, ISO certifications and Hygienic Meat Confirmation systems and Certificates (Jakobsen & Hansen, 2020).

Results of quantitative analysis had revealed that Pakistani exporters faced several challenges and there is strong need of taking different initiatives in Pakistan's halal meat industry to overcome issues. Few of existing issues include loss of animals and meat products during transportation, unsustainable production methods, post harvesting issues, poor marketing, poor distribution channels, lack of financial mobility, and lack

of advanced machinery and increasing prices (Khan & Shah, 2011).

Results of Quantitative Analysis

"How does Voice of Customers (VOC) affect the Exports Enhancement?"

The value of relationship between requirements (VOC) and global standards (GTS) according to results of P-Value was (0.00) which was less than (0.5). Regarding Path coefficients value (0.760) correlation between requirements of halal meat industry and global quality and compliance standards was standardized. It shows the strength of the relationship was very strong. Based on Regression-squared results, global standards are highly required to answer requirements in Pakistan halal meat industry. Literature strongly supported application of global quality standards that challenges in Pakistan halal meat industry are mainly due to lack of implementation of international quality standards. Aniqoh and Hanastiana, (2020) have stated that to meet international quality standards manufacturers should learn about issues and requirements of halal meat industry.

Analysis show that based on the path coefficients, the P-value for voice of customers (VOC) and exports enhancement (EE) was (0.020). It shows that the relationship between exports enhancement (EE) and halal meat industry was very significant because P-Value was less than (0.05). The path coefficient value for VOC and EE was (0.246), which depicted that dependent and independent variables had moderate to weak relationship. Concerning Regression-squared, exports enhancement (EE) was 24.6% dependent on voice of customers (VOC) and 75.4% on global technical standards (GTS). Previous studies also supported the degree of relationship between exports and halal meat industry requirements. Pellattiero et al. (2020) said that more than 80 percent meat processing units in underdeveloped countries only focused on high production and only 20 percent considered quality compliance standards requirements. Top suppliers of halal meat have very strict rules regarding implementation of global quality standards and requirements of WTO to enter into global halal meat markets (Aujla and Sadiq, 2018). In Pakistan mainly small and medium level production units are working on raw and process halal meat products and producers are not aware about global quality standards (Arijo, 2020). Therefore, there is strong need to provide ten training about application and accessibility of global quality requirements (Jalil and Hussain, 2013).

"Does Global Technical Standards (GTS) mediate the Voice of Customers (VOC) and the Exports Enhancement (EE)?"

Further the P-value of global technical standards (GTS) and exports enhancement (EE) was also (0.00), which shows high significance of correlation between GTS and EE. Further value of path coefficient value on Regression-Squared between GTS and EE was (0.552), which shows that the relationship between EE and GTS was very strong. Previous studies also supported these results as Hauser and Clausing (1988) said that economies can enhance exports in any sector by improving overall structure according to competitor economies and global practices. Al-Tehniz et al. (2020) said

that exports are highly dependent on requirements of industry and market segmentation according to competitors' strategies. Results of the study shows that global technical standards (GTS) strongly correlate voice of customers (VOC) and exports enhancement (EE). The P-value of mediating variable between dependent and independent variable was (0.00), which indicated high level of significance of the relationships. Giyanti et al., (2020) stated that Path Coefficient and Regression-Squared value is an important component of quantitative research which determines the strength of these relationships. Therefore, based on the results on analysis the indirect pathway and checking the mediation of GTS between EE and VOC path coefficient/ indirect pathway value was (0.419). It shows that global technical standards have very strong mediation between requirements of actors (VOC) and exports enhancement (EE) process. Ajay (2020); Talib et al. (2019) stated that Pakistan halal meat industry faced several challenges i.e., inefficient animal nutrition plan, lack of animal fodder/feed plants, lack of awareness about animal vibes awareness, transportation means, old slaughter houses etc. it leads to low level of production and high cost of production. Results of analysis also shows that the global technical standards (GTS) in Pakistan halal meat industry are highly required to address existing issues. Application of quality standards would lead to better performance and high exports in halal meat industry.

The previous literature shows that Pakistan has untapped potential to increase its exports of halal meat and processed products. Pakistan's red meat is highly demanded in ME, CARs, GCC, Europe, and Africa region due to unique taste, organic nature and hygienic perspectives (Bashir et al., 2015). But instead of having untapped potential to produce high quality of meat, Pakistan has only (0.2) percent share in global halal meat markets (UN-COMTRADE, 2019). It is an alarming situation for Pakistan. The competitor economies are taking strong position in global halal meat markets because they are exporting processed products after value addition. While, Pakistan is exporting mainly raw hides, leather, fowls, and frozen chicken with low level of value addition (Faraz et al., 2019). Current study presented results of mixed methodology to identify issues in halal meat industry of Pakistan. Also, to understand global competitors' strategies to get high share in global markets.

CONCLUSIONS

Results of mixed methodological approach for current study has concluded that halal meat industry is a customer-oriented industry which highly based on consumer preferences. Therefore, there is strong need to analyses and priorities requirements of Pakistan halal meat industry based on expert's assessment and global requirements. Results have highlighted some important issues in halal meat industry of Pakistan. In addition, by application of QFD model and results of survey some important global quality standards to overcome existing issues were also discussed by the study. Study further has concluded that demand of halal meat and processed products is increasing rapidly and only economies with surplus production of livestock would remain stand at competitive position in global halal meat export markets. It

was suggested that Pakistan being a Muslim county ideal geographical location has huge potential to get competitive advantage in halal meat markets of ME, CARs, ASEAN, Europe and Africa. But there is strong need to learn about global competitor strategies to implement global quality and compliance standards. It will surely help Pakistan's halal meat exporters to explore new markets.

QFD model was tailored specifically for exports enhancement of Pakistan halal meat industry. Its application will differ for other sectors, so model should be re-designed according to requirements of other sectors.

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