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Model of Critical Success Factors (CSFs) Influencing Food Inspection Management in UAE

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Abstract: Muslims abide by strict dietary regulations that specify that the foods must be Halal for the consumption by Muslims. Previous research has shown that there is no definite or appropriate model of Critical Success Factors (CSFs) related to halal food inspection. The success of a project is largely dependent on critical factors, which primarily track the project's development from the ground up (Ahsen et al. 2021). As a result, this study employed a quantitative approach to formulate a structural model of success factors that halal food authorities can use to optimise their inspection model, with a focus on training and development. The factors that affect/influence halal food inspection management, particularly when dealing with packaged food and halal certificates were identified through literature work. Questionnaire survey was conducted to collect data that was used in the formulation of the model. The Critical Success Factors (CSFs) model, which was created tested and validated using SEM-AMOS software. The model has seven constructs (independent variables) and one dependent variable of the management of halal food inspection, thus having seven hypotheses. It was discovered that five out of seven of the hypotheses are were supported. These findings aid in the discovery of new information to several parties like managers, employees with progressively less experience, and local and foreign halal food inspectors, as well as curriculum and infrastructure beliefs, and how these effects affect opportunities and motivation. The study contributes significantly to UAE and global research community.

Keywords: Food inspection management, SEM, success factors, UAE

1. Introduction

The halal sector in the United Arab Emirates (UAE) has grown tremendously, with rapid changes recorded each fiscal year. This industry is currently of worth $1.24 trillion (Stanley 2018). The UAE has emerged as the global market leader in the halal sector. The UAE typically processes halal food weighing approximately 16 billion kilogrammes from which some halal food is consumed in the UAE while a significant portion of the food is exported. The halal food industry in the UAE is changing dramatically. One of the critical transitions has been the incorporation of halal into the country's tourism domain. This sector recognizes the need to meet the needs of visitors from Kuwait, Saudi Arabia, and Qatar (Batrawy 2015). The UAE government is always concerned with ensuring that the halal consumed locally or domestically is safe for humans. As a result, the regime requires that every halal food item be inspected. Abu Dhabi

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Food Control Authority (ADFCA) is the authority in charge of inspecting halal food in Abu Dhabi (Samia et al. 2019). Any food entering Abu Dhabi containing animal-derived additives, such as enzymes, must have a halal certificate.

Furthermore, the institution expresses that halal food produced or processed locally must adhere to Islamic rules established by local authorities such as General Secretariat of Municipalities (GSM). Inspection is essential for ensuring that the halal meets regulatory requirements. Food inspectors typically facilitate the inspection through laboratory tests utilizing biochemical and chemical techniques. These inspectors are trained to help them carry out their duties expertly.

ADFCA has developed the Essential Food Safety Training programme (EFST). ADFCA introduced EFST in 2007. The model at the heart of this training is the provision of knowledge as well as an understanding of food safety. As a result, the training model not only instils but also ensures that food is handled appropriately throughout the food chain process. Checking for cross-contamination, identifying food safety hazards, detecting potential sources of bacteria, and pest control are all covered in the programme. At the same time, the EFST programme addresses issues such as cleaning and disinfection, as well as high-low-risk food preparation. The training programme is divided into modules. The first three (3) modules give participants the knowledge and skills they need to understand food safety concepts and appropriate controls. Following modules typically include case studies as well as exercises to assist participants in learning appropriate applications of food safety management and systems. Participants are given the EFST Record of Attendance certificate upon completion of the course, but this is subject to an evaluation process (ADFCA, 2011). Only the broad categories of halal inspection are covered in the training modules. The modules are based on four (4) pillars that provide a general introduction to food safety: cross-contamination, cooking, cleaning, and chilling (ADFCA, 2011). This model fails to recognize that food safety extends far beyond halal preparation, cleaning, cooking, cross-contamination, and chilling to include issues with food packaging. The EFST's generic nature has made it impossible for halal food inspectors to perform their duties optimally, particularly when it comes to detecting forged certificates and inspecting packaged food. The existence of numerous halal standards and certifying bodies also presents difficulties for halal food inspectors. The lack of consistency in halal regulations and standards makes it difficult for halal food inspectors who received generic training from EFST.

Indeed, many researchers have concluded that the Halal Food Inspectors are insufficient. According to a study by Premanandh and Bin Salem (2017), the authentication of consumer-packaged halal is sometimes problematic. The EFST programme was created in 2010 with the intention of making food safe in the food business by making EFST mandatory for food dealers (Khaleejtimes, 2010). Despite the ADFCA management's efforts to regularly monitor the mechanism put in place to ensure compliance; failures have occurred due to a lack of inspectors and supervisors to ensure that all food handlers in the UAE undergo the mandatory EFST examination. As a result, inspectors are frequently unable to verify that the business practices used to process and package the foods comply with local regulations. A case study involving allegations of McDonald's using non-halal products demonstrates how ADFCA's management had to act quickly to contain a rump or allegation that some foreign businesses in the UAE were violating food safety programmes and standards by using pork, which is considered a non-halal food product (Kader, 2014).

According to Ireland and Rajabzadeh (2011), residents in Gulf States complained that, despite being labelled as free of pork, packaged halal contained traces of the non-halal ingredient. One could argue that these issues were primarily caused by dishonesty among halal food providers. As a result, it is not the inspectors' fault. Nonetheless, additional evidence suggests that the current level of inspector competence is to blame for the increasing level of dishonesty among vendors. Farooqui and Kurt (2013) stated that halal inspectors are primarily food auditors. The issue is that a food auditor lacks the technical skills required to inspect halal requirements and procedures in a specific processing technology or discipline. In support of the notion of incompetent inspectors, Halaseh and Sundarakani (2012) stated that the UAE overlooks the importance of halal food inspection in ensuring the quality of meat consumed in the region. As a result, a more complex model is required to improve inspectors' abilities to detect forged certificates and inspect packaged halal without difficulty. At the moment, it is undeniable that the inspectors have extensive experience inspecting halal products. However, their experience is meaningless unless they have the necessary skills and knowledge about the two issues.

Previous research has shown that there is no definite or appropriate model of Critical Success Factors (CSFs) related to halal food inspection. The success of a project is largely dependent on critical factors, which primarily track the project's development from the ground up (Ahsen et al. 2021). As a result, this study employed a quantitative approach to formulate a structural model of success factors that halal food authorities can use to optimise their inspection model, with a focus on training and development. The factors that affect/influence halal food inspection management, particularly when dealing with packaged food and halal certificates were identified through literature work. Questionnaire survey was conducted to collect data that was used in the formulation of the model in AMOS software.

2. Literature Review

2.1 The Concept of Halal and Haram in Islam

Muslims must adhere to the concepts of Halal (permitted) and Haram in every aspect of their lives (forbidden). In the Qur'an, the word "halal" means "permitted," "permitted," "lawful," or "legal," while the word "haram" means "forbidden," "illegal," or "illegally." Wace (2014) argues that everything is halal and thus permissible to eat, with the exception of things that are prohibited by a clear, authentic, and explicit nass, which can be either a clear, authentic, and explicit verse from the Quran or a clear, authentic, and explicit Sunnah of the prophet. The Quranic verses and the explicit Sunnah, which refers to the deeds or sayings of the Prophet, are the two main sources of Islamic law that are used to determine whether a product is halal or haram. Wace (2014) asserts that in this instance, the best way to determine whether food inspectors are effective and whether the proposed halal food inspection model is effective is to use the two main sources of Islamic law as a guide. Pork, meat from dead animals, and meat that wasn't killed in Allah's name are all examples of haram material. In the holy Quran, it is mentioned four times (Toure, 2012). For instance, verse 173 of Surah al-Baqarah states:

"He forbids you from eating maytah (dead animals), blood, and swine flesh, as well as anything that has been killed as a sacrifice for someone besides Allah (or something that has been killed for an idol, but Allah's Name was not uttered during the killing). However, if one is compelled out of necessity, without engaging in willful disobedience or going beyond what is reasonable, he is not guilty. Because Allah is Merciful and Forgiving"

A product is regarded as Haram if it contains or comes into contact with anything from.

i. Carnivores like pigs, dogs, and donkeys (e.g. bears and lions)
ii. The Apostle of Allah prohibited eating donkey meat. Similarly, the Apostle of Allah prohibited eating meat from animals with fangs. Insects and reptiles regarded as unattractive or filthy (e.g. worm lice, flies and cockroaches).
iii. Animal deaths can occur due to strangulation, a blow to the head (clubbing), a head-first fall, natural causes (carrion), or being gored or attacked by another animal. Fish are not included in this category. The messenger's response to a question about the sea was, "Its water is pure, and its dead are Halal."
iv. Every animal, barring fish, which is exempt from sacrifice under Islamic law.
v. Poisonous or intoxicating plants, substances, and alcoholic beverages (e.g. hashish, opium, and contemporary drugs, whether natural or chemical). Ibn Umar stated that "all forms of Khamr are Haram" and that "everything that intoxicates the brain is Khamr."
vi. vii. Animals with erupting canine teeth (e.g. Monkeys, and cats, lions).
vii. 7. Amphibians (e.g. Frogs, crocodiles and turtles). "When Allah's Apostle was asked about putting frog in medicine by an apothecary, He forbade him from doing so," according to Abdur Rahman bin Uthman's narration.
viii. Animals killed for worship or in the name of someone or something other than Allah are listed as viii.
ix. Rats, scorpions, centipedes, and other creatures of a like nature (Allah's messenger has given the command to kill these creatures.
x. Animals that can't be killed.

2.2 Inspection Procedures in Halal Food Certification in Abu Dhabi

Halal inspection is part of halal certification (Szutest 2019). The primary goal of halal inspection is to ensure that halal products and services meet the minimum requirements of Islamic law, making them suitable for consumption not only in Muslim majority countries, but also in western countries where Muslim practices are common. Halal inspection is a process that ensures the features and quality of halal products and services comply with the Islamic Council's rules (Shah 2018). Furthermore, Manan, Rahman, and Sahri (2016) discovered that halal inspection or certification is only applied to meat products and services. As a result, in order for such products to bear the Halal label, the animals must have been slaughtered in a single cut. They should also be thoroughly bled, and their meat should not come into contact with animals slaughtered using other methods, particularly pork. The halal food certification process suggested by the Islamic Service of America (ISA) is presented in Figure 1.

An efficient food control system must include national legal frameworks. All nations have a wide range of laws and rules governing food that carry out the policy obligations of food chain operators to guarantee food is safe and of sufficient quality. Typically, when we talk about "food rules," we mean laws that control how food is produced, distributed, and handled. These laws also control how food is protected and regulated, as well as other related aspects of food distribution. Food law stipulates minimum quality requirements so that the food offered is unadulterated and not subject to unethical activities intended to deceive customers. Additionally, food legislation should cover the entire supply chain, from provisions for animal feed to on-farm inspections and early processing to distribution and final consumption. It is acknowledged that many nations may have multiple laws with provisions to guarantee food production is safe and of a high standard, even though food law is used for a specific purpose. If laws and rules are not continually revised or updated, the situation could deteriorate and become difficult for regulators, business, and consumers to navigate.

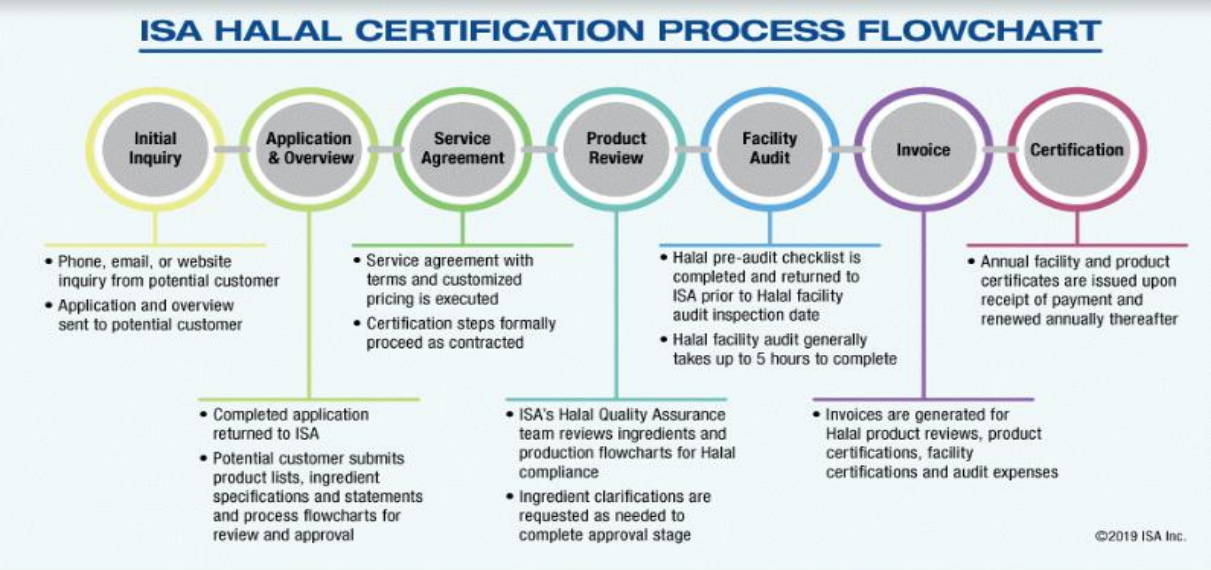

Fig. 1 - Halal certification process flowchart

2.3 The Measurement of Risk Management

The programme for essential food safety training (EFST) was developed by the Abu Dhabi Agriculture and Food Safety Authority. To ensure food is handled safely throughout the food chain, all food handlers employed in the Emirate of Abu Dhabi must acquire the necessary knowledge and understanding. The four fundamental pillars of safe food handling are covered in the EFST course: preventing cross-contamination, cooking, cleaning, and chilling safely, and storing food safely. The process of Halal food training is depicted in Figure 2.

Fig. 2 - Halal food training process

The course's main goal is to ensure that every party involved in the supply chain process is trained to gain the necessary information and knowledge to handle food and related products in accordance with Islamic religious requirements. However, the program's failure to promote effectiveness and efficiency in Abu Dhabi's halal food industry has been necessitated by the fact that most of the training only targets food handlers, without understanding that a supply chain consists of a network of facilities and distribution centres that begin at the origin of the product in question and end when the food product reaches the final consumer (Randeree, 2019).

3. Conceptual Framework of Halal Food Inspection Management System

A concept is an idea on a collection of things or an abstraction that enables people to recognise, point to, and engage with something (Dickoffet al., 1968). When a concept is given a name, it is easier to understand and compare it; examples of names include activity, occupational justice, and other terms. A theory of concepts is regarded as a component of the revival of the national theory of mind because Carey (2009) defined the concept as mental symbols, and it is expected that the theory will have to match the current and accurate understanding of what mental symbols are. The way a concept is defined, however, can vary depending on the discipline. For instance, a phone biological psychologist named Hebb (1949) was primarily interested in identifying neural structures that serve as the foundation for what psychologists refer to as concepts (Akoka, 1999).

Concepts require research that is both theoretical and empirical (Goertz 2006). As a result, the semantic also alters as knowledge of the topic increases. A strong concept offers significant insight into the nature of the subject. Realistic because it is an empirical analysis; ontological because it concentrates on what constitutes a subject; causal because it identifies ontological attributes that determine analysis for hypotheses. As a result, a conceptual framework is defined as a framework made up of concepts that are arranged together to show how they relate to one another (Creek, 2010). As a result, the conceptual framework provided here acts as a road map for this study, bringing together earlier frameworks to give it direction (Jabareen, 2009). A conceptual framework was created in order to evaluate the causal relationship between the success factors for the halal food inspection management system. Top Management Commitment, Adequate Support, Halal Training and Education, Employee Attributes and Management, Halal Personnel Empowerment, Policy and Procedure, and Consumer Focus were the seven groups into which the success factors were divided. The conceptual model created for the study is shown in Figure 3 and Table 1 presents the attributes measuring these success factor groups that were found in the literature.

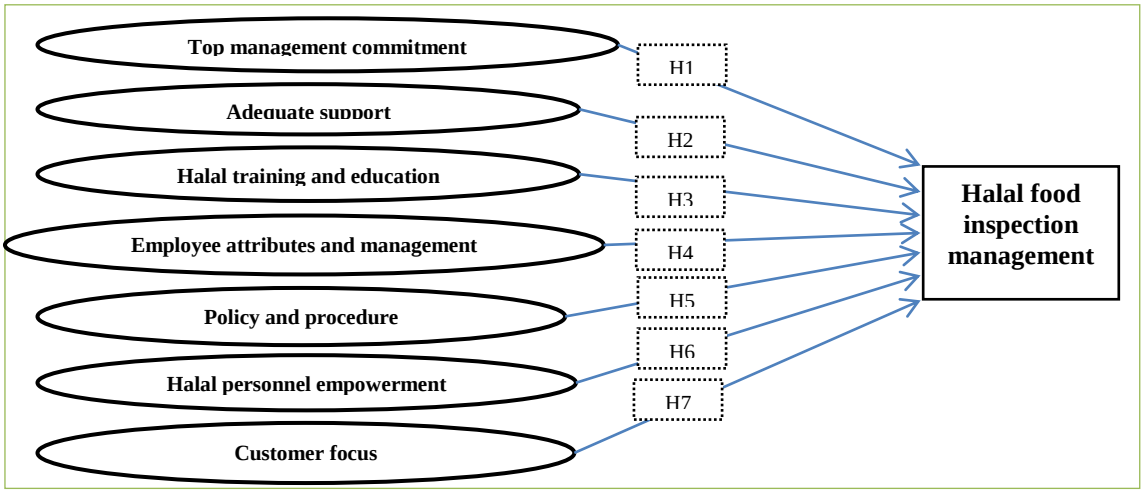

Fig. 3 - Research conceptual framework

Based on the research conceptual framework as in Figure 3, several hypotheses were developed as:

1. Hypothesis (H1): Top management commitment has a significant and direct effect on Halal food inspection management.
2. Hypothesis (H2): Adequate support has a significant and direct effect on Halal food inspection management.
3. Hypothesis (H3): Halal training and education have a significant and direct effect on Halal food inspection management.
4. Hypothesis (H4): Employee attributes and management have a significant and direct effect on Halal food inspection management.
5. Hypothesis (H5): Policy and procedure have a significant and direct effect on Halal food inspection management.
6. Hypothesis (H6): Halal personnel empowerment has a significant and direct effect on Halal food inspection management.
7. Hypothesis (H7): Customer focus has a significant and direct effect on Halal food inspection management

Table 1 - Success factors groups and attributes influencing halal food inspection management

Groups	Factors	Reference
Top management commitment	• Support from management and the environment improves the quality of the produced. • Customer-focused strategies improve operational efficiency. • Consumer-focused businesses produce higher-quality goods. • Management and employee characteristics have a favourable impact on operational performance. • Management and employee qualities have a favourable impact on product quality. • The effect of teamwork on operational performance is favourable. • Teamwork improves the quality of the final product.	Ahmad et al, (2017); Mohamad, and Backhouse (2014); Basir et al, (2018).
Adequate	• Measurements Items	Indrasari et al,

support	• Products' halal ingredients ought to be examined and confirmed. • It's important to mention which food additives contain halal ingredients. • Ensure there is enough information available to make an informed choice. • Government must ensure that Halal goods are available. • The availability of Halal goods is under the control of Halal Authorities. • Manufacturers are in charge of ensuring the availability of Halal goods. • Supermarkets are in charge of ensuring the availability of Halal goods.	(2020); Ahmed, (2018).
Halal training and education	• Train the team on how to create new halal food products. • Halal food standards must be fully understood by all team members. • Due to dedicated storage, personnel must acquire more skills to deal with proper customer delivery • Disseminate information about how having a dedicated vehicle makes deliveries to customers simple. • Change the amount of the offered halal food being produced. • Tailor production to the range of halal foods available. • Comply with the halal food production process being offered.	Rafiki, Wahab (2016); Giyanti et al, (2020)
Employee attributes and management	• Fulfil customer need for halal • Responding sincerely and openly to customer complaints about halal food • Being aware of the worker's religious background and his propensity for handling halal food • Ascertain that the worker is familiar with all the requirements and guidelines for the halal food industry. • Observing the employee's participation in the production of halal food • Make sure the worker follows the rules and is very interested in the required halal food ingredients. • Top-down coordination among the committed team • Complete cooperation between halal food suppliers is a sign that the standards set for halal food manufacturing have been successful and met.	Ahmad et al, (2020); Indrasari et al, (2020); Ahmed, (2018).
Policy and procedure	• Following all wholesome ingredients • Implement the necessary precautions to protect your health. • Making sure the materials don't contain any animal byproducts that are forbidden by sharia • Free from anything that Islamic law classifies as najis (filth). • Eating halal food is acceptable and legal.	Shafie and Othman (2006); Rafiki, Wahab (2016); Giyanti et al, (2020)
Halal personnel empowerment	• Willing to put forth significant effort to acquire Halal foods • Believing that a product is Halal influences behaviour in a positive way. • Comply with regulations and guidelines to ensure that halal products are of high quality. • It is important to choose a candidate who has the knowledge necessary to make a decision. • It's crucial to check that certain food additives contain halal ingredients.	Indrasari et al, (2020); Ahmed, (2018); Nawawi et al, (2017).
Customer focus	• I only purchase goods whose packaging bears the word "Halal" • I cite the legitimacy of Islamic institutions that grant halal certification • If there is no Halal certification, I identify the product's source. • The cleanliness of the location where the product is purchased worries me. • I never purchase a foreign product with a Halal logo without first confirming that it is a recognised logo. • If a non-halal product is sold next to a product I intend to purchase, I won't. • I only purchase a product when the business owner is a Muslim. • I'll use the apps on my phone to research the halal status.	Giyanti et al, (2020); binti Masrom et al, (2017); Ahmed, (2018).

4. Research Methodology

Quantitative research specifies a process for determining validity and describes population comparisons, population generalization, numerical data summaries, and large sampling sizes (Creswell 2014). Almansoori et al. (2021) cited that quanitative method approach helps the researcher to make sense of a large amount of data. Additionally, using field trends or the requirement to explain why something is happening, researchers can use the quantitative method to pinpoint the research problem. Detecting patterns, for instance, suggests that a study that aims to ascertain the general pattern of individual responses and how this propensity differs between people will assist in addressing the issue of science (Pallant, 2011). In addition to problems with quantitative research, it is difficult and specific to obtain data on measurable and observed variables (Cresswell, 2014). However, the problem statement's opening statements and guiding questions, as well as its research questions and hypotheses, are narrow and specific, which aid in the establishment of studies, measurements, or evaluations of a tool or records scale by observations (Creswell, 2013). They are extremely narrow and focused. The research variables are also calculated using a method that also yields data.

Additionally, the tool includes some questions and responses that were created prior to the study (Mugenda & Mugenda, 2008). Additionally, statistics, which divides the data into sections to answer analysis questions, is used to evaluate the data. Last but not least, the general reporting and evaluation format for the study adheres to a predetermined structure that starts with the introduction, review of the methodology, results, and concludes with a discussion (Saunders et al., 2015). The tool contains some questions and solutions that were created prior to the study (Mugenda & Mugenda, 2008). Additionally, statistics are employed to evaluate data, which includes segmenting data to answer analytical questions. The presentation, review, findings, and conclusion of the research are followed by a general analysis and evaluation structure that, in the end, conforms to a forecasting template (Saunders et al., 2015). Since the data can be quantified and applied to a larger population, this study used a quantitative research design. It was therefore intriguing to look at the dependent variable (halal food inspection management) and the independent variables (critical success factors). To enable statistical analysis of the numerical data, these variables were measured on the instrument. However, the research design is the framework that serves as a guide for the collection and analysis of data (Yin. 2009). Additionally, it is tested via exploratory tests, descriptive tests, or hypothesis tests (Trochim & Donnelly, 2008). As data are gathered and interpreted descriptively, descriptive survey analysis is therefore the simplest way to explain a trend and is more accurate, more pertinent, and can be easily used for community generalisation (Omair, 2015).

We'll gather information from the Abu Dhabi Food Control Authority. Simple random sampling will be used in the probability sampling to choose study participants. The sample size for this study will be determined based on Krejcie and Morgan's sample size determination table (Krejcie& Morgan, 1970), in the same way that the appropriate and representative sample size will be drawn from the population. According to Krejcie and Morgan's standards, a sample size of 226 was needed for this study. Self-administrated questionnaires, the method used in this thesis, are described as a data collection strategy in which respondents read survey questions and write up their responses without the researcher present. Self-administered questionnaires are more challenging than interviewers' proficiency with written word consistency (DeVaus, 2013). With a significant majority of the respondents in this thesis, for instance, this methodology also has a number of advantages (Creswell, 2013; Davies & Hughes, 2014). As a result, an independent questionnaire can be used to effectively and inexpensively analyse other approaches, such as in-person or telephone interviews. You can also conduct self-administered surveys whenever respondents have the time. On the same pointless self-administered questionnaires, a more geographically extensive test can be obtained at a lower cost because the researcher is not required.

This study investigated the relationships between a variety of variables (both independent and dependent), which aided in justifying the use of SEM techniques as the software tool in this investigation. However, certain functional restrictions in the use of SPSSs, such as the disabling for this research, allow for more than one dependent variable to be regressed, and this function is also available in the SEM, even though variables of SPSS analysis separately and disabled in modelling systems are accessible for SEM. Statistics for the social sciences are frequently used to analyse and forecast relationships (Alavifar et al., 2012). According to Awang (2012) and Alavifard et al. (2012), the SEM has additional applications with benefits that SPSS does not have, such as the ease of testing hypotheses and the suggestion of modifications and evaluations of the theoretical model. SEM is multivariate statistical analysis through which it is possible to examine the strength of the relationship between these theoretical constructs as well as the factors that underlie a set of indicators (Memon et al. 2013). SEM can handle correlated errors among response items and model the error terms; and Confirmatory Factor Analysis is used to measure an error more accurately (CFA). When analysing regression with the multi-coordination problem, both observed and unobserved variables may be involved. It can be used to assess a measurement model's consistency, veracity, and dependability.

The SEM family of statistical models aims to shed light on the relationships between various variables. According to Tabachnick et al., SEM combines factor analysis, canonical correlation, and multiple regressions (2007). It was used to put the model's hypotheses to the test. It was decided to conduct the SEM analysis in two stages. In the first stage (measurement model), the analysis was carried out by defining the causal relationships between the observed variables (items) and the underlying theoretical constructs (Awang, 2012). This goal was achieved through the use of

confirmatory factor analysis with AMOS. The structural model then specified the paths or causal relationships that existed between the underlying exogenous and endogenous constructs. The two components of structural equation models are measurement models and structural models. The measurement model focuses on the relationships between measured variables and latent variables. The structural model takes into account only the relationships between latent variables. The measurement model depicts the relationship between the latent variables and their measured values (i.e., the CFA model). The CFA model only considers the relationship between factors and their measured variables in the context of SEM (Byrne 2013). According to Hair et al., confirmatory factor analysis (CFA) allows us to assess how well the measured variables represent the constructs (2010). Confirmatory factor analysis was used in this study to evaluate the measurement models for each construct (CFA). Confirmatory factor analysis (CFA) was used to assess the measurement model's unidimensionality, reliability, and validity. To evaluate the measurement model, the CFA used two broad strategies. Consider the fitness index criteria first, and then evaluate the measurement model's accuracy and dependability. The fitness index assesses how well a model fits the data from which it was created. It is typically determined by how closely the model's predicted data matches the actual data collected (Field, 2009). In SEM, a model meets the criteria for successfully achieving the goal when it achieves a set of suggested acceptable values for a number of indices. This criterion must be met by both the measurement model and the structural model of SEM. Despite the fact that these indices are universally applicable, SEM experts disagree about what values are acceptable. Table 2 shows the requirements for successfully achieving the goal in SEM.

Table 2 - The criteria of successfully achieving the goal in SEM

Name of category	Acceptance level	Applicability
Factor loading	≥ 0.6 (for items)	Measurement model +structural model
Square multiple correlation ($\mathbf{R^2}$)	≥ 0.20	Measurement model +structural model
Correlation coefficient	≤ 0.85	Measurement model
Standardized beta	≤ 0.85	Structural model
Significance level	≤ 0.05	Structural model
Average Variance Extracted (AVE).	≥ 0.5	Measurement model
Construct Reliability (CR)	≥0.6	Measurement model
Modification Index.	≤15	Measurement model +structural model

Source: Hu and Bentler, 1999; McDonald and Ho, 2002; Nokelainen, 2007; Hooper et al., 2008; Kline, 2011; Byrne, 2012; Awang, 2012; Cangur and Ercan, 2015

The fitness indices serve as a gauge for how accurately a given model reproduces the covariance matrix between the indicator variables (Hair et al., 2010). At least three fit indexes should be used, with at least one index coming from each category of model fit, according to Hair et al. (2010). Absolute fitness, incremental fitness, and frugal fitness are the three categories of fitness. Table 3 lists the indices used in this study along with the acceptable values for each category of fitness index. This information was gathered from a number of authors.

Table 3 - The criteria of successfully achieving the goal in SEM

Index	Name of fitness indices	Recommended value	Applicability
Absolute fit	Goodness-of-Fit Index (GFI)	≥ 0.8	Measurement model + Structural model
	Root Mean Square Error of Approximation (REMSEA).	≤ 0.08	
Incremental fit	Tucker-Lewis Index (TLI)	≥ 0.9	
	Comparative Fit Index (CFI)	≥ 0.9	
	Normed Fit Index (NFI)	≥ 0.8	
Parsimonious fit	Chi-Square/Degree of Freedom (ChiSq/df,)	≤ 3.0	

Source: Ramayah and Lee, 2012

5. Results and Discussion

5.1 Respondent's Demography Background

Respondents involved in the survey are engaged from Abu Dhabi Food Control Authority. The demography of the respondents in terms of gender, age, nationality, level of study, current of study as illustrated in Table 4 below.

Table 4 - Demography background

Criteria	Frequency	Percentage %
Gender		
Male	151	53
Female	132	47
Position		
General manager	4	1.41
Executive Director	23	8.12
customer	97	34.27
employee	159	56.18
Experience in current institution		
1 to 5 years	86	30.38
6 to10 years	95	33.56
11 to 15 years	79	27.91
More than 16 years	23	8.12
Qualification		
PHD	3	1.06
M.SC	7	2.47
B.SC	268	94.69
Diploma	5	1.76

Table 3 shows that about 53% of the respondents are males and 47% are female. The respondent's positions were recorded 1.41% of general manager and Executive Director were represented 8.12 % from the total targeted respondents. The distribution according to experience shows that the majority of respondents who have experience from 1 to 5 years represents 30.38% and 33.56% for those who have experience from 6 to 10 years. For the respondents who have experience from 11 to 15 years and above 16 years were recorded 27.91% and 8.12% respectively. The questionnaires were distributed according to one of the probability sampling technique that is the systematic random sampling reflecting the professional from Abu Dhabi Food Control Authority. Table 4.3 shows that the majority of respondents (i.e. 94.69 %) have B.SC degree. 2.47% of respondent represents have M.sc degree while 1.76% of respondent have diploma degree, while others representing 1.06% of total respondents have a PhD certificate.

5.2 Confirmatory Factor Analysis (CFA)

A more reliable method of factor analysis called confirmatory factor analysis (CFA) is used to determine whether the construct's measures agree with the researcher's understanding of the construct's nature (Awang, 2012). To establish construct validity, the CFA procedure has taken the place of more traditional techniques like EFA. In order to quantitatively evaluate the quality of the factor structure and further support the construct validity of the new measurement, confirmatory factor analysis (CFA) is used to test any relationships that might exist between the observed variables under each hypothesised construct. As a result, the following sections present confirmatory factor analyses of the measurement model of all latent constructs in the evaluated research assessment framework. For each construct, preliminary measurement models, fitness indices, modification indices, and final measurement models were also presented in order.

5.2.1 Top Management Commitment (TMC)

The relationship between the response items and the underlying construct that they relate to graphically displays the measurement model for top management commitment. The results of the confirmatory factor analysis (CFA) were examined and are shown in Figure 4.

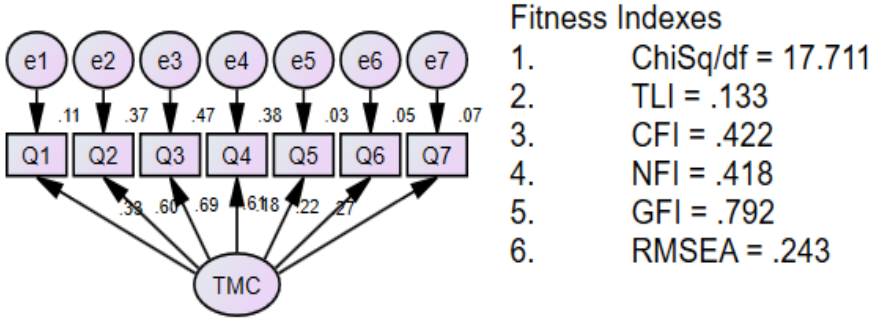

Fig. 4 - The initial measurement model for top management commitment

Figure 4 shows that the fitness index are not in the standard range. Therefore, the measurements items that having low factor loading are deleted as one item at a time from each construct with the lowest among. The model was re-run and repeated the same process until the fitness indexes are attained. In this construct, two items Q5 and Q7 were deleted to achieve the fit model as shown in Figure 5.

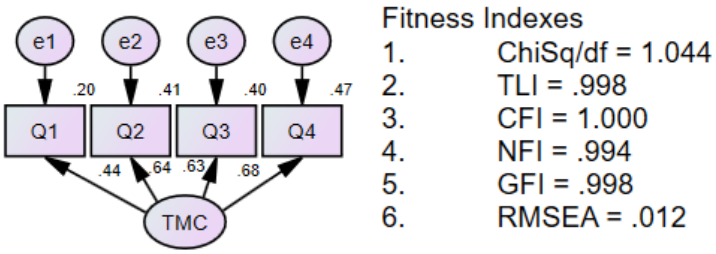

Fig. 5 - The final measurement model for top management commitment

Figure 5 depicts the measurement model for the top management commitment following the fulfilment of all model-fitting requirements. This means that if a model satisfies all the criteria for a good model, then factors with low factor loading cannot prevent it from being accepted.

5.2.2 Adequate Support (AS)

The relationship between the response items and the underlying adequate support construct graphically displays the measurement model for adequate support. A confirmatory factor analysis (CFA) was conducted, with the analysis's findings shown in Figure 6. There are 7 indicators in all in the adequate support measurement model.

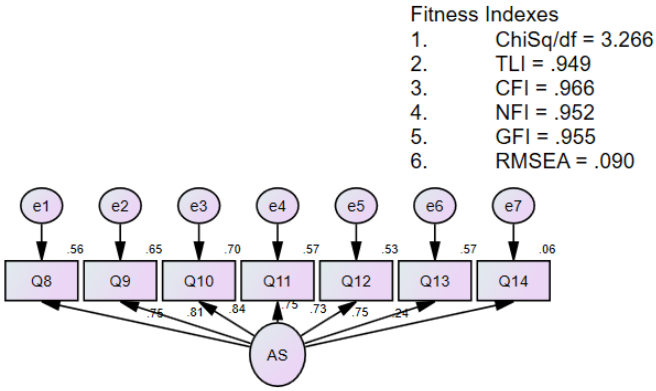

Fig. 6 - Measurement model for adequate support

NFI, TLI, and GFI requirements were satisfied, but RMESA and Chisq/def requirements were not met as shown in Figure 6, necessitating modification. As a result, the final measurement model for the adequate support construct is presented in Figure 4.3 along with the updated measurement model. In order to determine which of them exhibits high regression weights, the researcher looked at the Modification Indices (MI) and checked the manifest measurement error. Next, covariance between measurement errors with the highest Modification Indices was calculated (MI).

The researcher first checked the Modification Indices to ensure that the factor loading of the items was greater than 0.6. (MI). The modification indices with high covariance and high regression weights are potential manifests items to covary, according to Byrne (2013). The Q14 questions with low factor loadings were eliminated. So, as advised, the measurement model was re-run after fixing these problematic items. In Figure 7, the final CFA model is presented.

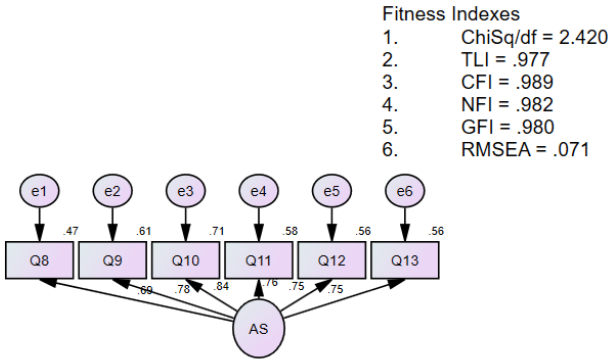

Fig. 7 - Final measurement model for adequate support

All of these fit indices for the model of "adequate support" achieved the recommended values as shown in Figure 7 based on the results of fitness indices relative to the recommended values

5.2.3 Halal Training and Education (HTE)

The CFA findings for the halal training and education measurement model are shown in Figure 8. Fitness indices, squared multiple correlation (R2), and factor loading for each item were noted. Seven indicators items with corresponding factor loadings make up the construct of the halal training and education measurement model, as shown in Figure 8.

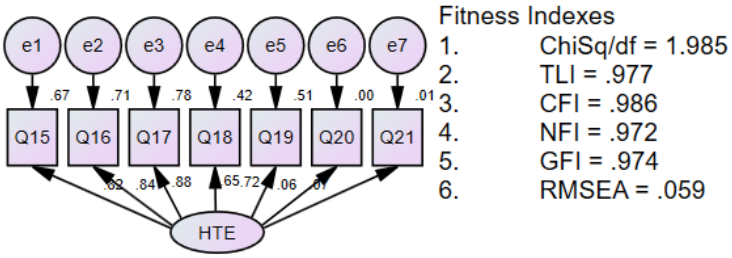

Fig. 8 - Measurement model for halal training and education

According to the analysis of the "halal training and education" for fitness criteria, all factor loadings and squared multiple correlations met the necessary level (0.50 for factor loading and 0.20 for squared multiple correlation), which is based on the "halal training and education" for fitness criteria. All of these fit indices for the model "halal training and education" achieved the recommended values based on the results of the fitness indices relative to the recommended values. Therefore, the structural equation modelling in this study used all seven of the halal training and education construct items that met the level of acceptance.

5.2.4 Policy and Procedure (PP)

The CFA's findings for the policy and procedure measurement model are shown in Figure 9. Fitness indices, squared multiple correlation (R2), and factor loading for each item were noted.

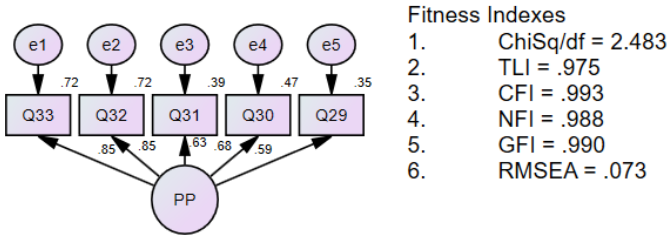

Fig. 9 - Initial measurement model for policy and procedure

Figure 9 shows that there are a total of five indicators items in the construct of the policy and procedure measurement model. The model "The policy and procedure" was further examined for other fitness criteria (such as factor loading and squared multiple correlation), and it was found that all factor loadings and squared multiple

correlations met the necessary standards (0.60 for factor loading and 0.20 for squared multiple correlation). Therefore, in this study's structural equation modelling, the components of the policy and procedure construct that met the level of acceptance were used.

5.2.5 Halal Personnel Empowerment (HPE)

The outcome of the confirmatory factor analysis (CFA) for the halal personnel empowerment measurement model is shown in Figure 10. Factor loading, squared multiple correlation (R2), and fitness indices for each of the observed items were presented in the construct of the halal personnel empowerment measurement model. The goal was to determine whether the halal personnel empowerment construct has reached the level of acceptance for each index.

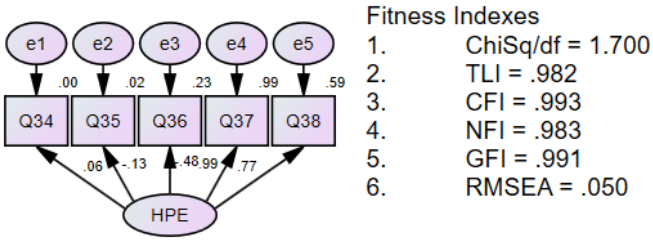

Fig. 10 - The measurement model for halal personnel empowerment

There are a total of five indicators items in the construct of the halal personnel empowerment measurement model, as shown in Figure 10. All factor loadings and squared multiple correlations in the model "Individual and Occupational Identity" achieved the necessary level (0.60 for factor loading and 0.20 for squared multiple correlation), according to analysis of the model for other fitness criteria. As a result, the construct for the Halal Personnel Empowerment of Measurement Model met every acceptable cut off value as advised by the fitness indexes.

5.2.6 Customer Focus (CF)

The results of the confirmatory factor analysis (CFA) for the customer focus measurement model are shown in Figure 11. Factor loading, squared multiple correlation (R2), and fitness indices for each of the observed items were conducted in the construct of the customer focus measurement model. The main goal was to determine whether the customer focus construct has reached the level of acceptance for each index. There are ten indicator items in all for the Policy and strategy measurement model construct.

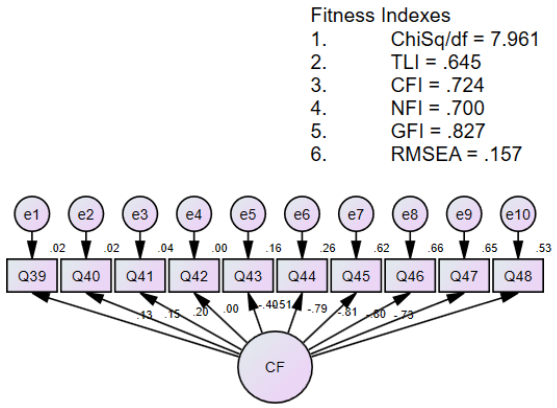

Fig. 11 - Initial measurement model for customer focus

NFI, TLI, and GFI requirements are met, but RMESA and Chisq/def requirements were not met as shown in Figure 11, necessitating modification. As a result, through an iterative process, the new measurement model was re-specified and made into the final measurement model for the customer focus construct. Figure 12 shows the CFA model for the modified measurement model after the indicators Q45 and Q48 were removed.

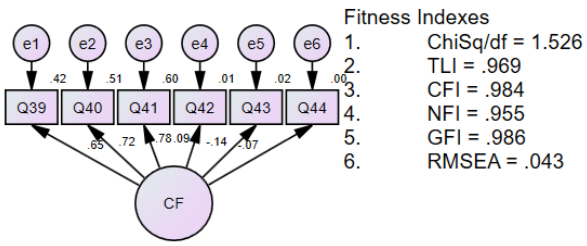

Fig. 12 - Final measurement model for customer focus

Based on the analysis, Figure 12 demonstrates that all fit indices for the model's "Policy and strategy factors" met the recommended values. The results of these fitness indices relative to the recommended values show that. As a result, all of the acceptable cut-off values as advised in the fitness indexes were satisfied by the construct of customer focus for the final measurement model.

5.2.7 Assessment of the Entire Constructs

Every measurement model construct in the research assessment model is examined for its unidimensionality and statistical reliability prior to the validity analysis. All constructs in this study are evaluated for their unidimensionality using the comparative fix index (CFI). Table 5 lists the computed values above 0.90 for all the constructs of the research assessment model as CFI values. In essence, every value was higher than the suggested value of 0.90 (Hair et al., 2011; Awang, 2012), indicating that uni-dimensionality is not violated. The measurement items for each construct in the research have to have respectable factor loadings in order for uni-dimensionality to be achieved. All of the latent construct items in this study have acceptable factor loadings that are higher than the suggested value of 0.6 across all model constructs. As a result, none of the research constructs violate the assumption of uni-dimensionality.

Table 5 - Uni-dimensionality and reliability scores of the constructs

Research constructs	Code	CFI scores (uni-dimensionality)
Top management commitment	**TMC**	0.966
Adequate support	**AS**	0.986
Halal training and education	**HTE**	0.964
Employee attributes and management	**EAM**	0.977
Policy and procedure	**PP**	0.984
Halal personnel empowerment	**HPE**	0.972
Customer focus	**CF**	0.998

5.3 Path Analysis of The Integrated Constructs

The initial CFA model for each construct was used to examine construct redundancy. "Top management commitment," "adequate support," "Halal training and education," "Employee attributes and management," "Policies and procedures," "Halal personnel empowerment," and "Customer focus" are the independent constructs. Figure 13 shows the initial measurement model.

5.3.1 Reliability and Validity of a Measurement Model

Convergent and discriminant validity are both analysed in this study to examine construct validity. The construct validity is investigated by examining its relationship with other constructs, both related (convergent validity) and unrelated, according to Pallant (2011) (discriminant validity). The factor loading scores from the items of the measurement scale in a latent construct are referred to as convergent validity and should be correlated and significant. Such items are intended to measure the same construct, and the convergent requirement is sustained if their factor loading scores are greater than 0.5 and NFI values are above 0.9. (Awang, 2012). Bentler-Bonett coefficient (NFI) and factor loading of each item in the final measurement model are used in this study to evaluate the convergent validity (Hair et al., 2011). The final measurement models' items and NFI values all scored higher than 0.9, as was previously stated. Additionally, Hair et al. (2010) noted that Average Variance Extracted (AVE) estimates for two factors should be greater than the square of the correlation between the two factors to demonstrate discriminant validity, and that AVE estimates for one factor should be at least 0.5 to suggest adequate convergent validity (Hair et al., 2010). Fornell and Larcker (1981) claim that discriminant validity is satisfied if the AVE is greater than the square of the correlation

coefficient among the constructs. Additionally, construct reliability (CR 0.60) was used in this study to evaluate reliability. The outcomes of the model's convergent validity are displayed in Table 6.

Table 6 - Convergent validity results

No	Research constructs	NFI scores (Convergent validity)	CR(≥0.6)	AVE (≥0.5)
1	Top management commitment	0.941	0.769	0.589
2	Adequate support	0.976	0.749	0.570
3	Halal training and education	0.943	0.826	0.636
4	Employee attributes and management	0.964	0.675	0.507
5	Policy and procedure	0.971	0.872	0.536
6	Halal personnel empowerment	0.954	0.800	0.613
7	Customer focus	0.983	0.736	0.555

Displaying the discriminant validity is Table 6. While the other values in Table 7 represent the correlation between the various constructs, the diagonal values (shown in bold) are the square root of AVE. When a diagonal value is greater than its row and column values, the discriminant validity is achieved (Fornell and Larcker, 1981).

Table 7 - The discriminant validity

Construct	1	1	3	4	5	6	7
1	**(0.655)**						
2	0.122	**(0.797)**					
3	0.291	0.295	**(0.754)**				
4	0.271	0.098	0.218	**(0.712)**			
5	0.182	0.085	0.154	0.152	**(0.744)**		
6	0.053	0.516	0.189	0.128	0.164	**(0.782)**	
7	0.266	0.392	0.158	0.133	0.134	0.321	**(0.756)**

From the aforementioned, it can be concluded that convergent validity for each construct in this study met the acceptability requirement. Reliability and validity of the research's findings, which were satisfactory, suggest that multivariate analysis can move on to the following stage with confidence. As a result, the analysis of the structural equation modelling for this research is presented in the following sections.

5.3.2 Modelling of Fitness

The next stage of the analysis model is to incorporate all of the research constructs into a structural equation model using Analysis of Moment Structure after the uni-dimensionality, reliability, and validity of the research constructs have been established (AMOS). The research assessment framework had independent and dependent variables set up in a certain order. As shown in Figure 14, an arrow pointing in the direction of the hypotheses connects each construct to one another. A realisation of the acceptable level of goodness-of-fitness indices is shown in Table 8, which presents the fitness indices for the structural measurement models.

Table 8 - The fitness indexes for the proposed structural model

Name of Index	Level of Acceptance	Index Value	Comments
Chisq/df	Chisq/df ≤ 3	1.431	The required level is achieved
TLI	TLI ≥ 0.9 means satisfactory	0.923	The required level is achieved
CFI	CFI ≥ 0.9 means satisfactory fit.	0.930	The required level is achieved
NFI	NFI ≥ 0.80 suggests a good fit	0.803	The required level is achieved
GFI	GFI ≥0.80 suggests a good fit.	0.818	The required level is achieved
RMSEA	RMSEA ≤ 0.08 mediocre fit.	0.040	The required level is achieved
Model is accepted			

As a result, Figure 14 presents the final measurement model for all research constructs, which demonstrates perfect compliance with the structural Model's goodness-of-fitness. The standardised regression coefficient for all of the research constructs is presented in the structural model. The results of the analysis of the causal effect (impact) for the various constructs in the path diagram are presented in the final structural measurement model. First, the fitness indexes for the structural model were observed and found to be satisfactory within the established acceptable level of fitness indexes, reflecting how fit the hypothesised model is with the data at hand (Hair et al.,2011; Awang, 2012). The critical

success factors of halal food were exogenous variables that were measured by the beta coefficient, which is estimated using the standard regression weights (inspection management in UAE).

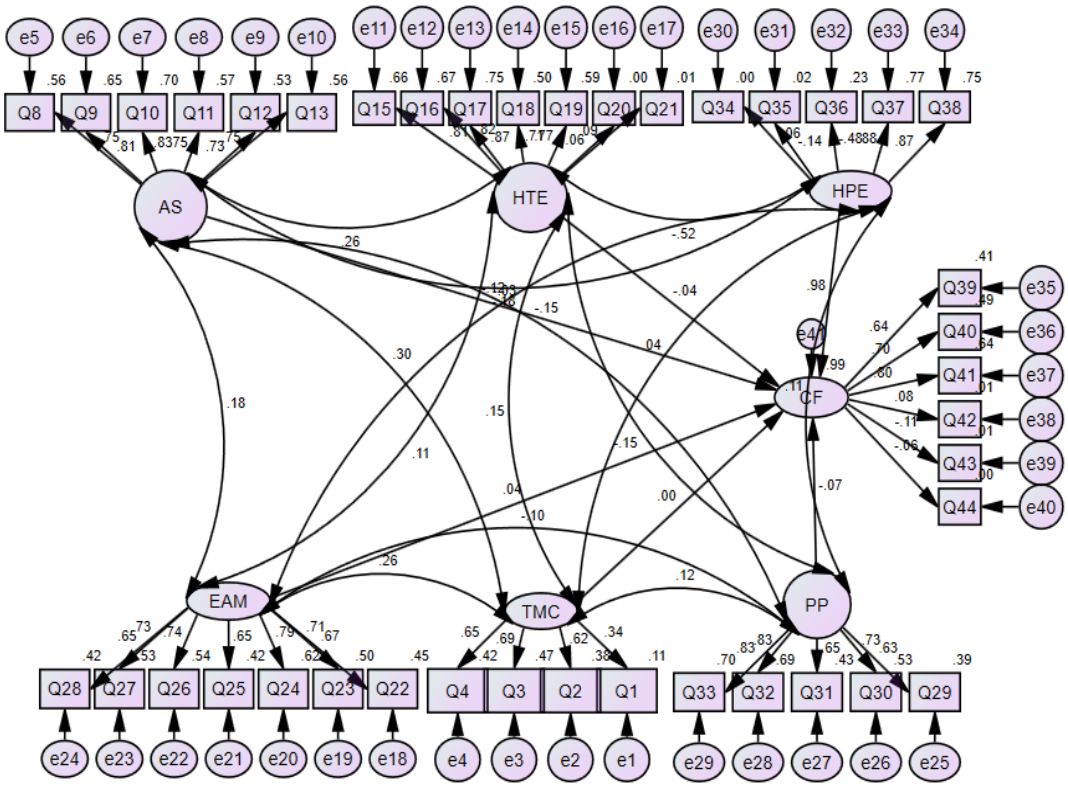

Fig. 14 - Structural model

The standardised regression coefficients with their R2 equal 0.69, as shown in Figure 4.13. Standardized regression weights and unstandardized regression weights for the path analysis were the two types of text outputs that were typically produced by the Analysis Moment of Structures (AMOS) used for the structural equation modelling in this study. The research framework adopts the standardised regression weight to explain the relationship between all of the constructs, and then uses it to test the research's hypotheses because it is thought to be more effective due to its simplicity of interpretation (Awang, 2012). The path co-efficient () of each path and squared multiple correlations (R2) are two criteria for judging structural models. Cohen et al. (2003) defined the R2 of endogenous as substantial (R2 0.26), moderate (R2 0.13), and small (R2 0.02), respectively.

Figure 14 demonstrates that the endogenous latent variable (customers focus) has an R2 of 0.69, indicating that the developed model has a significant capacity for explanation. The path co-efficient is evaluated by comparing the values of all structural paths; the higher the path co-efficient, the more significant the impact on the endogenous latent variable.

5.3.3 Hypothesis Testing

Structural model assessment also examined the direct relationships of the seven Critical Success Factors of halal food inspection management in UAE, which are represented by the seven hypotheses. The results of the tested hypotheses are presented in Table 9, consisting of the direct relationship of the seven Critical Success Factors of halal food inspection management in UAE.

Table 9 - Results of hypothesis testing (Direct relationship)

Independent variable	Dependent variable	Hypothesis	CR	P-value	Decision
Top management commitment have a significant and direct effect on Halal food inspection management	Halal food inspection management	H1	11.660	***	Supported
Adequate support have a significant and direct effect on Halal food inspection management	Halal food inspection	H2	2.154	.024	Supported

	management				
Halal training and education have a significant and direct effect on Halal food inspection management	Halal food inspection management	H3	2.724	.006	Supported
Employee attributes and management have a significant and direct effect on Halal food inspection management	Halal food inspection management	H4	2.084	.037	Supported
Policy and procedure have a significant and direct effect on Halal food inspection management	Halal food inspection management	H5	1.371	.170	Not Supported
Halal personnel empowerment have a significant and direct effect on Halal food inspection management	Halal food inspection management	H6	1.34	2.32	Not Supported
Customer focus have a significant and direct effect on Halal food inspection management	Halal food inspection management	H7	1.31	0.095	Not Supported

Note: * $p < 0.05$; ** $p < 0.01$; *** $P< 0.001$

Based on the findings presented in Table 9, the results of relationships between the exogenous and endogenous variables are as follows:

- Top management commitment is significant and has a positive relationship and direct effect on Halal food inspection management. Therefore, the H1 is supported, indicating that the top management commitmenthas a significant impact on the Top management commitment have a significant and direct effect on Halal food inspection management in UAE.
- Adequate support is significant and have direct effect on halal food inspection management in UAE. Therefore, H2 is supported, indicating that the Adequate support has a significant impact on halal food inspection management in UAE.
- Halal training and education is significant and have direct effect have a significant and direct effect on Halal food inspection management. Therefore, H3 is supported, indicating that the communication skills has a significant impact on halal food inspection management.
- Expertise skills in the lesson plan is significant and have direct effect on halal food inspection management. Therefore, H4 is supported, indicating that the expertise skills in the lesson plan has a significant impact to the Halal food inspection management.
- Policy and procedure is not significant on on halal food inspection management. Therefore, H5 is not supported, indicating that the policy and procedure does not have significant impact on the quality of halal food inspection management.
- Halal personnel empowerment is not significant on halal food inspection management. Therefore, H6 is not supported, indicating that the policy and strategy does not have significant impact to the quality of halal food inspection management.
- Customer focus is significant and have direct effect on Halal personnel empowerment. Therefore, H7 is supported, indicating that technology has a significant impact to halal food inspection management.

In essence, there are five Critical Success Factors of halal food that have significant direct affect to the quality of Top management commitment, Adequate support, Halal training and education, Employee attributes and management. While, there are two Critical Success Factors of halal food do not have significant relationship with Policy and procedure, Halal personnel empowerment, and Customer focus.

6. Conclusion

This research has developed Critical Success Factors (CSFs) model to improve the competency of halal food inspection management in UAE. To test and validate the model, a cross sectional survey was conducted. A total of 281 sample were used to analyse the data using SEM-AMOS. The analysis involved two-stage process namely, analysis for measurement model and analysis for structural model. For the measurement model, CFA was conducted to ensure the items of the constructs meet the fitness index and to evaluate the validity and the reliability of the measurement index. The seven hypotheses that test the relationship between the seven constructs (independent variables) and the halal food inspection management were tested. Based on the hypothesis testing, it was found that out of the seven hypotheses, two hypotheses were not supported which are *Halal personnel empowerment have a significant and direct effect on Halal food inspection management* and *Customer focus have a significant and direct effect on Halal food inspection*

management. In essence, there are five Critical Success Factors of halal food that have significant direct affect to the quality of Top management commitment, Adequate support, Halal training and education, Employee attributes and management. The findings provide information to managers, less experienced employee and local and expatriate halal food inspection, curriculum and infrastructure beliefs, and ways in which these effects influence motivation and opportunities. In the context of the UAE the investigation of these issues makes an important contribution to international research into quality, especially in the tertiary context.

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