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Research Article

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TECHNOLOGY REQUIREMENT FOR HALAL QUALITY CONTROL

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ABSTRACT

This study identify the appropriate characteristics of assistive technology to facilitate quality control process in halal industry segments namely food and beverages, consumer goods, logistics and cosmetics. 4 separate research projects have been conducted to cover these 4 deferent industry segments. This paper combined the findings and provided a compilation of all the results. Questionnaire surveys were distributed during MIHAS 2016. Main data collection was done on industry in Johor in southern part of Malaysia. The 7 elements of technology characteristics selected for this study are speed, convenient, integrated, auto-report, customizable, cost and data accessibility. Findings show that each industry segments have different technology characteristics preference. Majority of respondents agreed that technological assistance in halal quality control is vital in helping companies to ensure the halal integrity of their product and services.

Keywords: halal industry, quality control; technology assistance; food and beverage; consumer goods; cosmetics; logistics.

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1. INTRODUCTION

1.1. Problem Background

Halal certification by Department of Islamic Development Malaysian (JAKIM) is the highest Halal logo recognized worldwide. Malaysia is the only country that has its halal authority under government department. Malaysia has the most comprehensive halal standards, guidelines and manual to date compare to other nation in the world. Malaysia is the first country in the world to introduce Halal status and Halal logo in 1971 and the first halal standard (MS1500) in 2004 [1]. This portrays the commitment of Malaysia in gearing to be the world leader in Halal industry. Currently, Malaysia has gazette 13 Halal standards addressing 7 industry categories. On top of that, there are other related document such as halal manuals, guidelines and procedures. A halal product or services should portray the highest quality of product and services. In [2] stated that halal integrity means that the halal product are being sourced, produced, stored and distributed in the manner coherent with the Islamic values, where these are in line with the modern and universal values such as high quality and safety, hygienically produced with respect for animal welfare and fairly traded. This also means in order to achieve the halal status; a product and service not only need to comply to shariah law but also pass the other quality accreditations such as MESTI, GMP, HACCP, ISO and other related quality assurance accreditations.

Although all these quality documents are very important in helping to upheld the integrity and quality of halal product and services, to read thru, understand, identify and compile the related clause and develop the appropriate checklist are very tedious and exhaustive. A finding from a preliminary study shows that complying to JAKIM halal certification perceived as costly, tedious and time consuming.

This study focused on technology as part the solution in overcoming the problems mentioned. The importance of information technology (IT) has increase and rapidly becoming a the most importance factor in productivity and cost reduction [3-6]. Weston claimed that IT could act as a feedback mechanism to users who keen on measuring productivity. This may refer to acquire rapid and accurate information and improve communication links. Technology should also be friendly enough for users to feel at ease in performing their tasks.

This posits that, in order to change the industry's unhealthy perception on the process of acquiring halal certification and at the same time promote industry to adopt halal, information technology can be proposed as the possible solution to the current problems. This study had been carried out to achieve two objectives; 1) to identify the technology requirements that the industry needs in helping them to pursue or carry the tasks in managing halal quality control, 2) to evaluate the perceived significant technology requirements for industry to conform to halal quality standard.

2. LITERATURE REVIEW

Extensive literature review has been done to really understand the current situation of halal implementation in Malaysia. Numerous area of subjects in regards with halal control and certification has been reviewed and among them are the concept of halalan toyibban, haram critical control point, halal application process, current halal certification technology and technological characteristics of what is perceived useful and ease by technology user.

2.1. Halalan Toyibban and Haram Critical Control Point (HrCCP)

Halal has been widely accepted as one of quality indicator for a high quality product and services. Currently, product and services that bear the status of halal, especially from Halal JAKIM will gain a higher market value. JAKIM halal logo has been recognized as the most preferred halal brand as it represent the Shariah law as well as other quality standards. Halal should not only be viewed from the perspective of the product is being produced but also on handling of the product throughout all processes of its reaching the consumers. This complete supply chain cycle is referred as "from farm to fork". This concept should ensure that there would not be any cross-contamination between halal product and non-halal substance, which will result the halal product turn to be non-halal (haram) or subhah. There are seven categories of halal certification schemes in Malaysia: food and beverages, cosmetics, pharmaceuticals, consumer's goods, logistics, food premise and slaughterhouse.

On top of complying with standards based on the seven schemes to acquire halal status, a company must identify Haram Critical Control Point (HrCCP) in their working process. HrCCP is critical point in production of goods process that can cause the finish product to be haram or

subhah and unsafe to be consumed by human. HrCCP plays a vital role in Halal assurance management system, which the main element of enquiring Halal status. HrCCP is closely related with audit process where the halal checklist is prepared, basically to ensure the HrCCPs are monitor systematically. Moreover, the proper control and monitoring of HrCCPs should be supported with supporting document and evidence.

2.2. Halal Application Process

Application of halal certification from JAKIM will involve three main phases namely application process, audit process and approval process as shown in Fig. 1. These stages involve both parties, companies as applicants and JAKIM as the certification body [7].

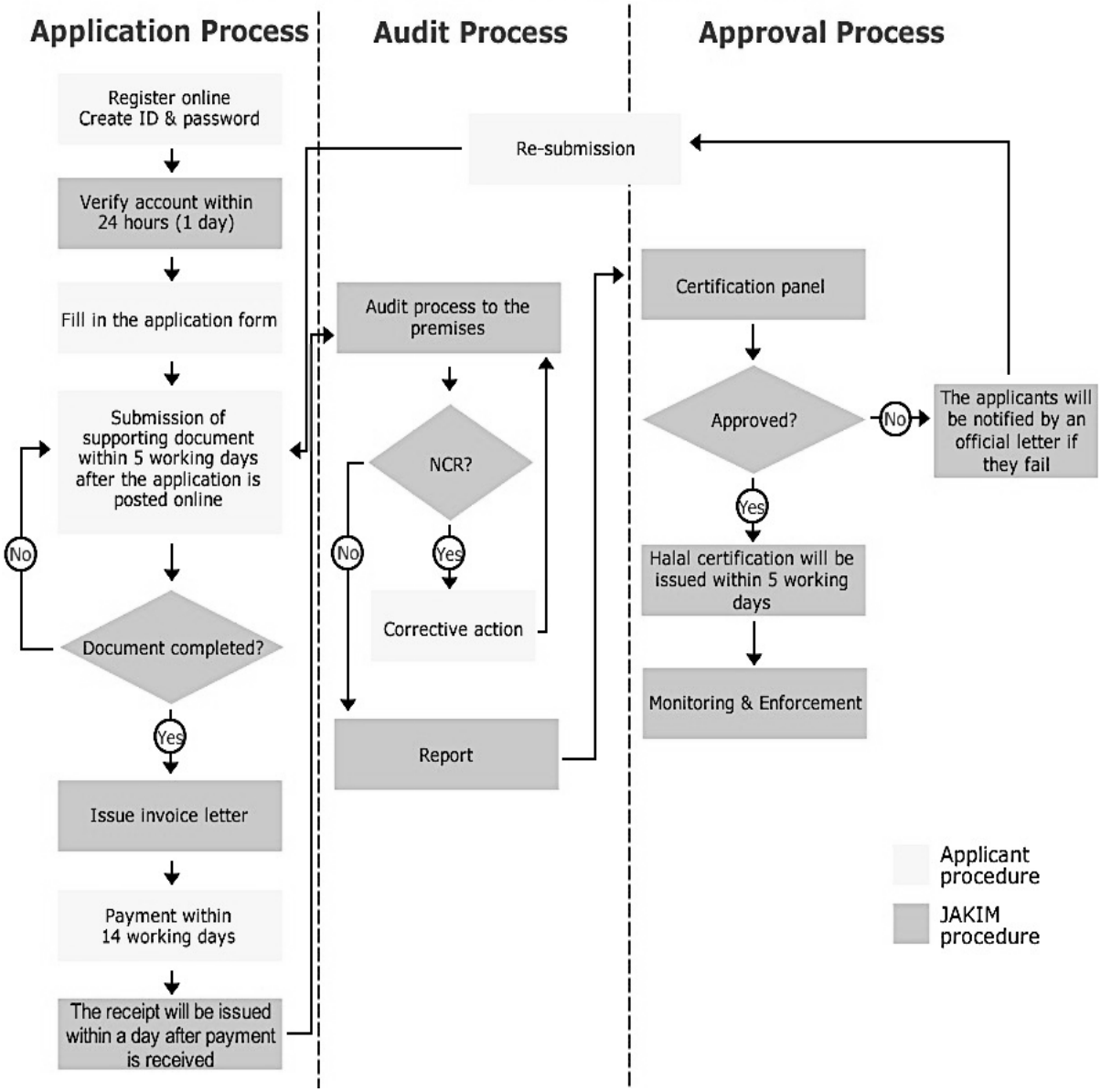


Fig.1. Process flow of JAKIM halal certification

Among these processes the most critical and complex is the audit process. Audit process is divided into two parts; document audit and site audit. Document audit will be done after applicant submitted the online application form, followed by submitting all relevant supporting documents within five working days. Failing to do this will cause the application not to be processed and the application will be reset and new application form need to be re-submitted. If all documents are completed, JAKIM auditors will conduct a site audit at applicant premise. According to JAKIM auditor, most of applications failed due to un-readiness of the company in terms of providing supporting document as the evidence that they have fulfilled the halal standard requirement.

Furthermore, company also need to proof that they have a halal monitoring system incorporated in their business process [8]. Understanding the requirement, standards and procedure of halal certification is very challenging and overwhelming to some companies especially first time applicants. This situation has impede the motivation of companies to pursue for halal certification particularly by small medium enterprises

2.3. Halal Certification Technology

Technology is s an instrument that was created to facilitate processes or daily affairs. Term of "technology" is not easy to define due to time and the different level of understanding among researchers and philosophers. Based on Oxford Dictionaries, technology is defined as the application of scientific knowledge for practical purposes, especially in industry. In the perspective of business, BusinessDictonary.com defined technology as the purposeful application of information in the design, production, utilization of goods and services, and in the organization of human activities. In [9] stated in their study that information technology has not only play a great role in total quality management (TQM), but also facilitate the process in main act as an enabler. Study by [10] has conform the same for TQM in logistics companies. Therefore, there is no doubt that technology is crucial for a total quality management system to work effectively and efficiently.

According to [11], there are eight technologies has been developed specifically to support halal certification activities as shown in Table 1.

Table 1. Halal certification technology

No	Type	Category	Introducer
1	My e-Halal	Web Based Technology	JAKIM
2	JAKIM My SMS 15888	Mobile Phone Technology	JAKIM
3	HaFYS Technology	Machine Technology	Halalysis Sdn. Bhd.
4	MyMobilHalal 2.0	Mobile Phone Technology	Syahrul Junanini and Johari Abdullah
5	HDC Halal Widget	Web Based Technology	HDC
6	HDC i-Kiosk	Machine Technology	HDC
7	HDC Nokia Apps	Mobile Phone Technology	HDC
8	HDC iPhone	Mobile Phone Technology	HDC

The technology listed were developed to provide information on the halal status, whether does it halal certified or not. To date, there are no researches and development focus on assisting industry on how to ensure their product and services comply with the halal requirement. Surprisingly, this is the most crucial part of getting to be halal certified that more study to be conducted.

2.4. Formation of Research Model

Based on the literature reviews and preliminary study, a conceptual framework has been developed based on seven characteristics of technology assistance needed to facilitate industries in monitoring their halal quality control activities. This characteristics are also looked from the perspective of its perceived usefulness and perceived ease of use of Technology Acceptance Model (TAM) [12-14, 20]. Characteristics identified from literatures were then used in the preliminary study to validate the characteristics, which then form the research constructs. During the preliminary study four experts in halal industry and also information technology has been interviewed. The characteristics chosen for this study are: 1) Speed, 2) Convenient, 3) Integrated, 4) Auto-Report, 5) Customizable, 6) Cost-effective and 7) Transparency of data. This is important in order to achieve halal certification from JAKIM. Fig. 2 shows the conceptual framework for this research.

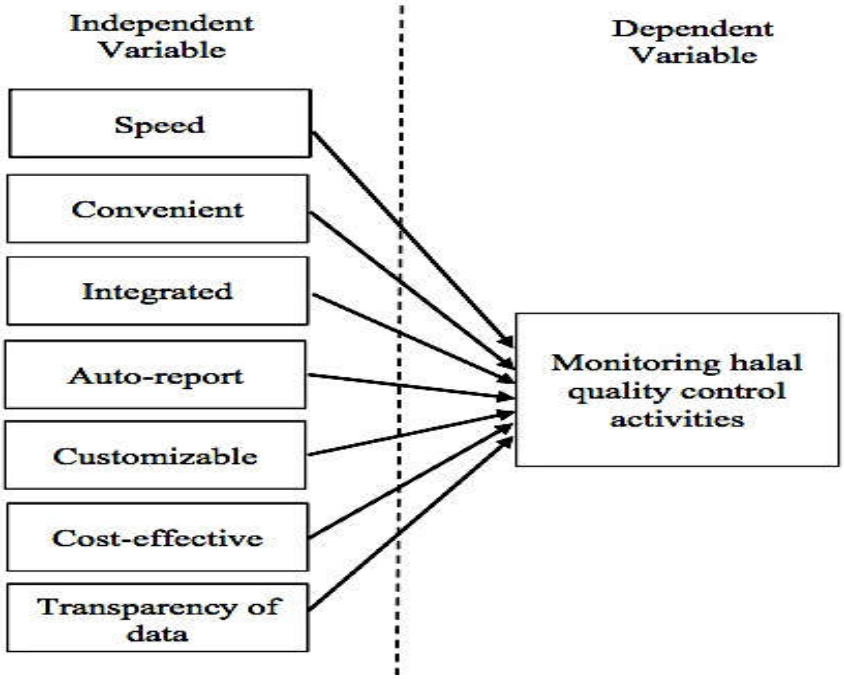


Fig.2. Research conceptual framework

In Fig. 2, the independent variables represent the preferred characteristics of technological assistance that are preferred by industries to monitor their halal quality control activities which represent the dependent variable in this research.

3. METHODOLOGY

Malaysian International Halal Showcase (MIHAS) 2016 was chosen as the venue for pilot study as local and international Halal companies in various sizes from micro to multinational are gathered in one place to showcase their products. Result achieved from the reliability test for pilot study showed that the questions used in the questionnaire survey are reliable with Cronbach alpha, $\alpha = 0.643$.

The questionnaire has been improved for the use of main data collection. The respondent distribution of each industry segment is as shown in Table 2.

Table 2. Survey respondent distribution

Industry	Sample Size	Total Respond	Valid
F&B	62	63	46
Consumer Good	53	36	36
Cosmetics	52	39	39
Logistics	50	50	50
	Total Company Participated		171

The sample size where based on the companies population for each industry segment in Johor Bahru, Malaysia. 171 companies have participated in this survey [15-18]. Four types of halal industry segments: F&B, consumer goods, cosmetics and logistics were chosen to represent the highest number of company establishment in Johor. 5-point Likert scale was used to allow respondent to express how much they agree or disagree to the statements in the questionnaires. Ranging from strongly disagree to strongly agree. Research design is shown in Fig. 3.

The main data collection was done using online survey. Invitation email to 400 Malaysian Halal certified companies in Johor that consist of 28% of F&B, 24.4% consumer goods, 24% cosmetics and 23% logistics. 176 (43%) valid responses were received within 30 days. Researcher perform the reliability test and achieve a better result of $\alpha = 0.843$. According to [19], smaller sample size of 150-200 cases should be sufficient to perform analysis if solution have several loading maker variable above 0.80.

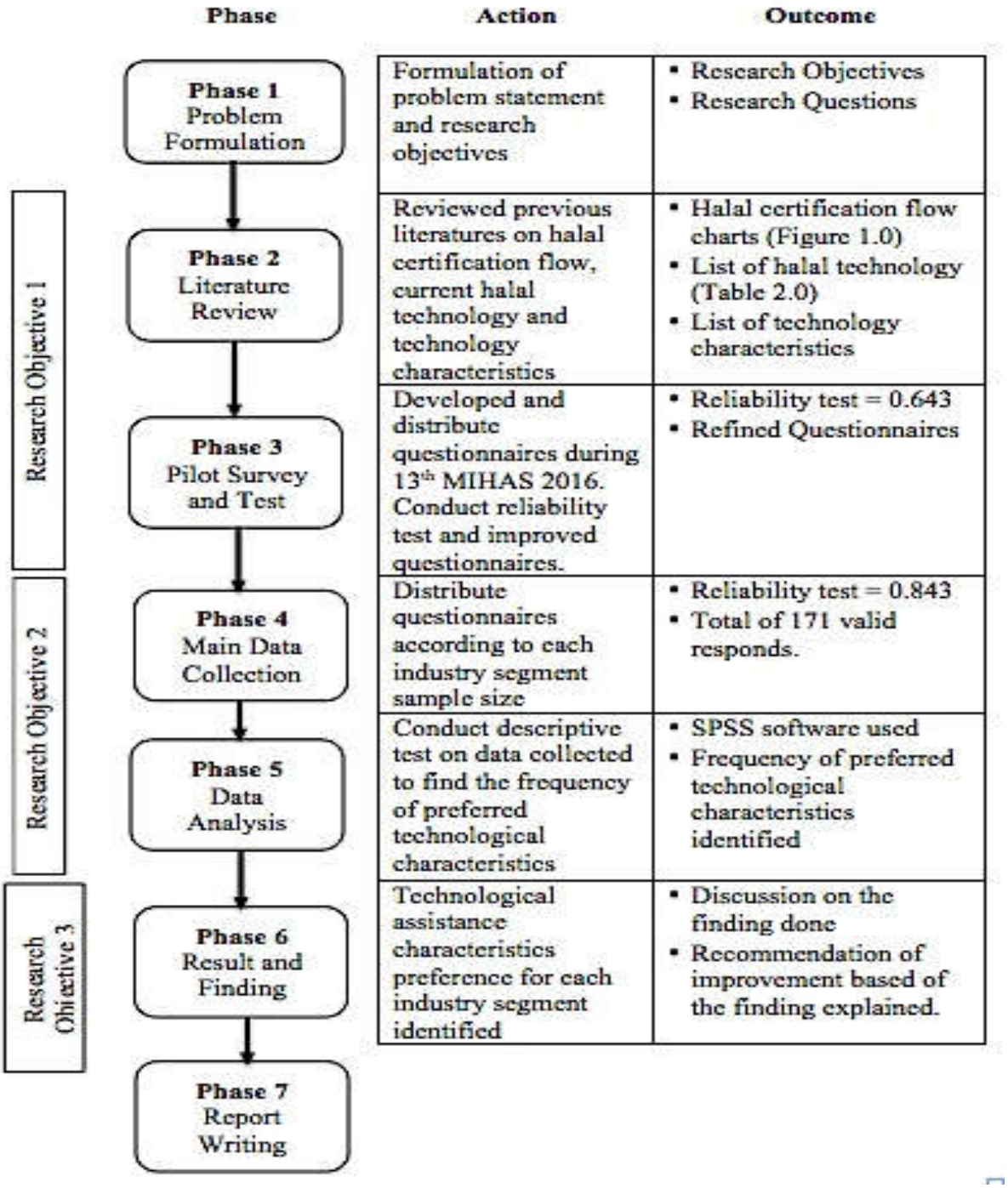
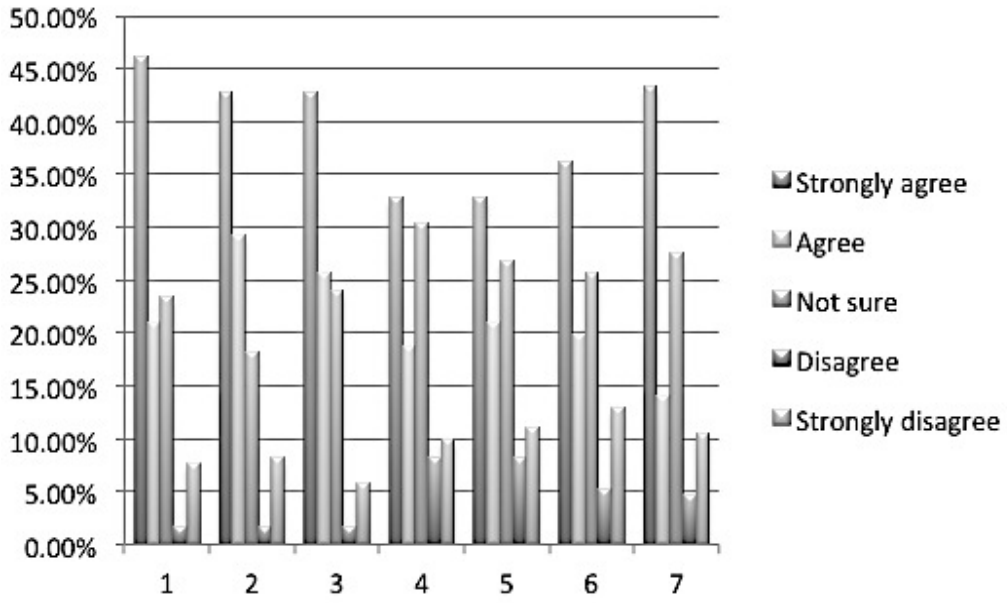


Fig.3. Research design

4. DATA ANALYSIS

Overall, the findings acquire from data collected shows that strongly agree are the highest bar in all charts for all industry segments. This shows that the majority of the respondents has strong agreement that all characteristics evaluate are important to them in choosing technological solutions. This has clearly shown in Fig. 4.



Note: 1 = Speed, 2 = Convenient, 3 = Integrated, 4 = Auto-report, 5 = Customizable, 6 = Cost-effective, 7 = Transparent.

Fig.4. Response chart

In order to achieve the second objective of this research, mean tests were conducted for each technology characteristics in each industry segments. Analysis from mean test shown in Table 3 demonstrated that speed (4.1), convenient (4.0), auto-report capability (3.86) are the most preferred characteristics that the industry had selected to be incorporated in their technology solutions [15-18].

T**able 3.** Summary of mean analysis

Technology Characteristics	Mean
Speed	4.10
Convenient	4.00
Auto-Report	3.86
Transparency of data	3.76
Cost-Effective	3.77
Integrated	3.67
Customizable	3.58

The highest characteristics demand is at speed at 4.10 followed by convenient at 4.00. These two characteristics played the most important role to the industry when it comes to having a

technological support in assisting them to meet JAKIM halal requirement. Other characteristics such as integrated, auto-report generated, customizable, cost-effective and transparency of data are also important where their mean analysis result showed above 3.5 for all constructs which these range between unsure (3) to agree (4).

5. RESULTS AND DISCUSSION

This research provides a foundation for future empirical studies on technology requirement for halal quality management. This study has delivered major evidence for the contention that all seven characteristics study namely speed, convenient, integrated, auto-report, customizable, cost-effective and transparency of data are important and needed by the industry to assist them in applying for halal certification. Gaining halal status for a company is an added value especially in competing with other halal producer in global halal market.

The significant contribution of this study is to identify the technology features that industry needs to look for in helping them to comply and monitor with Malaysia Halal certification and quality requirement. Technology developer can use these research findings to develop technologies that would really suit the industry's need.

Beside than that, another significant contribution of this study is to encourage future research on multifarious dimensions and contribution of technology design and development specifically for halal industry, for instance like the application of 4^{th} Industrial Revolution in halal business operations. Exploratory and explanatory research can be conducted on the application of Internet of Things, Blockchain, Smart Logistics, Robotics, Big Data, etc. in halal supply chain processes.

To summarize, this study has succeeded in stipulating evidence to achieve the objectives outlined for this research. Seven important categories of technology characteristics have been identified. All seven of these characteristics are significant where all of these categories are needed and perceived important by all four segments of the industry studied. Speed and convenient are the top two desired characteristics for a technology. This explained that in current business situation, industries are always looking for the fastest way but yet convenient to use in doing their work. Cost is not the major issue as long as they able to get the job done

in quickest time. This shown from the finding where cost-effective falls at number five.

As other researches, it is for sure that this research has also its limitations. This research is limited to only four halal industry segments instead of seven. The industry segment that not included in this study is pharmaceuticals, slaughtering house and food premises. This research also only concentrated to Johor based companies and studied on the general characteristics of technology solutions. However, from these limitations comes the opportunity of future studies. A study could be carried out to industries beyond the boundary of Johor state. A comparison analysis can be conducted to see the differences and the common preference of technology characteristics between states in Malaysia. This study can also be extended to the other three industry segments that are pharmaceuticals, slaughtering house and food premises. Another good study could also be conducted on looking to specific technology such as mobile technology, cloud services, data analytical dashboard etc. These studies will give a much more concise and specific findings that will benefit both users and the system developers.

As a conclusion, technology that can increase the speed and at the same time convenient and easy to use may be more desired by the industry regardless the cost. Besides than that, understanding the desired characteristics on a technology is the necessary enabler of promoting the development of suitable technology to assist halal industry. Finally, this study has also made a major contribution to future innovation in technology application in halal industry by providing the characteristics required by industry in assisting them to be players in Halal market place.

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7. REFERENCES

[1] Department of Standards Malaysia (DSM). Standard 1500: 2004-Halal food: Production, preparation, handling and storage-General guidelines (1st revision). Selangor: DSM, 2004

[2] Sungkar I R, Othman P A, Hussin W W. Potentials of global halal food market: Implications for Vietnamese SMEs. In 33rd Annual Conference of the Federation of ASEAN'S Economic Associations-ASEAN's Co-operation and Agricultural and Rural Development in the Globalisation Era, 2008

[3] Kagan A. Information technology seen as key to productivity. Chemical Week, 1994, 155(2):20-22

[4] McFarlan F W. Information technology changes the way you compete. Harvard Business Review, 1984, 62(3):98-103

[5] Parsons G L. Information technology: A new competitive weapon. Sloan Management Review, 1983, 25(1):3-14

[6] Weston F C J. Weighing 'soft' and 'hard' benefits of information technology. Manufacturing Systems, 1993, 11(7):120-121

[7] Department of Islamic Development Malaysia (JAKIM). Halal Malaysia. 2011, http://www.halal.gov.my/v4/

[8] Department of Islamic Development Malaysia (JAKIM). Manual procedure for Malaysia halal certification (third revision). Putrajaya: JAKIM, 2014,

[9] Dewhurst F, Martínez Lorente A R, Dale B G. Total quality management and information technologies: An exploration of the issues. International Journal of Quality and Reliability Management, 1999, 16(4):392-406

[10] Brah S A, Ying Lim H. The effects of technology and TQM on the performance of logistics companies. International Journal of Physical Distribution and Logistics Management, 2006, 36(3):192-209

[11] Husny Z J, Tan M I, Ibrahim I S, Rozan M Z. Assessment on the utilization of current halal certification technologies by halal industry players in Malaysia. In MITEC Research Colloquium, 2013, pp. 47-82

[12] Davis F D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 1989, 13(3):319-339

[13] Al-Gahtani S S. System characteristics, user perceptions and attitudes in the prediction of information technology acceptance: A structural equation model. In Diffusion Interest Group in Information Technology Conference, 1998, pp. 1-23

[14] Cho Y C, Sagynov E. Exploring factors that affect usefulness, ease of use, trust, and purchase intention in the online environment. International Journal of Management and Information Systems, 2015, 19(1):21-36

[15] Mazlan M N A, Husny Z J I M, Tan M I I. Technology requirement for halal supply chain: Industry segment-Logistics. Johor: Malaysian Institute of Industrial Technology Unversiti Kuala Lumpur, 2017

[16] Sulon N, Hamid Z I M H, Tan M I I. Technology requirement for halal supply chain: Industry segment-Cosmetics. Johor: Malaysian Institute of Industrial Technology Unversiti Kuala Lumpur, 2017

[17] Yusof N S, Husny Z J I M, Tan M I I. Technology requirement for halal supply chain: Industry segment-Consumer goods. Johor: Malaysian Institute of Industrial Technology Unversiti Kuala Lumpur, 2017

[18] Adenan M Z H M, Husny Z J I M, Tan M I I. Technology requirement for halal supply chain: Industry segment-Food and baverages. Johor: Malaysian Institute of Industrial Technology Unversiti Kuala Lumpur, 2017

[19] Tabachnick B. G., Fidell L. S. Using multivariate statistics. 2007, Boston: Pearson Education

[20] Ibrahim R, Leng N S, Yusoff R C, Samy G N, Masrom S, Rizman Z I. E-learning acceptance based on technology acceptance model (TAM). Journal of Fundamental and Applied Sciences, 2017, 9(4S):871-889

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