

MYeHALAL System Usage During the Covid-19 Pandemic: Proposing a Socio-Technical Model to Enhance the Certifier's Role

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Abstracts: The Coronavirus Disease 2019 (COVID-19) pandemic has disrupted Malaysian halal certification process. With lockdowns and travel restrictions in place, halal certification bodies have had to adapt to new ways of conducting inspections and audits. This has led to delays and backlogs in the certification process. The purpose of this study is to propose a socio-technical model that will enhance the role of the certifiers in the MYeHALAL system during the Covid-19 pandemic. The system aims to make halal certification more accessible in Malaysia. However, it appears that this endeavour is difficult to achieve, considering the discouraging acceptance of the users. The Covid-19 pandemic makes the halal application process even more difficult as not all halal certification application processes can be done online. Semi-structured interviews were conducted with 14 halal applicants and 3 officers from the certification bodies. To develop the model, this study used Actor-Network Theory (ANT), a theory that allows for equal consideration of human (social) and non-human (technological) elements in one analysis. The socio-technical model is derived from identified issues that led to the revelation of the three actors or elements; applicants, technology and guidelines which have a major impact on the use of the MYeHALAL system. The model will highlight the important elements that the certifiers should emphasize to improve its organizational performance and promote more sustainable use of the system particularly during the Covid-19 pandemic. This study provided new insight into enhancing the role of halal food certifiers by proposing a socio-technical model.

Keywords: MYeHALAL System, Halal Food, Socio-Technical, Malaysian Halal Certifier, Covid-19.

1. INTRODUCTION

Malaysia is a country with many different religions and over 63% of Malaysia's 33.2 million citizens are Muslims. Malaysia has demonstrated strong performance as a worldwide participant in the halal sector, and the country does not want to fall behind in terms of the development of the Islamic Digital Economy (IDE) in the region [1]. This is demonstrated by the fact that Malaysia has been acknowledged by the international community as the primary leader in the global halal industry due to its well-organized halal business ecosystem and the high calibre of its halal certification. Malaysia beat out numerous other nations, including Singapore (125.2), the United Arab Emirates (104.4), Indonesia (71.5), and Saudi Arabia (51.1), by earning an index score of 209.8 for the Halal Food Indicator (HFI) in 2020. This score was determined based on the fact that Malaysia dominates the trade in halal food items, halal-related laws and standards, and public awareness of halal and product prices, this score was determined [2].

Malaysia's Halal Certification is one of the primary factors contributing to the country's potential to become a global leader in the commerce of halal food items. Malaysia has set up several e-government systems, one of which allows halal certification applications to be submitted. Beginning in 2007, the Malaysian Department of Islamic Development (JAKIM) decided to launch the MYeHALAL system, the first online halal certification application. This online application system is responsible for facilitating online halal certification applications in the halal sector and providing a directory of halal companies and products [3]. Since then, many researchers have investigated the effectiveness of the online halal application procedure.

Some researchers mentioned the online halal certification system's technical challenges, such as limited language support, system update issues, and a disorganised homepage layout [4,5]. Device incapability and a poor internet connection have also been identified as limiting the use of online halal systems. Other studies have identified operational and applicant issues, such as lengthy applications, uneven information delivery, poor communication, a lack of awareness of current halal regulations and guidelines, and poor skills in using them [3].

Considering the situation of COVID-19, JAKIM realised the difficulty of the applicant applying for the halal certificate has worsened following the Movement Control Order (MCO), as not all halal certification application processes can be done online. With lockdowns and travel restrictions in place, halal certification bodies have had to adapt to new ways of conducting inspections and audits. This has led to delays and backlogs in the certification process, which have affected businesses that rely on halal certification to sell their products. The pandemic has also highlighted the need for greater transparency and traceability in the halal supply chain. Consumers are becoming increasingly concerned about the safety and authenticity of halal products. The awareness and trust for hygienic and halal food during COVID-19 are seen increasing, and this has become the driving factor why the application for the halal certificate is continuing to be accepted [6].

Therefore, this study proposes a socio-technical model to enhance the certifiers' role. It develops a socio-technical model using the Actor-Network Theory (ANT) as the underlying theory of investigation. This is to be applied by the certifiers to ensure the sustainable use of the MYeHALAL system. Considering the post-COVID-19 situation, which witnessed more companies transforming their businesses into digital and online system platforms, it is seen that this model will contribute to highlight the important elements that certifiers should emphasise to improve their organisation's performance and promote the system's long-term success.

2. RELATED WORKS

2.1 Definition and Concept of Halal

The term halal refers to an action that is permitted by Shariah law to indicate "permitted, allowed, legal or lawful" [7]. In Malaysian Standard MS1500:2019, halal is defined as "*matters that are lawful and permitted in Islam based on the Shariah law and Fatwa*" [8]. Halal encompasses all elements of human consumption, including food, drink, banking services, logistics, travel, medicine, cosmetics, and a variety of other things. It also places a strong emphasis on eating, but it goes beyond that [7]. Being a Muslim requires one to consume halal products and services to safeguard against harm to one's body and the welfare of the community [9]. The term haram, which means things that are forbidden, illegal or unlawful is in contrast with the concept of halal [10].

Halal food must adhere to the following criteria, which have been quoted in Malaysian Standard MS1500:2019 [8]:

"Halal food covers foods and beverages and/or their ingredients permitted under Shariah law and fatwa, and fulfils the following conditions:

- a) *does not consist of or contain any part of an animal that is prohibited by Shariah law and fatwa for a Muslim to consume or that has not been slaughtered in accordance with Shariah law and fatwa;*
- b) *does not contain anything that is najis (impure) according to Shariah law and fatwa;*
- c) *does not intoxicate according to Shariah law and fatwas;*
- d) *does not contain any part of a human being or its yield, which are not allowed by Shariah law and fatwa;*
- e) *is not poisonous or hazardous to health;*
- f) *has not been prepared, processed, or manufactured using any instrument that is contaminated with najis (impurity) according to Shariah law and fatwa; and*
- g) *has not in the course of preparing, processing, or storing, been in contact with mixed, or in close proximity to any food that fails to satisfy items 3.4 (a) and (b)."*

Halal is a generally accepted term for Islamic dietary regulations that provide guidance on how Muslims should spend their lives. Muslims place a great deal of attention on the halal haram debate because it affects their religious beliefs. Eating is regarded as a form of worship in Islam. As a result, Muslims have a duty to eat healthfully in order to receive Allah's blessings on their lives. Islam emphasises the Islamic dietary regulations as the prescriptions for ingesting high-quality food. The foundation of this Islamic dietary regulation is the distinction between halal (lawful) and haram (unlawful). Food that is halal (lawful) has been specified clearly, and only things that are haram (prohibited) according to the Quran or Hadith are prohibited. Muslims must also consume the high-quality foods that Allah has supplied.

2.2 Halal Certification in Malaysia

In Malaysia, halal certification is currently governed by the imposition of stringent and extensive procedures that cover food production, processing, packaging, and logistics in accordance with Islamic law. Based on market demand and positive responses from food manufacturers, halal certification went through several stages of development before JAKIM was selected as the only governance organisation for halal certification affairs in 2009. To respond to the government's call towards e-government, JAKIM enlisted the assistance of the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) in developing an online halal certification application branded as MYeHALAL. This system is responsible for facilitating online halal certification applications as well as providing a database of halal products [3]. The online form must be filled out and submitted through the system. Those applicants who met all criteria and the standards are awarded halal certification.

Malaysian halal certification organisations are classified into 2 types: certifiers and supporting agencies. The certifier bodies are JAKIM as the central body for halal certification, and State Islamic Religion Council (JAIN), as the executive body, and both must collaborate to improve the competence and capability of halal certifying bodies. Despite the fact that JAKIM and JAIN are both categorized as certifiers, their roles as certifiers are very different. JAKIM is responsible for issuing halal certificates and for establishing, issuing, and updating the Manual Procedure for Malaysia Halal Certification, which serves as the Malaysian halal certification reference. Considering that JAKIM founded the MYeHALAL system, JAKIM has direct access to it as well. JAIN does, however, play a big part in halal certification. The executive body in charge of making sure that halal-certified businesses adhere to the certification requirements is JAIN. Additionally, it is in charge of all aspects pertaining to halal certification applications and is required to notify the public in a way that is appropriate regarding halal certifications. Both certifiers have collaborated to process the halal application and are responsible for giving essential assistance to the applicants [11].

While JAKIM and JAIN serve as the central entities for halal certification, the Department of Standards (DoS) and the Ministry of Health (MoH) act as supporting agencies for the halal sector. The MS1500:2019 standard, which is intended exclusively for halal food production, preparation, handling, and storage, is established by the DoS. On the other hand, because it is necessary for MESTI certification, MoH also plays a significant role in improving food hygiene and safety. The applicants also recognized that since both certificates place an emphasis on equivalent criteria, if they could pass MESTI or Halal requirements, they would receive both. By doing this, the MoH helps JAKIM emphasize the significance of producing high-quality, hygienic, and secure food.

The COVID-19 pandemic has had a significant impact on many industries around the world, including Malaysia's halal industry. The dynamic of the current business practise became uncertain and complex, thus triggering the need to transform their business into one of digitalization [12]. The Malaysian government has implemented various measures to ensure the continuity of halal certification processes during this challenging time, including the adoption of digital transformation. Before the pandemic, the certification process involved face-to-face meetings, site visits, and physical documentation. The restriction movement order limits the halal application process as the application involves more of a manual process compared to the online process.

To overcome these challenges, JAKIM has implemented several digital transformation initiatives to ensure the continuity of halal certification. The government realises the inconvenience to the applicants and has responded to

simplify the process while still putting halal compliance affairs on top. The standard of Malaysia's halal certification is well known as a credible and reliable halal logo globally, and despite the pandemic situation, JAKIM tried its best to accommodate the halal certification application for the industry [13]. For instance, the adoption of the Integrated Halal Management System has enabled JAKIM to process halal certifications entirely online. This system facilitates the submission of applications, document verifications, and the issuance of halal certificates. JAKIM has also introduced virtual site visits, where auditors conduct inspections remotely through video conferencing platforms. This initiative has significantly reduced the need for physical site visits, resulting in cost and time savings [14].

Another initiative is the introduction of Verify Halal, a mobile application and website that enable consumers to verify halal-certified products by scanning the product's barcode or searching for halal products via a search bar. Despite all the challenges, the number of halal applicants still shows a significant number of 12,612 halal applications processed during the pandemic [15]. This shows that a strengthened and refined process is needed to accommodate the current and future demands of halal certification as acceptance and awareness of halal-certified products increase, especially after the COVID-19 outburst [6].

3. METHODOLOGY

3.1 Underpinning Theory in Developing the Model

To develop the model, this study needs to first identify the actors that will give an impact either facilitating or hindering, the usage of the MYeHALAL system. When analysing the use of the MYeHALAL system, this study used Actor-Network Theory (ANT) as the underlying theory of investigation to build a socio-technical model. ANT is a theory that allows equal treatment of human (social) and non-human (system) elements in a single analysis. This theory was developed primarily by Bruno Latour, Michel Callon, and John Law in the mid-1980s. According to ANT, scientific work is not fundamentally different from other forms of social activity [16]. This theory was well-suited to the nature of the study because it combined the social (applicants and certifiers) and technical (MYeHALAL system). Although ANT recognises the distinctions between human and non-human actors, it does not treat them as separate entities [17], thus allowing for the development of a holistic solution to the system's challenges. ANT theory allows for equal treatment of social and technical factors, allowing for the development of a comprehensive and holistic solution to the system's challenges.

ANT is distinct from other socio-technical approaches in that it treats both human and non-human elements as equal agents in a network [18,19]. Humans, things, ideas, and concepts can all be part of these networks [20]. This will lead to a comprehensive understanding of the system. As a result, each actor receives equal treatment and attention, regardless of their nature, whether stated or unstated, visible or not. Each actor has its own set of associations, and the fundamental activity in ANT is tracing the connections or interactions between network components (or actors) [21]. This will result in the formation of a new network, and ANT will look into how networks grow to be larger and more important than others, how they become more durable by enlisting both social and material actors, and where and how power is wielded [22]. All aspects of the networks will go through a translation process because the actors are constantly impacting and altering each other.

The translation process consists of four (4) phases that are significantly influenced by ANT [23], and these phases are not sequential [24].

1. **Problematization:** The process by which a key actor identifies other human and nonhuman actors, defines the problem, and proposes a solution. When all participants are subjected to a centralised control mechanism known as a "obligatory passing point" (OPP), the solution is achieved.
2. **Interestment:** It is a set of actions in which an entity attempts to impose and stabilise the identities of other players formed during problematization. It is a set of processes in which a focal actor attempts to lock other actors into a predetermined network position.

3. Enrollment: It refers to a focal factor's strategies for defining and connecting the various roles that allow other actors to enrol. The stability of the network's alliances and actors is dependent on the process of establishing their roles within the network.

4. Mobilisation: This is the stage at which the main actors borrow the power of their passive agent allies and transform themselves into their representatives or spokespersons.

3.2 Population and Sampling

The population was drawn from Melaka-based halal food/beverage manufacturing enterprises and was obtained from JAKIM's halal directory website. Purposive sampling was used as a sample approach in this study. The search yielded a total of 106 companies, which were accepted as the study's population. They were then contacted, and their responses were varied. A total of 14 companies agreed to be interviewed. The data patterns were identified and mapped following each interview, resulting in the emergence and development of the themes. However, by the 12th respondent, data pattern growth has ceased, resulting in saturation material that is redundant and adds little or no value to the research [25]. As a result, data collection was terminated at the 14th respondent. Furthermore, information was gathered from MYeHALAL system administrators. To obtain comprehensive and holistic information for better data analysis, 2 officers from JAIN Melaka (JAIM) and one JAKIM technical officer were interviewed.

3.3 Data Collection and Analysis

The data was gathered using semi-structured interview questions. The questions were designed for two types of respondents: applicants and certifiers. Individual notes were taken during the interview sessions and the material gleaned from the interviews was recorded. To perform data analysis, the audio was later transcribed. Following the completion of the translation process, the data was analysed. The data analysis was carried out in two stages using the translation method. Finding the problems that will have an impact on how the MYeHALAL system is used was the first step in the data analysis process. The translation process was utilised to incorporate the highlighted problems and revealed the key players who have a significant influence on how the MYeHALAL system is used. The second stage of data analysis and the result of the translation process was the establishment of a socio-technical model.

4. RESULTS AND DISCUSSION

4.1. A Socio-Technical Model to Enhance the Certifier's Role

The development of the model is framed by ANT. To develop the model, this study needs to first identify the actors that will have an impact, either facilitating or hindering the usage of the system. The model might assist the certifiers in selecting the most important strategy to use when utilising the system. It will highlight the important elements that the certifiers should emphasise to improve their organisational performance and encourage long-term use of the system, as shown in Figure 1 below:



Figure 4.1 A Socio-Technical Model to Enhance the Certifier's Role

The process of developing a socio-technical model is derived from identified issues that led to the revelation of the actors who have a major impact on the use of the MYeHALAL system. It is framed by ANT and inspired by the four moments of the translation process. The preceding data analysis indicated that there are 3 actors that must be coordinated to interact and collaborate to determine the system's success [26]. Applicants, technology, and guidelines are the 3 actors, and each actor has alliances with other actors. These alliances will help to construct a complete and comprehensive picture of the system's network of associations. According to the model in Figure 1, the certifier's role encompasses all 3 elements of technology, guidelines, and applicants. The elements within the certifier's parameter can be tackled and improved directly or indirectly by the certifier. On the other hand, the elements within the applicant's focused parameter are those that do not have direct governance or supremacy under the authority of the certifier. The details are as below:

4.2. Technology

Because the MYeHALAL system itself is a technology, technology is an essential component of the socio-technical model. Another element of technology involved is the system's maintenance and operations, as well as the medium of accessibility, such as devices and internet connections. To guarantee a smooth application, the system must be run efficiently. JAKIM must confirm that the system is operated by a qualified and competent individual in his or her capacity as system operator. This is also required for system maintenance since the system is updated and prepared regularly.

However, the quantity and duration of scheduled maintenance work may have had a detrimental impact on system utilisation. This is because the more frequent the maintenance, the longer it will take, and each time spent will prevent users from using the system. Therefore, a feasible improvement to this situation is to schedule a

maintenance plan and distribute a notice before the maintenance work. This may allow applicants to finish their applications before the maintenance work begins. Aside from that, certifiers must understand that each applicant has a unique profile that reflects their ability to complete the halal application online. Some applicants may need system manuals to help them complete the online halal application; thus, certifiers should inquire if applicants need system manuals as a reference. The improvement in technology element is crucial as, during the pandemic of COVID-19, many industry players have modulated current offline business challenges into online ones, and this has exposed the entrepreneur and industry player to a better experience on the online business platform [27]. This situation could lead some applicants to anticipate a decent customer experience when using the system for their halal certification application purposes.

4.3. Guidelines

There are 3 important guidelines that applicants must adhere to. All 3 guidelines must be discussed with applicants by the certifiers, preferably before the online application is completed. The certifier should explain the significance of these guidelines to applicants who intend to apply for a halal certificate during the initial interaction:

- a) Manual Procedure for Malaysia Halal Certification (MPMHC): The MPMHC includes important information on halal certification in Malaysia, emphasising the guidelines and procedures.
- b) Certification workflows: Because the halal certification method entails several processes, applicants must understand the requirements and time required for each process.
- c) Malaysian Standards: The standards, particularly MS1500:2019, developed by the Department of Standards are another set of guidelines that are quite essential.

Communication and time management are two essential factors in determining the effectiveness of a guideline's implementation. The certifiers are closely related to the factors of communication and time management. Depending on how the certifiers perform, these two factors might support or hinder the online halal certification application. The way the certifiers communicate or distribute information about halal certification has a major impact on communication delivery. To provide reliable service to all halal applicants, certifiers must first ensure that all staff are knowledgeable and understand all rules or guidelines.

The halal information, particularly the guidelines, must be provided at the start of the halal certification application process, preferably during the first meeting between the applicants and the certifiers. Concerning this matter, Halal Development Corporation (HDC) encourages all companies that intend to apply for the halal certificate to get the necessary information and advice from HDC before submitting the halal application to JAKIM [28]. This initiative is taken to ensure that all companies have the correct information and exposure to the halal certification application process, which assists them in having a smooth application experience. This is significant because applicants must be aware of the existence of the guidelines to improve any deficiencies or defects that might risk their halal certification application process.

Aside from that, the certifiers must apply an efficient time management schedule to indicate how much time is required for each application procedure. If both the certifier and the applicant are dedicated to their respective responsibilities, the halal certification application may be completed according to the client's charter. The time it takes to complete a successful application through the MYeHALAL system is determined by two primary elements: (1) applicants' capability to comply with the procedures and, (2) certifier's willingness to handle and assist with any issues that arise throughout the application process. Therefore, effective communication between the certifiers and the applicants is very important to ensure the most efficient flow of information. This entails good communication between the certifier and the applicants, which, if followed consistently, allows both the certifier and the applicants to manage the time spent on each procedure of the halal application successfully.

The time management factor is also important in the execution of procedures for the halal certification process during the MCO, as each applicant who needs to submit the supporting document is limited to 10 minutes per person [29]. The 10 minutes for the document review may not be enough for the applicant, who has an issue with

their supporting document and needs to be guided by the certifier. The certifier must be reminded to give clear and straightforward information during the meeting to assist the problematic applicants.

4.4. Applicants

On the other side, there are factors that the certifiers cannot control because they are identified uniquely within the applicant's focused parameter. Human resource management and the company's organisational work ethics are two important factors that might affect the applicant's decision to use the MYeHALAL system. Human resource management is concerned with how a firm manages its personnel to maximise performance while cultivating a sense of loyalty to the organisation. Whereas work ethics is the practise of proper, honourable, and acceptable behaviours in the workplace, work ethics may be good or bad, depending on how someone handles them in their day-to-day activities. An employee with strong work ethics will stay on track with what they should do and will be more mindful of the quality of their work because he or she is conscious that their work may influence their colleagues or other parties. Among the problems related to work ethics is when an employee forgets or is not aware of the notice provided via the system.

The effect can also fall on the halal certifiers, even though it was caused by the applicants, because this process requires both parties to offer their entire dedication throughout the certification procedures and process. The certifiers, on the other hand, may emphasise the necessity of having a professional team of employees, particularly halal executives who have completed the necessary halal certification training and courses. Luckily, even in the MCO, the online halal training is still available and this helps the halal applicants sharpen and update their halal compliance knowledge at any time.

In summarizing the discussion from the above model, these 3 actors or factors and their alliances must be handled to encourage more successful and long-term use of the MYeHALAL system, particularly during the COVID-19 pandemic. As a consequence, if any actors or factors fail to comprehend and carry out their tasks, the halal application will take longer or fail. Regardless of whether the elements are inside or beyond the certifier's parameters, knowledge and skills, are found to be substantially linked in all 3 factors. Knowledge and skills, which are considered the core elements, are critical in determining the success of the system. This refers in particular to the development of knowledge concerning the guidelines for both certifiers' staff and applicants. For certifiers, the selected staff must attend skill improvement courses to improve their skills and expertise in administering the system to help the applicants.

Therefore, both certifiers and applicants can benefit from this model in their efforts to understand the key elements of system usage. Before applying for certification, applicants must confirm that they have reviewed and practised all halal certification requirements. In addition, they must have the necessary skills, knowledge, and equipment to complete the online halal application. Furthermore, applicants must constantly improve human resource management and work ethics in order to ensure that the halal certification application is completed without hassle.

JAKIM and JAIN are both classified as certifiers and regulators of halal certification and must be dedicated to giving technical assistance to applicants. More significantly, the certifiers play important roles in ensuring that the application submitted is handled effectively and successfully. Furthermore, because the certifiers also serve as the system's managers, they are responsible for maintaining and securing the system, as well as doing regular monitoring and improvements. This will result in a system that is less troublesome and has a more favourable application process.

The government also realised the importance of digital literacy after the COVID-19 pandemic, and through various policy interventions, the environment of digital and online technologies will be improved and transformed shortly [30]. In addition to that, with a refined understanding of both the certifier's and applicants' halal certification application process, guidelines, and polished skills in managing and using the system itself, it will be a great combination for successful, sustainable, and resilient halal applications.

CONCLUSION

A socio-technical model was developed in this study to enhance the role of the certifiers in the MYeHALAL system. The certifiers should pay more attention to improving communication among staff and with applicants, particularly regarding awareness and understanding of the requirements. This can be beneficial in a number of ways, including by providing a more qualified and capable team dedicated to the operation and management. It can also assist in the development of more strategic and systematic consultations or workshops to assist applicants with the use of the MYeHALAL system and to improve the modus operandi in serving halal applicants' prospects.

Finally, as this study focuses specifically on the MYeHALAL system, it is recommended that more research be conducted on a national level, as well as investigating other online halal certification application systems developed by other halal certification bodies across the world. Indirectly, this socio-technical model can provide an insight to the other halal certifiers worldwide an understanding of the crucial indicators that they should be aware of and prepared for when establishing a clearer online halal certification application procedure. The preparation entails the ability of the certifier's employee to respond to technical system requirements, provide effective consultation and provide workshops or seminars to improve the use of the online halal certification system. This will support the development of a knowledgeable and skilled user who can effectively use the system and simultaneously will elevate a sustainable usage of the online halal certification.

ACKNOWLEDGMENT

The study is funding by the Ministry of Higher Education (MOHE) of Malaysia through the Fundamental Research Grant Scheme (FRGS), No: FRGS/1/2016/SS06/UTEM/02/2. The authors would also like to thank Universiti Teknikal Malaysia Melaka (UTeM) for all the supports.

REFERENCES

- [1] MIDA (Malaysian Investment Development Authority). (2022, April 28). Govt to step up efforts to develop robust local Islamic digital economy — MyDIGITAL. Retrieved April 28, 2022 from <https://www.mida.gov.my/mida-news/govt-to-step-up-efforts-to-develop-robust-local-islamic-digital-economy-mydigital/>, 2022.
- [2] Bedford E, Global Halal Food Index Score 2020, By Country. Retrieved November 28, 2022 from <https://www.statista.com/statistics/737175/halal-food-index-score-by-country-worldwide/#:~:text=In%202020%2C%20global%20leader%20Malaysia,public%20awareness%20and%20product%20pricing,2022>.
- [3] Sawari SS, Ghazali MA, Yap SM, Latif AA. E-Halal as Method and Apparatus for Halal Product Detection in Malaysia. *Mediterranean Journal of Social Sciences*. 2015 Sep 4;6(5):638-642. <http://doi.org/10.5901/mjss.2015.v6n5s2p638>.
- [4] Husny ZJ, Tan MI, Ibrahim IS, Rozan MZ. Assessment on the utilization of current halal certification technologies by halal industry players in Malaysia. In *Proceeding of The World Congress on Engineering and Computer Science 2014 (Vol. 2, pp. 22-24)*.
- [5] Noordin N, Noor NL, Samicho Z. Strategic approach to halal certification system: An ecosystem perspective. *Procedia-Social and Behavioral Sciences*. 2014 Mar 19;121:79-95. <http://doi.org/10.1016/j.sbspro.2014.01.1110>
- [6] Syed Marzuki SZ, Abdullah H, Ab Halim R, Buyong SZ, Zreik M. Purchasing behaviour on halal food products during movement control order (MCO): quantitative evidence from Covid-19 pandemic. *ASEAN Entrepreneurship Journal (AEJ)*. 2020;6(2):16-21.
- [7] Khan MI, Haleem A. Understanding "halal" and "halal certification & accreditation system"-a brief review. *Saudi Journal of Business and Management Studies*. 2016;1(1):32-42.
- [8] MS1500:2019. Halal food - general requirements (3rd revision). Department of Standards Malaysia, 2019.
- [9] Al-hammadi A, Al-shami SA, Al-Hammadi A, Rashid N. Halal tourism destination in UAE: The opportunities, threats and future research. *International Journal of Innovative Technology and Exploring Engineering*. 2019;8(6):788-93.
- [10] Nafis MC. The concept of halal and thayyib and its implementation in Indonesia. *Journal of Halal Product and Research*. 2019;2(1):1-5.
- [11] Bakar NA, Arif S, Sidek S. Overview of online halal certification: Practice and issues. *International Journal of Advanced Science and Technology*. 2020;29(4s) 3624-38.
- [12] Priyono A, Moin A, Putri VN. Identifying digital transformation paths in the business model of SMEs during the COVID-19 pandemic. *Journal of Open Innovation: Technology, Market, and Complexity*. 2020 Oct 3;6(4):104. <https://doi.org/10.3390/joitmc6040104>.
- [13] Husain NH. Permohonan Sijil Halal Akan Diperudahkan: Zulkifli. *Sinar Harian*, 6 July. Retrieved November 2, 2022 from <https://www.sinarharian.com.my/article/90956/berita/nasional/permohonan-sijil-halal-akan-diperudahkan-zulkifli,2020>.
- [14] JAKIM. Permohonan Pensijilan Halal Malaysia. Retrieved February 10, 2023 from <https://www.halal.gov.my/v4/index.php?data=bW9kdWxlcly9uZXZxOzs7Ow==&utama=ann&ids=2021060360b822d0b3cd7&lang=bn,2021>.

- [15] Amree Ahmad. Lebih 12,000 Permohonan Sijil Halal Berjaya Diproses Semasa Pandemik. Utusan Malaysia, 23 November. Retrieved November 2, 2022 from <https://www.utusan.com.my/berita/2021/11/lebih-12000-permohonan-sijil-halal-berjaya-diproses-semasa-pandemik/>, 2021.
- [16] Crawford CS. Actor Network Theory. In: Ritzer G, editor. Encyclopedia of Social Theory. Sage Publications, 2004.
- [17] Eze SC, Chinedu-Eze VC, Bello AO. Determinants of dynamic process of emerging ICT adoption in SMEs—actor network theory perspective. *Journal of Science and Technology Policy Management*. 2018 Jul 16;10(1):2-34. <https://doi.org/10.1108/JSTPM-02-2018-0019>.
- [18] van der Wagen W, Pieters W. The hybrid victim: Re-conceptualizing high-tech cyber victimization through actor-network theory. *European Journal of Criminology*. 2020 Jul;17(4):480-97.
- [19] Stanforth C. Using actor-network theory to analyze e-government implementation in developing countries. *Information Technologies & International Development*. 2006 Mar 1;3(3):35-60. <http://doi.org/10.1162/itid.2007.3.3.35>.
- [20] Cresswell KM, Worth A, Sheikh A. Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. *BMC medical informatics and decision making*. 2010 Dec;10(1):1-11.
- [21] Latour B. Reassembling the social: An introduction to actor-network-theory. Oup Oxford; 2007 Sep 6.
- [22] Cressman D. A brief overview of actor-network theory: punctualization, heterogeneous engineering & translation. ACT Lab Center for Policy Research on Science & Technology (CPROST) School of Communication, Simon Fraser University, Canada, 2009.
- [23] Callon M. Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. *The sociological review*. 1984 May;32(1_suppl):196-233.
- [24] Thapa D. The role of ICT actors and networks in development: The case study of a wireless project in Nepal. *The Electronic Journal of Information Systems in Developing Countries*. 2011 Nov;49(1):1-6.
- [25] Gentles SJ, Charles C, Ploeg J, McKibbin KA. Sampling in qualitative research: Insights from an overview of the methods literature. *The qualitative report*. 2015 Apr 26;20(11):1772-89.
- [26] Arif S, Bakar NA, Sidek S. Impediment factors to successful usage of online halal certification. *Humanities & Social Sciences Reviews*. 2019 Mar 19;7(2):135-45.
- [27] Jaiyeoba HB. The spillover effects of covid-19 on halal industry: an overview and way forward. *Halalpsphere*. 2021 Jan 15;1(1):72-82. <https://doi.org/10.31436/hs.v1i1.16>.
- [28] Abd Wahab DS. HDC sasar 50,000 syarikat ada sijil halal. Utusan Malaysia, 21 July. Retrieved November 2, 2022 from <https://www.utusan.com.my/nasional/2022/07/hdc-sasar-50000-syarikat-memiliki-sijil-halal-menjelang-2030/>, 2022.
- [29] Jabatan Hal Ehwal Agama Islam Pulau Pinang. Prosedur pensijilan Halal Sepanjang Tempoh Perintah Kawalan Pergerakan (PKP) Covid-19 bagi Negeri Pulau Pinang. Retrieved October 28, 2022 from https://jaipp.penang.gov.my/images/pdf/SOP_HALAL_12012021-WEB.pdf, 2021
- [30] Nik Anis M. COVID-19 Accelerated Digital Transformation in All Aspects of Life, Says PM. *The Star*, 25 October. Retrieved November 20, 2022 from <https://www.thestar.com.my/news/nation/2021/10/25/COVID-19-accelerated-digital-transformation-in-all-aspects-of-life-says-pm>, 2021

DOI: <https://doi.org/10.15379/ijmst.v10i4.2152>

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