

ICMC 2023**The 3rd International Conference on Management and Communication****SME'S BEHAVIOURAL INTENTION TOWARDS IR 4.0
TECHNOLOGY IN MALAYSIAN HALAL FOOD INDUSTRY**

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Abstract

This study analyzed the motivation for utilizing IR 4.0 technology among Malaysian SMEs in the Halal food industry. The Malaysian government has encouraged SMEs to adopt and implement the IR 4.0 technology by providing grants and training funds. However, most SMEs still needed to exploit the government's encouragement to utilize IR4.0 technology in business, especially in the Halal industry. Therefore, it is essential to fill the knowledge gap and provide valuable insight into investigating the level of awareness and willingness of halal food industry players to adopt and implement IR 4.0 in their business. Thus, this study uses coercive, normative and mimetic isomorphism as variable factors to investigate the behaviour intentions of SMEs in Malaysia's Halal food industry to adopt IR 4.0. Furthermore, the voluntariness of use as a moderator were examines whether it could alter the connections discovered in technology adoption models. Moreover, this investigation employs partial least square structural equation modelling (PLS-SEM). In addition, 218 middle- to top-level management respondents from the SME that produce Halal food were examined. The study uses descriptive statistics, confirmatory factor analysis, and path coefficients. In this investigation, SmartPLS software was utilized. Findings show that coercive and normative isomorphism significantly affected SMEs' behavioural intentions. However, mimetic isomorphism was not significant. For the moderator, only coercive isomorphism has a significant result. This study has important implications for researchers, practitioners, and policymakers to understand the potential benefit and challenges related to the integration of IR4.0 technologies in the Halal food industry in Malaysia.

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1. Introduction

Malaysia is currently focusing on IR4.0 technology and encouraging SMEs business to adopt and implement the IR4.0 technology by providing funds and incentives. Some government initiatives are from the Ministry of International Trade and Industry, which has taken proactive measures to develop a National Policy on Industry 4.0. Furthermore, the government is attempting to promote the use of technologies and IR4.0, which are critical for boosting efficiency and lowering operational costs. Now that SMEs are in the era of industrial revolution 4.0, which is the period of technology and information use, they must begin to adapt (Sari & Santoso, 2020). Furthermore, with the development of new technology, there is a new arena to explore to ensure the high quality of Halal food products (Ahmad Tarmizi et al., 2020). According to the Halal Industry Master Plan 2030 (HIMP), there is a heavy emphasis on supporting Halal innovation through the technological improvement of IR4.0 to ensure Halal products get through a completely certified supply chain. Moreover, Elias et al. (2019) claimed that more enterprises, particularly SMEs, have entered the Halal industrial sector because of a surge in demand for Halal products. Furthermore, due to their dominance, SMEs were considered the backbone of Malaysia's economy, accounting for 98.5% of all registered companies (Shanmugam et al., 2022). According to DinarStandard (2022), the Halal economy contributed 7.5% of Malaysia's GDP in 2020. The largest Halal economy in Malaysia is the Halal food business, which generated RM 128.8 billion in revenue in 2021 (DinarStandard, 2022). In order to be competitive, Entrepreneurs in the Halal industry are encouraged to step up their game, and IR4.0 technologies are one of the advantages that can be utilized for business.

Nevertheless, according to Teh and Kee (2019), Malaysian SMEs still need to prepare for IR 4.0 to take impact. SMEs in the sector need to be made aware of IR 4.0 despite its significant economic potential. Following the study, SMEs must build resilience, adapt to these shocks, and consider the quick rate of change as an opportunity since IR 4.0 will significantly impact Malaysian firms and organizations. In addition to technology considerations, Raghavan et al. (2018) discovered that the characteristics of SME owner-managers, organizational variables, and institutional factors are significant factors affecting SMEs' adoption of e-Business. Moreover, Ramli (2019) contends that putting Industry 4.0 into practice is a challenging endeavour that might take ten years or longer to complete. This study used the institutional theory as a conceptual framework to examine how different institutional constraints affected SMEs' intentions to use IR 4.0 technology in the Halal food sector. The IR 4.0 technology that relate to this study such as big data, the Internet of Things, 3d printer, artificial intelligence, cloud computing, and other IR4.0 technologies related to the food industry. As a result, this study will utilizing an organizational perspective to investigate the factors that influence SMEs' behaviour intentions to use IR4.0 technology in the Halal food business. The developed research model can be an alternative framework for business organizations to investigate SMEs' behavioural intentions. Bukhari et al. (2021) explain that institutional theory provides a comprehensive and dynamic framework for analyzing the determinants of organizational adoption behaviour. As a result, this study will add to the body of knowledge in studying organizational behaviour concerning IR 4.0 technology. Thus, this study believes there will be a significant correlation between the institutional motivation factor and the behavioural intentions of SMEs in using IR 4.0 technology in the Halal food industry.

2. Literature Review

2.1. Small and medium enterprises' behaviour intention towards IR4.0 technology in the halal food industry

The halal food sector, which is rapidly growing in Malaysia, primarily provides consumers with the quality and value of Halal food (Ahmad Tarmizi et al., 2020). According to Zailani et al. (2015), a negative mindset toward Halal businesses may lead to SME entrepreneurs needing help in the market and missing out on Halal's global business prospects. In the study by Torkkeli et al. (2018), the top executives at halal SMEs contribute entrepreneurial knowledge to decision-making to boost company growth and gain a competitive edge. Individuals with a favourable assessment of the performance conduct may have the intention to perform (Qurniawati & Nurohman, 2020). Given the importance of Halal food-based SMEs in Malaysia, incorporating sophisticated technology in the food and beverage (F&B) business is critical for assuring product quality and realizing the industry's potential (Abdul et al., 2017). Despite the enormous economic potential of IR 4.0, industry entrepreneurs must be made aware of it. The country will face a crisis if SMEs do not implement Industry 4.0 to boost their industrial competitiveness (Ministry of International Trade and Industry, 2018). As a result, the intentions of SMEs toward IR4.0 technology in Halal industry should be examined.

2.2. Normative isomorphism

According to Siahaan and Tan (2022), the normative aspect relates to social norms, values, and beliefs that individuals in a corporate firm pursue to attain organizational goals. Furthermore, according to Latif et al. (2020), normative isomorphism stems from corporate culture's expectations, norms, values, and standards. The requirement for corporations to win public confidence via Halal is called normative isomorphism. Suppose many companies are already using new technology. In that case, they will be more likely to see it as a good thing to do (Jamalut et al., 2022), as technology in Halal business is an essential strategy for business growth, the use of IR 4.0 technology in business operations is an excellent strategy for maintaining image and reputation. It is critical to enhance earlier research by considering current Halal industry trends (Ab Talib, Md. Sawari, et al., 2016). Besides, Al Balushi et al. (2021) discovered that normative pressures strongly encourage the adoption of IR 4.0. Hence, the following hypotheses are proposed:

H1: There is a significant effect of normative isomorphism towards Small and Medium Enterprises (SME) behaviour intention using IR4.0 technology in the Halal food industry.

2.3. Mimetic isomorphism

Ben Boubaker et al. (2021) identify that peers, professional groups, or competitors can all cause mimetic isomorphism. Moreover, according to Oliveira et al. (2014), mimetic isomorphism occurs when corporate leaders adopt an idea or technique similar to that of rivals to fulfil market standards or regulations. Besides, an organization would copy other organizations in the same environment if it were unsure how to react to environmental changes or specific goals and demands (Bukhari et al., 2021). In

addition, the motivation behind the imitation of Halal technology is to ensure company continuity by employing Halal tactics to represent cleanliness and freshness (Aziz & Chok, 2013). Furthermore, developing advanced technology might help these businesses retain their compliance with Halal standards (Ramdani et al., 2013). Moreover, the chances of failure in a given technology adoption are decreased by imitating the technology enterprises of competitors. Thus, it is commended to maintain a competitive advantage in the rapidly developing period of technological innovation, according to Xu et al. (2022). The importance of mimetic processes in various adoption behaviours has also been demonstrated, both in the context of SMEs and in research by Bakr and Napier (2022) and Caldera et al. (2019). Hence, the following hypotheses are suggested based on previous studies:

H2: There is a significant effect of mimetic isomorphism towards the behaviour intention of Small and Medium enterprises (SMEs) using IR4.0 technology in the Halal food industry.

2.4. Coercive isomorphism

Coercive isomorphism is the process by which companies adjust to the external constraints placed on them by other institutions on which they rely, such as the government, industry associations, professional networks, and significant clients and suppliers (DiMaggio & Powell, 1983). Moreover, essential stakeholders, including governmental bodies, non-governmental organizations, consumers, and suppliers, are accountable for coercive isomorphism (Latif et al., 2020). Besides that, according to research by Fauzi (2019), there is a lot of coercive pressure on SMEs in the food business to implement online delivery services. It is also similar to Usman et al. (2022); pressure can also take the shape of demands and solicitations from clients, vendors, and the SME community, as well as pressure from the social environment and religious issues. Coercive pressure has been shown to significantly affect various adoption behaviours, particularly in the setting of SMEs, as indicated by several prior research (Caldera et al., 2019; Shibin et al., 2020). Therefore, as suggested by past researchers, we are convinced that Coercive isomorphism will significantly affect SMEs' behaviour intention in using IR4.0 in the Halal food industry. Hence, the following hypotheses are proposed:

H3: There is a significant effect of coercive isomorphism towards the behaviour intention of Small and Medium Enterprise (SME) using IR4.0 technology in the Halal food industry.

2.5. Voluntariness of use

According to Wu and Lederer (2009), voluntariness moderates the impact of usability and simplicity of use on the intention to use in the context of meta-analysis research in education and business. In contrast to mandatory use, this influence is more likely to happen in heavily volunteer-driven communities (Margahana, 2019). Besides, this study employs voluntariness as a moderator following Hartwick and Barki (1994) and Brown et al. (2002), who claimed that voluntariness, could alter the connections discovered in technology adoption models. In addition, a study by Park et al. (2022) revealed that self-directed voluntarism significantly impacted people's acceptance of intelligent information technology. Based on the discussion, the researcher uses voluntariness of use as a moderator to examine if

voluntariness will affect the behaviour intention of SMEs in using IR4.0 technology in the Halal food industry. As a result, in considering the preceding discussion, it is suggested that:

H4: Voluntariness of use as a moderator between Normative Isomorphism and the behaviour intention of Small Medium Enterprises using IR4.0 technology in the Halal food industry.

H5: Voluntariness of use as a moderator between Mimetic Isomorphism and the behaviour intention of Small Medium Enterprises using IR4.0 technology in the Halal food industry.

H6: Voluntariness of use as a moderator between Coercive Isomorphism and the behaviour intention of Small and Medium enterprises) using IR4.0 technology in the Halal food.

2.6. Institutional theory

Institutional theory is one of the fundamental concepts that holds that external institutions impact business isomorphism (DiMaggio & Powell, 1983; Yigitbasioglu, 2015). Moreover, according to Gualandris et al. (2018), an external environment influences organizational decisions based on a set pattern of cultural values, norms, and behaviour. Besides that, according to Ab Talib, Abdul Hamid, et al. (2016), managers needed a channel approach for their attention and focus, which may be influenced by motivational variables, to make effective and efficient Halal implementation decisions. Accordingly, in the context of the Halal food market, this change reflects the company's efforts to respond to external factors, such as meeting the requirements of governmental regulations, such as standards under the Halal guarantee system, or meeting the demands of the Halal market. As a result, the results here can supplement several past studies' findings. In addition, this study may provide a chance to examine in depth the behaviours and intentions of SMEs regarding using IR 4.0 technology.

As discussed above, Figure 1 below represents the framework model in this study. All the proposed hypotheses are illustrated as independent variables; Coercive isomorphism, mimetic isomorphism and normative isomorphism. For the dependent variable, small and medium enterprises' behaviour and intention of using IR 4.0 technology in the Halal food industry. Furthermore, the voluntariness of use will be the moderator for this study.

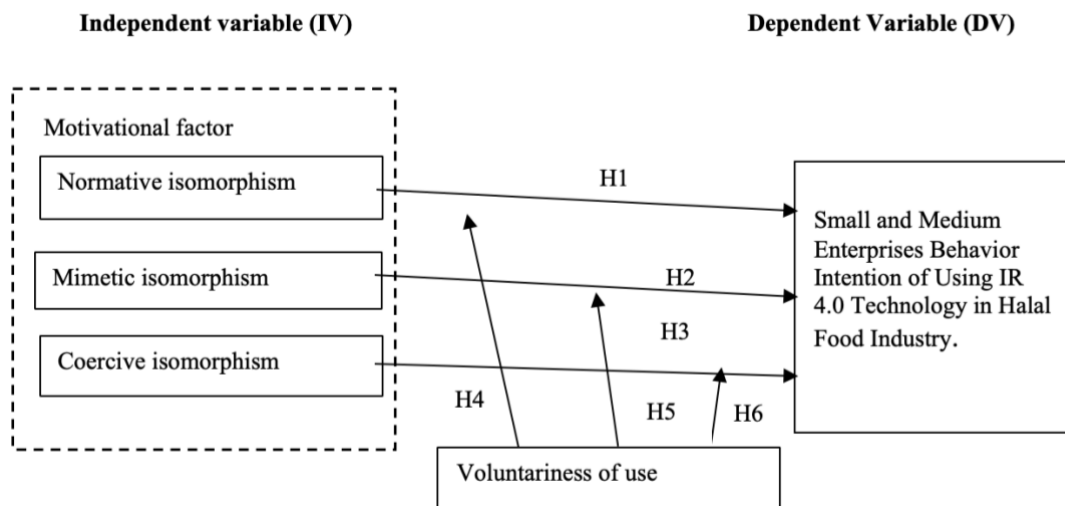


Figure 1. The framework model for this study

3. Method

The study was conducted using a structured questionnaire with closed multiple-choice questions. The researcher gathered the information through a self-administered questionnaire. Besides that, five-point scales are used to quantify these factors and six sections are measured. The sections include the respondents' demographics, normative isomorphism, mimetic isomorphism, coercive isomorphism, the voluntariness of use, and SMEs' behaviour intention of using IR 4.0 technology in Halal food industry. This study's target population consisted of middle and upper-management respondents from SMEs that produce Halal food products in East Coast Malaysia. Afterwards, this study used 30 samples for a pilot study. There was no significant need to alter the questions since Cronbach's alpha was good and over 0.7 for all independent variables. The researcher applied the purposive convenience sampling strategy in this investigation. The sample size uses G*Power, and the sample needed is a minimum of 153. The researcher was getting information from the Halal directory from JAKIM official portal. Next, the researcher contacts the person in charge and sends the e-mail by attaching a link to the Google form. In return, 218 questionnaires were received from middle to top managers from SMEs that produce Halal food. Besides, SmartPLS software was used to analyze the hypothesized associations between the variables. To achieve the following six study objectives, the researcher employed the PLS analysis findings, including path coefficients (β), path significance (p-value), and variance explained (R2 values).

4. Result and Analysis

4.1. Measurement model

The researcher assessed the construct's internal consistency, reliability, convergent validity, and discriminant validity in the measuring model. The dependability of the structures was evaluated using Cronbach's alpha and composite reliability. Fortunately, all factor loading values exceed 0.5 except item "V3" (dropped). The subsequent phase in the concept validation process is the investigation of

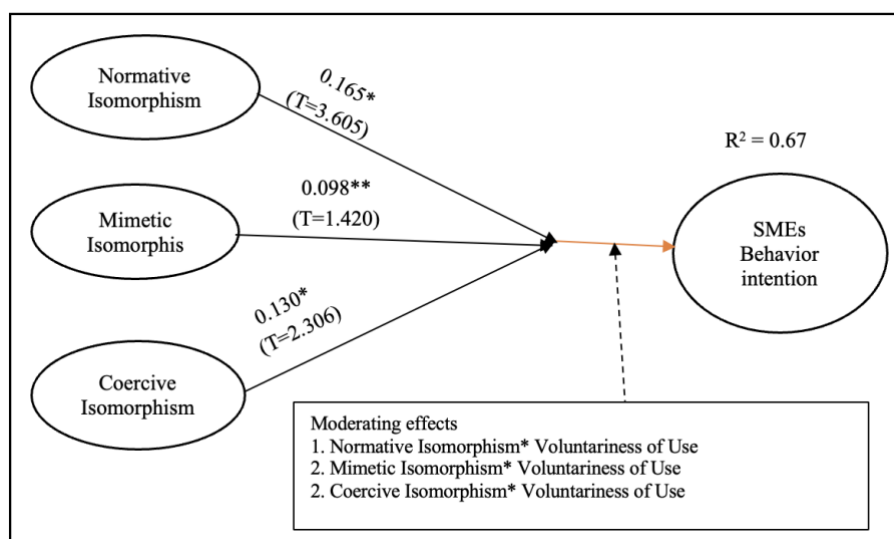
discriminant validity. In order to evaluate discriminant validity, the Fornell and Larcker criteria were applied. Table 1 illustrates that the square root of AVE is more relevant than its related constructs.

Table 1. Fornell & Larcker criterion

	Behaviour Intention	Coercive Isomorphism	Mimetic Isomorphism	Moderating Effect 1- coercive	Moderating Effect 2- mimetic	Moderating Effect 3- normative	Normative Isomorphism	Moderator
Behaviour Intention	0.932							
Coercive Isomorphism	0.184	0.813						
Mimetic Isomorphism	0.556	0.161	0.761					
Moderating Effect 1- coercive	-0.163	0.144	-0.102	1.000				
Moderating Effect 2- mimetic	0.124	-0.091	0.073	0.388	1.000			
Moderating Effect 3- normative	-0.012	-0.120	0.003	0.208	0.451	1.000		
Normative Isomorphism	0.561	0.190	0.428	-0.126	0.003	-0.010	0.778	
moderator	0.759	0.072	0.569	0.016	0.216	-0.026	0.507	0.689

4.2. Structural model

Hair et al. (1998) employ a structural model to reflect the linear regression impacts of the endogenous components on one another in order to address the hypothesis. The structural model was validated using the SmartPLS software. The hypothesis has therefore been addressed in Table 3. Meanwhile, the PLS analysis findings are shown in Figure 2, along with the variance, path coefficients, and path significance. Every statistical test was examined using two-tailed t-tests with a 5% significance level. Moreover, Figure 2 below illustrates the model for the study's coefficient of determination, calculated statistically using SmartPLS v.3.2.9. This figure indicates that the motivational factor accounted for 67% of SMEs' behaviour intentions. Meanwhile, 33% of SMEs' behavioural intentions are influenced by additional predictor factors not explored in this study.



Note: *p-value < 0.05, **p-value < 0.20

Figure 2. Model framework

The findings of the hypothesis testing are shown in Table 2 below. The researcher used the partial least squares method using SmartPLS to evaluate hypotheses to see if they supported them. A 5% significance threshold is typically used, meaning the association must have a p-value of less than 0.05 to be considered significant. To examine and interpret the data, researchers must first assess the importance of all structural model relationships, including the empirical t-value and bootstrapping confidence interval. Table 2 presents the path coefficients' results and their associated probabilities. Based on Table 2, SMEs' behaviour intentions are highly influenced by Normative Isomorphism and Coercive Isomorphism, which partially supports Hypotheses 1 and 3. However, hypothesis 2 was rejected. The path from Mimetic isomorphism to behaviour intention (H2) is insignificant. Besides, with voluntariness as a moderator, only coercive isomorphism was significant, and hypothesis 6 was accepted. Unfortunately, hypotheses 4 and 5 were rejected because the moderator (voluntariness of use) was insignificant for Mimetic Isomorphism and Normative Isomorphism towards SMEs' behaviour intention to use IR4.0 technology.

Table 2. Result of hypothesis testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	Supported
Coercive Isomorphism → Behaviour Intention	0.130	0.133	0.057	2.306	0.021	Supported
Mimetic Isomorphism → Behaviour Intention	0.098	0.094	0.069	1.420	0.156	Not Supported
Moderating Effect - coercive → Behaviour Intention	-0.194	-0.193	0.064	3.024	0.003	Supported
Moderating Effect -mimetic → Behaviour Intention	0.051	0.053	0.057	0.886	0.376	Not Supported
Moderating Effect -normative → Behaviour Intention	0.034	0.032	0.043	0.795	0.427	Not Supported
Normative Isomorphism → Behaviour Intention	0.165	0.170	0.046	3.605	0.000	Supported

5. Discussion

Table 2 demonstrates that SMEs' behaviour intentions are significantly influenced by Normative Isomorphism, Coercive Isomorphism, and voluntariness as a moderator for coercive isomorphism towards SMEs' Behaviour Intention, partially supporting Hypotheses 1, 3, and 6. Unfortunately, mimetic isomorphism did not help the objective of SMEs to implement IR4.0 within the Halal food market. Consistent with Shi et al. (2008) findings, the results indicate that normative and coercive pressures significantly affect attitude and intent to use Internet banking. In contrast, mimetic pressures appear to have no effect. In addition, despite the study on green technology, Berrone et al. (2013) and Latif et al. (2020) indicates that enterprises are more likely to embrace new technology when confronted with coercive pressure from powerful governments and partners. In addition, businesses in a regulated environment are driven by simultaneously complying with the law and preserving their competitive edge following coercive isomorphism (Ye et al., 2013). In the Halal industry, management of Halal

certification is a validation and guarantee of the status of Halal food; failure to comply with this regulation can result in a fine for the violator (Mohd Nawi & Mohd Nasir, 2014). Companies must therefore ensure that laws, regulations, and standards are consistently enforced. Masocha and Fatoki (2018) found that when considering Small Businesses' vulnerability and how excessive government and legal norms have been frowned upon, the role of these non-regulatory coercive elements becomes highly relevant.

Besides that, similar to the findings of Shanmugam et al. (2022), the mimetic isomorphism is not statistically significant. Before replicating their competitors' acts, business leaders must examine the similarities and variations between organizations because each SME may vary in size, assets, and strength. Nevertheless, only coercive isomorphism was deemed relevant for moderator (voluntary use), which supports hypothesis 6, while hypotheses 4 and 5 were rejected. Xia et al. (2021) propose that enterprises are more motivated to deploy green technology when government requirements are flexible and optional. The study is consistent with Moore and Benbasat (1991), who describe the relationship between external environmental influences and the voluntariness of technological adoption. Nevertheless, voluntary information and communications technology usage was not a significant predictor of normative information and communications technology (ICT) use in study why employees engage in voluntary ICT use by Schlachter et al. (2018). The social-normative context was a prevalent subject, with employees admitting that they use ICT because everyone else expects constant availability, calling into doubt the 'voluntary' nature of ICT use. Nonetheless, although mimetic isomorphism did not influence SMEs' adoption of IR 4.0 technology in the Halal Food Industry, this study shows that institutional motivation has a significant potential to influence SMEs' use of IR 4.0. By gaining a deeper understanding of the behavioural intentions of SMEs, it is predicted that these Halal technologies of IR4.0 will yield long-term benefits for SMEs in the Halal food business.

6. Conclusion and Recommendations

6.1. Theoretical implication

The finding has implications both practical and theoretical. Its primary objective is to lay the groundwork for a more thorough understanding of Halal SMEs and the use of IR 4.0 technologies in the business world by developing a conceptual study framework. This study contributes to the literature of earlier research on adopting Institutional in different cultural settings by focusing on the implications for Malaysian SMEs in the Halal food industry. In addition, the moderator employed in the study can close the research gap. The academician can implement the suggested approach generated from the research's findings, and it can serve as a resource for future Halal studies-related research. Thus, this study contributes fresh insights and a practical analytical methodology, particularly in investigating the implications of IR 4.0 technology adoption on Halal SMEs in Malaysia.

6.2. Practical implication

Initially, the Malaysian government has actively pursued Industry 4.0 technologies, as they offer immense prospects to increase productivity in the SME sector. The Halal industry master plan 2030

(HIMP) was developed by Halal Development Corporation (HDC) to facilitate the implementation of Halal traceability services. One of the primary enabling factors is a significant emphasis on Halal innovation through the technological improvement of IR4.0. In addition, this research can assist the Department of Islamic Development of Malaysia and other relevant government bodies in understanding the issues SMEs face when integrating Halal and IR4.0 technologies. Consequently, the government might invest much time and effort to assist SMEs in adopting IR4.0 technologies for their businesses. This research will also provide essential descriptions and explanations for why small and medium-sized enterprises (SMEs) are motivated to apply technology in Halal. With this information, it will be easy to see what factors should be prioritized while implementing Halal standards in the food sector. The findings of this study could enlighten managers and influence their purposeful investment in and use of IR4.0 technology to enhance interactions with internal and external stakeholders.

6.3. Limitations and future research

The boundaries and limitations of each research study should be understood. The first problem was due to the limited sample of respondents, as this survey only included companies primarily located on Malaysia's east coast. The respondents did not represent all SMEs in Malaysia's Halal food and beverage sectors. Consequently, the outcomes may have differed if respondents had come from all around Malaysia. This study's sample was also limited to small and medium enterprises in the Halal food industry. As a result, the current study's findings may only be representative of some small and medium enterprises involved in Malaysia's Halal food industry. Thus, future researchers can repeat the framework for a more general setting of Malaysia's food and beverage industry.

7. Conclusion

In summary, this research aims to investigate the Institutional Motivation factor of Small and Medium Enterprises in using IR 4.0 technology in Halal Food Industry in East coasts Malaysia. This study utilizes an institutional model with voluntariness as a moderator as an addition to the topic of the study. Furthermore, this study investigated and addressed instrument validity, reliability, and data normalcy in structural equation modelling. Lastly, the findings revealed that coercive and normative isomorphism substantially impact Small and Medium Enterprises using IR 4.0 technology in Halal Food Industry in East coasts Malaysia. In addition, the voluntariness of use can affect coercive isomorphism toward Small and Medium Enterprise's behaviour intention in using IR 4.0 technology.

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