The adoption of halal food supply chain towards the performance of food manufacturing in Malaysia

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C H R O N I C L E	**A B S T R A C T**
	Halal industry in Malaysia provides a great opportunity for food manufacturers to expand their businesses, globally. However, the business has faced with some difficulties to improve performance due to complexity in halal supply chain. This paper studies the adoption of halal food supply chain (HFSC) factors on business performance among halal food manufacturers in Malaysia. Data were collected randomly from Halal Development Council (HDC) directory website. Using regression analysis, 103 responses were analyzed to determine the effects of adoption factors of HFSC on business performance. The results indicate that the context of technological, organizational and environmental can improve business performance of halal manufacturer. Perceived benefits in the context of technological gives the best predictor on business performance. In the context of organizational, readiness provides the best predictor of business performance. Meanwhile, halal market demand in the context of environmental gives the best predictor of business performance. The paper examines business performance in food industry; however other industries in halal are not focused. The results provide some insights into business performance among halal industry in Malaysia.

1. Introduction

Malaysian food industry is characterized with its cultural diversity derived from multicultural societies, which offer various types of food products with Asian preferences. The industry is mostly owned by Malaysians, made up of small and medium enterprises (SMEs). Besides, SMEs, international companies and well-known multinational giants manufacture a wide range of food products in Malaysia. While exports of food processing for Malaysia totaled RM18.0 billion in 2015, imports amounted to RM17.8 billion (Malaysian Investment Development Authority, 2018). Additionally, food processing SMEs is the biggest of the Malaysian SMEs' main stream whereby they assume an imperative part in maintaining financial development to accomplish a created nation status by 2020 (Bhuiyan et al., 2017). Moreover,

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SMEs are one of the main catalysts for economic growth in Malaysia whereby they become a medium to drive halal business.

Halal products in this country are no longer restricted to just food and beverages. Malaysia over Malaysia External Trade Development Corporation (MATRADE) are pushing for the improvement of huge value segments for example medical, health and pharmaceuticals to be a leader widely using halal as an incentive. Innovation is another offer that must be investigated by Malaysian halal industry to contend comprehensively. Moreover, halal industry provides immense opportunities for Malaysian food manufacturers whereby estimated value market of halal is at 544 billion dollar a year (Alam, 2010). Halal may remain incorporated of various businesses in sectors of halal supply chain. The business starts from the roots of raw materials to packaging and logistics. Meanwhile for adopting halal as a way of life, the practitioners should apply the absolute principles of Halalan Toyyiban (Malaysia External Trade Development Corporation, 2017).

The halal food products have turned out to be progressively popular among consumers globally, as the idea of halal is related with good, healthy, safe and high quality assessment. In other words, the halal food industry ought to have the capacity to ensure and certainly guarantee the halalness of foods sold (Fathi et al., 2016). However, entrepreneurs do not seriously picture the significance of halal and its power to attract consumers in which even MATRADE encourages halal entrepreneurs to utilize technology to enhance productivity and quality (Bernama, 2017; Jari, 2014). Moreover, most of them are still reluctant to apply for halal certification (Jari, 2014) due to effort and cost of certified halal, it could motivate players not to adopt halal supply chain (Ngah et al. 2017). Additionally, Talib et al. (2015) identified critical success factors in halal supply chain; however the study did not evaluate organizational performance. Moreover, Talib et al. (2014) evaluated critical success factors of quality management among food industry in Malaysia and suggested to evaluate organizational performance in that area. This study, by far, is the underlying exertion to examine adoption of halal food supply chain (HFSC) on the business performance of halal manufacturer.

1.1 Halal food supply chain

Ironically, supply chains serve the key objectives through dependent value processes. Therefore, commercial enterprises continuity and sustainable commercial enterprise performances are going to be competitive (Salam et al. 2017). Olson and Dash Wu (2010) stated that supply chains can be pictured as the first levels with significant participation in goods and services delivery; and the secondary level contributors include indirect participations. In the meantime, process over halal supply chain is applied as similar as the conventional supply chain processes; however it must embed accordingly towards the general principles in the Shariah law (Omar et al. 2013). Whereas halal is embed in the supply chain; hence it starts from the root to the point of consumption (Omar & Jaafar 2011). However, halal product still do not guarantee to secure authentic halal at the area of consumption without utilizing halal supply chain services (Ngah et al., 2014).

Meanwhile, HFSC includes the process of handling halal output from various angles of suppliers to various angles of buyers/consumers, which includes a number of exclusive parties, who are positioned at different areas, and might also at the same time, required along handling non-halal food products, with the reason of satisfying the needs and specification of both (halal and non-halal) consumers (Zulfakar et al., 2014). The process is involved in warehousing, sourcing, transportation, handling product, inventory management and procurement & order management. Omar (2017) mentioned HFSC must comply general Shariah law in all activities including transportation, sourcing, handling of output, warehousing, inventory management, order management, marketing and procurement. Halal supply chain management chain is crucial whereby the players can improve a business performance and satisfy consumers' demand by outputs supply, information and services that are in a manner conforming with Shariah (Talib et al., 2015). A study by Talib et al. (2017) proved HFSC had positive relationship with business performance.

However, halal supply chains complicated supply chains along vulnerabilities up to expectation necessity to remain addressed thru well organized, robust, effective and efficient halal supply chain (Tieman, 2014). Quality attributes, maintaining integrity, avoid doubt, lack of control of food norms, and sensitivity of the Muslim consumers in the direction of halal make halal supply chains complicated to design, manage, and optimize the supply chain of halal food industry (Tieman & Darun, 2017).

2. Theoretical framework of the study

Theories of adoption are pointed at perceiving, describing, or predicting why, how, and in conformity with as extent practitioners will adopt and undertake modern technologies or change processes of behavioural (Hameed et al., 2012). The background of theoretical emerges by dual streams of theoretical in innovation management; the Diffusion of innovation (DOI) and Technology-Organizational-Environmental (TOE) Framework. While DOI describes the factors have an effect on individuals' decision to adopt and undertake the use an innovation (Mohammed et al., 2016; Rogers, 2002), TOE is characterized in three structure groups to determine the adoption of innovations; technology context, organizational context, and environmental context (Mohammed et al., 2016).

A study by Ngah et al. (2017) found that customer pressure, organizational readiness and perceived benefits were associated with intention to adopt halal warehousing services and those factors were recognized as the drivers of adoption. Moreover, Azmi et al. (2018) identified halal standards adoption factors in perspective Malaysia's practices whereby technological context contained of compatibility and perceived benefits, organizational context contained of supporting management, halal integrity, halal awareness, expected business benefits and organisational readiness. Meanwhile, in the context of environmental consists of supporting by government, competitor's pressure, consumer's pressure and market orientation. The study applied TOE framework to identify and determine adoption factors of halal practises in Malaysia industries. Fig. 1 shows adaptive theoretical framework from Ngah et al. (2017) and Azmi et al. (2018) studies.
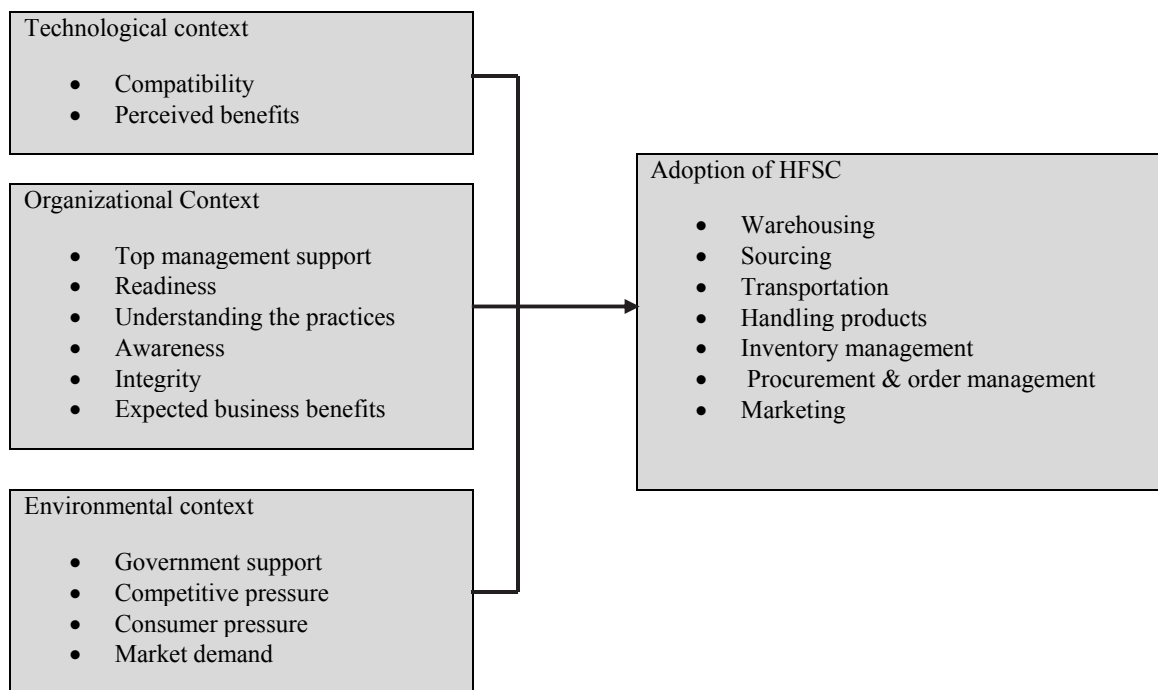

Fig. 1. Adaptive theoretical framework by Azmi et al. (2018) and Ngah et al. (2017)

Moreover, in terms of measurements of the performance, the study selects appropriate indicators, which focus on food industry. Bakar et al. (2014) and Ambali and Bakar (2014) proposed that business performance can be measured by growth of sales in the enterprises. Additionally, Bhuiyan et al. (2017) stated that sales turnover has significant relationship with food product innovations of small and medium enterprises. This is a new approach, which examines halal food industry business performance in the context of adoption approaches.

Premkumar (2003) argued that there are very few studies that have examined the impact of technological characteristics in the context of small businesses. In addition to focusing on particular technological factors, the organizational factors also may impact on the process of innovation adoption in an organization. The role and effect of environmental factors influencing organizational adoption decision have been highlighted by Orlikowski (1992). According to Lertwongsatien and Wongpinunwatana (2003), environment is recognized in the innovation literature as an influential factor in the adoption of new innovation for an organization. Therefore, the study proposed three (3) hypotheses whereby technology factors have positive and significant effect on business performance (H_1), organization factors maintain positive effect on business performance (H_2), and environment factors have positive effect on business performance (H_3). Meanwhile, Fig. 2 shows the research model to examine each adoption factors towards business performance.
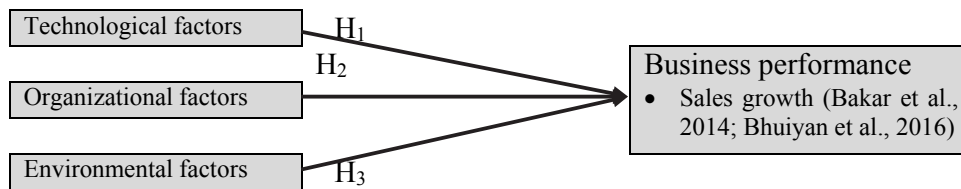

Fig. 2. Research model

3. Methodology

The present study used a convenience sample in which data were collected from the companies which were available and accessible to the researchers. Convenience sampling is an accumulation of data from individuals of the population who are advantageously accessible to access (Kumar et al., 2013). Hence, this technique is suitable when frameworks are unavailable or population is so extensively dispersed that cluster sampling would be too inefficient (Vaus, 2002). Furthermore, Bryman (2008) and Bryman and Bell (2015) assured that this method is frequently used in social research and very commonly used in the field of organizational studies. Although non probability sampling was applied in this research, the researcher observed every response online, hence, the number of responses for each characteristic were closely monitored. The study used e-mail survey as suggested by Ngah et al. (2017). In this case, the most convenient way to find the sampling unit was to visit HDC directory website to obtain data such as full address, the name of the company, type of industry, email address, telephone number and contact person. The study demonstrates primary data to answer all research objectives by employing causal research study whereby a total 103 respondents took part in the survey. It is recognized as explanatory study where the aims of this study approach is to obtain evidence effect of relationships (Malhotra, 2007).

3.1 Operational constructs

Practically, the study operationalized quantitative method utilizing a survey to obtain information from respondents. A questionnaire is an instrument of the survey method of this study to obtain information from halal food manufacturers in Malaysia. The questionnaire contained in five (5) sections: section one (1) of demographic profile of company, section two (2) of technological factors, section three (3) of organizational factors, section four (4) of environmental factors, and section five (5) of business performance.

Table 1
Construct of questions

Constructs		Items	No. of items	References
Technological context	Compatibility (Question no. 8)	• My company is likely to adopt new innovation on the products and processes of Halal Standard • Business and process of my company has aligned to Halal Standard. • The new procedure related to Halal Standard is suitable with my company's existing practices.	3	(Ngah et al., 2014a; Tan et al., 2012)
	Perceived benefits (Question no. 9)	• By implementing Halal Standard, we feel that our production control will improve. • By adopting Halal Standard, we feel that market share will increase. • By adopting Halal Standard, we feel that quality of the product will improve.	3	(Ngah et al., 2014b; Tan et al., 2012)
Organizational context	Top management support (Question no. 10)	• Our top management is likely to be interested in adopting a Halal Standard in order to gain competitive advantage. • Our top management would like to invest some budget to support and implement Halal Standard. • We feel that our top management is really concerned on the importance of implementing Halal standard.	3	(Fernando et al. 2015; Ngah et al. 2014b)
	Organizational Readiness (Question no. 11)	• Our employee has understood the Halal Standard. • Our company understands the real situation of the business related to Halal Standard. • Our company is ready to re-align companies' policies and strategy in order to implement HS.	3	(Ngah et al. 2010)
	Understanding the Practices (Question no. 12)	• Our companies fully understand the circular of HS. • Our company is ready for new policies and practices related to implementation of the Halal Standard. • Our company understands the legal aspects to ensure halal practices are done according to Shariah principles required by regulatory authority (eg: JAKIM).	3	(Alam et al. 2012; Marzuki et al. 2012; Mukherjee & Romi, 2014)
	Halal Awareness (Question no. 13)	• The increase of consumer awareness related to Halal, leads my company to adopt Halal Standard. • The aspects of hygiene, sanitation and safety lead my company to adopt Halal Standard. • Halal concept triggers Muslim consumers to preferably consume product based on Shariah principles.	3	(Alam et al. 2011; Zailani et al. 2015)
	Halal Integrity (Question no. 14)	• The aspects of morality and religiosity lead my company to adopt Halal standards. • Building trust towards consumers. • Halal product has strong relationship with consumer needs.	3	(Alam et al. 2011; Zailani et al. 2015)
	Expected Business Benefits (Question no. 15)	• Adopting Halal Standard gives more profits to my business. • Halal Standard gives the competitive performance of the firms. • To sustain business for the long run.	3	(Alam et al. 2011; Zailani et al. 2015)
Environmental context	Government Support (Question no. 16)	• Provides financial assistant and support. • Provides enough available infrastructures. • Government has appropriately support the Halal business.	3	(Manzouri et al., 2013; Tan et al., 2012; Zailani et al., 2015)
	Competitive Pressure (Question no. 17)	• We feel that we will lose customers to our competitors if we do not adopt Halal Standard. • We feel that is a strategic necessity to adopt Halal standards in order to compete in the existing marketplace. • We feel that our firm will have to sustain their business if we implement Halal Standards.	3	(Manzouri et al., 2013; Tan et al., 2012; Zailani et al., 2015)
	Consumer Pressure (Question no. 18)	• The consumers are confident that Halal food fulfils the hygiene, sanitation and food safety. • Consumers require our firm to operate based on Halal requirements. • Believing perception leads to attitudes of the consumers.	3	(Manzouri et al., 2013; Tan et al., 2012; Zailani et al., 2015)
	Halal Market Demand (Question no. 19)	• High demand of Halal food leads our firm to adopt Halal Standards. • Halal market product has a wide growth with a high prospect in current and future market. • The Muslim communities require and emphasize the Halal product to be certified by JAKIM.	3	(Manzouri et al., 2013; Tan et al., 2012; Zailani et al., 2015)
Business performance	Sales Growth (Question no. 20)	• Adopting of halal food supply chain will increase in sales turn over. • Adopting of halal food supply chain will increase in local market sales. • Improved sales efficiency.	3	(Japanese-Affiliated Firms in Asia and Oceania, 2009; Omar, 2017)

The study applied multiple-choice questions to obtain demographic profiles. Malhotra (2007) stated that multiple-choice questions are used to select one or more of the alternatives are given. For adoption of factors of HFSC, five point Likert-type scale was utilized to rate the responses to the questions because it can capture all the required data about attitudes (Bryman, 2008; Bryman & Bell, 2015), and enhance the comparability of answers. In addition, the Likert-scale ranged from one (1) which means "Strongly Disagree" to five (5) which means "Strongly Agree". Construct of questions are presented in Table 1.

3.2.1. Data analysis procedure

The study applied reliability to test the stability and consistency of the adoption factors including technological factors, organizational factors and environmental factors. One of the most frequently used reliability coefficients is Cronbach alpha value. The higher the correlation coefficient of Cronbach alpha value, the greater the reliability (Malhotra, 2007). Sekaran and Bougie (2016) stated that Cronbach's alpha is a reliability coefficient that shows stability of the items in a set with positive correlation to one another. A Cronbach alpha greater than 0.60 is commonly accepted for exploratory research to show the reliability for the measurement even though a value greater than 0.70 is more preferable (Bagozzi, 1994). Meanwhile, regression analysis is a statistical process in synthesizing associative relationships between a metric dependent variable and one or more independent variables (Kumar et al. 2013; Malhotra 2007). Regression analysis is utilised to discover the correlations between two or more variables having cause-effect relations, and to formulate predictions by using the relation (Uyanık & Güler, 2013). The study applied regression analysis to examine adoption factors of HFSC can be predicted on business performance.

4. Analysis and findings

4.1. Demographic profile analysis

Table 2 illustrates the results from 103 respondents of the study. The majority of the company owners were the Bumiputra with 68 companies and for Non-Bumiputra with 35 companies.

Table 2
Respondents profile

Characteristics	No. of respondents N=103	Percentage (%)
Status of ownership		
Bumiputra	68	66.0
Non-Bumiputra	35	34.0
Numbers of Employee(s)		
Less than 5	12	11.7
Between 5-75	78	75.7
Between 75-200	13	12.6
Sales turnover		
Less than RM 300,000	30	29.1
Between RM 300,000 - RM 15 Million	71	69.0
Between RM 15 Million - RM 50 Million	2	1.9
Year of business started		
Below 2000	42	40.8
2001-2005	26	25.2
2006-2010	26	25.2
2011- 2015	9	8.7
Business location		
Negeri Sembilan	17	16.5
Wilayah Perseketuan Kuala Lumpur	17	16.5
Kedah	16	15.5
Johor	11	10.7
Wilayah Perseketuan Labuan	11	10.7
Kelantan	5	4.9
Sarawak	5	4.9
Selangor	5	4.9
Melaka	4	3.9
Perak	4	3.9
Terengganu	3	2.9
Sabah	2	1.9
Pahang	1	1.0
Pulau Pinang	1	1.0
Putrajaya	1	1.0

The highest number of employees was in the range of 5-75 calculated by 75.7%. Lastly employees less than 5 was calculated as 11.7%. The highest group of the years of business started from 40% of companies (42 company) starting the business in year below 2000. This is followed by years of starting business between 2001 and 2005, with 26 companies. Range of year of starting business was from 2011 to 2015 with 18 companies. The results showed that the majority of respondents were located in the Wilayah Perseketuan Kuala Lumpur and Negeri Sembilan area with 17 companies (16.5%), followed by Kedah with 16 companies. Area in Johor and Wilayah Perseketuan Labuan was calculated as 10.7% or 11 companies. Kelantan, Sarawak and Selangor accommodated 5 companies. Melaka and Perak showed respectively 4 companies with calculated 3.9%. Terengganu area showed 2.9% respondents which calculated 3 companies, followed by Sabah which is calculated 1.9% with 2 companies' responses. Lastly, area in Pahang, Pulau Pinang and Putrajaya showed the lowest response of 1.0% with 1 company.

4.2. Reliability test

The study performed reliability analysis before proceed a further steps of analysis (see Table 3). A Cronbach alpha greater than 0.60 is commonly accepted for exploratory research to show stability of the measurement even though a value greater than 0.70 is more recommended (Bagozzi, 1994).

Table 3
Cronbach's Alpha test result

Construct	Items	Cronbach's Alpha (N=103)
Technological factors		
Compatibility	3	0.791
Perceived benefits	3	0.733
Organizational factor		
Top management support	3	0.708
Readiness	3	0.734
Understanding the practices	3	0.653
Awareness	3	0.827
Integrity	3	0.775
Expected business benefits	3	0.722
Environmental factor		
Government support	3	0.750
Competitive pressure	3	0.607
Consumer pressure	3	0.666
Market demand	3	0.716
Business performance	3	0.706

4.3. Multi linear regressions

Regression analysis was utilized to analyze the effect of adoption factors of HFSC (independent variable) on their business performance. Table 4 illustrates three (3) combinations adoption factors of HFSC which is technological, organizational and environmental. The R-square (R^2) for technological factors showed 0.432, which indicates that 43.2% of the variance in the business performance can be predicted from the association of all independent variables in technology factors. Regression analysis found that factors of technology played important roles in influencing business performance in HFSC. Technology factors contribute to improved business performance ($\beta=0.657$, p=0.000). Therefore, H_1 is supported by the analysis whereby a technology factor has positive significant relationship with business performance of halal manufacturers.

Moreover, R^2 for organizational factors showed 0.549, which indicates that 54.9% of the variance in the business performance can be predicted from association of all independent variables in organization factors. The study indicates organizational factors played important roles in influencing business perfor-

mance in HFSC. Organizational factors (β=0.741, p=0.007) contribute in business performance, significantly. Thus, H_2 is supported whereby an organizational factor has significantly positive relationship with business performance of halal manufacturers.

R^2 for the environmental factors is calculated as 0.507, which means that 50.7% of the variance in business performance can be predicted from association of all independent variables in these factors. The study found that environmental factors played important roles in influencing business performance in HFSC. Thus, environmental factors (β=0.712, p=0.000) contribute in business performance for halal manufacturers. Therefore, H_3 is supported by the analysis whereby an environmental factor has significantly positive relationship with business performance.

Table 4

Result of Multiple Regression Analysis (N=103)

Variables	Constant	Unstandardized coefficient (B)	Standardized coefficient (β)	p-value	R-square (R^2)
Technological factors	1.184	0.685	0.657	0.000*	0.432
Organizational factors	0.452	0.866	0.741	0.000*	0.549
Environmental factors	0.906	0.806	0.712	0.000*	0.507

significant at 0.05 level; dependent variable = business performance

Table 5

Analysis of constructs

Constructs	Model	Unstandardized coefficient (B)	Standardized coefficient (β)	p-value	R-square (R^2)
Technological					
Compatibility	1	0.144	0.143	0.219	0.450
Perceived benefits		0.527	0.555	0.00*	
Organizational					
Top management support		-0.037	-0.038	0.757	
Readiness		0.325	0.311	0.007*	
Understanding the practices	2	-0.089	-0.084	0.500	0.578
Awareness		0.150	0.153	0.386	
Integrity		0.236	0.207	0.176	
Expected business benefits		0.296	0.293	0.029*	
Environmental					
Government support		0.081	0.128	0.077	
Competitive pressure	3	0.054	0.053	0.604	0.577
Consumer pressure		0.153	0.145	0.196	
Market demand		0.580	0.542	0.000*	

significant at 0.05 level; dependent variable = business performance

Table 5 demonstrates the R-square (R^2) for technological factors showed 0.450, which means that 45% of the variance in the business performance can be predicted from the association of all independent variables in technology factors. Regression analysis indicates that perceived benefits played important roles in influencing business performance in HFSC. The significant variables that explained business performance are perceived benefits (β=0.55, p=0.000). However, compatibility of technology has no significance in business performance in HFSC. Moreover, R^2 for organizational factors showed 0.578, which means that 57.8% of the variance in the business performance can be predicted from association of all independent variables in organization factors. The results indicate that organizational readiness and expected business benefits played important roles in influencing business performance in HFSC. It has explained business performance influences on organizational readiness (β=0.311, p=0.007) and expected business benefits (β=0.293, p=0.029). Meanwhile, top management support, understanding the practices, awareness and integrity has no significance on business performance in HFSC.

R^2 for environmental factors calculated 0.577, which means that 57.7% of the variance in business performance can be predicted from association of all independent variables in these factors. The study found that halal market demand played important roles in influencing business performance in HFSC. This significant variables that explained business performance are halal market demand (β=0.542, p=0.000). Meanwhile, government support, competitive pressure and consumer pressure have no significance in business performance in HFSC.

5. Discussion and implications

Findings have indicated that an adoption factor about perceived benefits of technology is the best predictor of business performance in HFSC. Moreover, organization readiness and expected business benefits are the organizational adoption factors and they are the best predictors of business performance in HFSC. Lastly, adoption factor about halal market demand of environmental factors is the best predictor of business performance in HFSC. The technology context played important roles in order to adopt halal food supply chain. The player seeks perceived benefits of technology to improve the business in adoption of HFSC. The Star reported, Technology can bring local practitioners added extra value to halal products, which are recognized as high level of integrity in cleanliness and quality, the operation business maintains positive impact to the firms (Malaysia External Trade Development Corporation, 2017; Ravindran, 2017). According to the study, the players believed the technology will help them influence on their business specifically on sales growth. Moreover, organizational context in this study has found readiness of the organization and expected business benefit the players to adopt halal in supply chain in order to improve their business performance. According to Jasma et al. (2011), organization readiness is a way the company solves the problem in the network. The capability of the players finds solution in the supply chain to improve their performance. Additionally, the players realized a big screen in halal potential whereby its adoption of halal gives benefits to the business. According to HDC's report the global Muslim population is projected to increase about 27% percent of the world's total population by 2030 and halal exports are set to contribute higher by 2020 (The 15th Malaysia International Halal Showcase, 2018). The players can adopt the halal products in their supply chain according to the big potential in halal business. In the context of environmental, the study found market orientation drives the players to adopt halal in their food supply chain. Bernama (2018) reported, globally, the population of Muslim has grown 18% during the last 10 years compared to the global growth of 11% and this increases the value of demand for halal food and within Asia regions, non-Muslim majority countries, such as Philippines and Singapore, which are significant markets for halal drinks and packaged food, at 1.4 billion dollar and 7.5 billion dollar, respectively, partly appropriate to the acceptance of halal products in general society and incorporation. Due to huge market of halal, the study obtained positive results on their business performance specifically on sales growth. A study by Zailani et al. (2015) stated halal demand could make a considerable impact concerning halal orientation approach amongst halal food firms.

6. Constraints and future studies

Particular constraints need to be viewed for generalizing the output of this study. One constraint is that the study tested with small amount of sample. Therefore, the sample is limited to examine the relationship between adoption factors and HFSC performance. Moreover, the study is limited to the halal food firms only. The study should extend to others sectors such as food and beverages, pharmaceuticals, cosmetics, travel & tourism, logistics, finance and e-commerce. The study also should picture others dimensions of performance measurements such as quality, time, flexibility, customer satisfaction, human resources and etc.

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