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Intention to adopt Industry 4.0 technologies among small and medium enterprises in the Malaysian dairy manufacturing industry

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Abstract

Small and medium enterprises (SMEs) are one of the key economic growth engines which play vital roles in Malaysia's economy. In the manufacturing sector, SMEs are considered the backbone of industrial development. Presently, the dairy manufacturing industry is one with high potential. Technology is one of the enablers that can assist companies to improve their performances. Presently, SMEs are still hesitant to embrace and adopt new technology. The fundamental objective of this study was to identify the determinants of the intention to adopt Industry 4.0 technologies among SMEs in Malaysian. Data were collected from 114 managers of Small and Medium Enterprises (SMEs) and was analysed using SPSS. The findings from multiple regression revealed that the intention of SMEs to adopt Industry 4.0 Technologies was positively influenced by perceived usefulness (PU), perceived ease of use (PEU), subjective norm (SN), perceived behaviour control (PBC) and attitude (Att). Attitude had partial mediation effects on both relationships between PU and intention. It also has relationships between PEU and intention in adopting Industry 4.0 Technologies. The paper concludes and supports the assumptions of two theories - Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM). This study contributes to enhancing managers and higher authority of SMEs in deciding the future course of their manufacturing firms and policymakers in mapping out plans for Malaysian SMEs in the dairy manufacturing industry.

1. Introduction

The concept of Industry 4.0 was a daring initiative originally put forward by the German government in 2011, intended to allow industrial production of goods to experience the conspicuous key impact of the modern-day global undertaking. Industry 4.0, as a visionary idea, has already served as means for present-day global interconnectivity through recent changes created by the development of information and communications technologies (ICT). The advancement in ICT technologies has been supported by the Internet of Things (IoT) and Internet of Services (IoSs), that connect and interconnect industrial activities based on supply chain networks and cyber-physical systems (CPS) which have encouraged greater output from industrial operations (Kagermann *et al*., 2013; Müller *et al*., 2018).

In Malaysia, small and medium enterprises (SMEs) have made significant and relevant contributions to the economic development and growth of the country by encouraging or enhancing the production of goods of high value (Ghobadian and Gallear, 1996; Chen *et al*., 2009). As of January 1, 2014, SMEs have been categorised in two forms: manufacturing and services and other sectors (referring to firms with turnover sales of not more than RM20 million or full-time staff strength of 75) (SME Corporation of Malaysia annual report, 2013). According to the Malaysian Standard of Industrial Classification (MSIC, 2008), the dairy food and beverage manufacturing sector contributes approximately 10% of Malaysia's manufacturing output (DOS, 2011). In 2011, the industry consisted of 6,016 SMEs, which was the second-highest in number of SMEs in the manufacturing sector (DOS, 2011). Based on statistics, the dairy, food and beverage industry is highly important in enhancing the quality of life. SME entrepreneurs have always been trying to create and explore opportunities to adopt Industry 4.0 Technologies

among SMEs in an attempt to increase the quality of food and beverage products.

According to the Third Malaysian Industrial Master Plan (IMP3), the dairy manufacturing industry is not comparatively vulnerable to world economic changes. It was projected that the value of US$3.5 trillion of the worldwide retail sales in food and beverage items was anticipated to experience an annual growth rate of 4.8% to US$6.4 trillion in 2020 (MITI, 2006). The Malaysian SMEs experienced shortcomings in having low access to finance, low adoption of current technology, being deficient in managerial abilities, financially incapable and having low productivity. Nevertheless, the involvement of SMEs in improving trade and industry position was unrivalled (Hashim, 2007, Chelliah *et al.*, 2010). Therefore, as a means to closing up the gaps, the main objective of the present study is to determine the level of intention to adopt Industry 4.0 technologies among SMEs in the Malaysian dairy manufacturing industry.

2. Methodology

2.1 Conceptual framework and hypotheses development based on theoretical foundations

Technology Acceptance Model (TAM) revealed that more than 51% of the variance in behavioural intention was adopted as a part of technology usage (Davis *et al.*, 1989). In a meta-analysis on TAM based on 88 available studies, King and He (2006) revealed that the Technology Acceptance Model (TAM) was strong and effective. Researchers in technology adoption studies have documented that target users' acceptance of technology mostly adopted TAM (Davis *et al.*, 1989; Baker-Eveleth *et al.*, 2006; Kim and Bonk, 2006; Davis and Wong, 2007; Goeke and Faley, 2007; Lin, 2008; Alshare *et al.*, 2009; Ha and Stoel, 2009; Lin and Chou, 2009). TAM can create empirical assistance in order to ascertain the behavioural factors contributing to the intention to adopt ICT by the users (Agarwal and Prasad, 1999). TAM comprises the causal relationship between perceived ease of use (PEU), perceived usefulness (PU), attitude (AT), and behavioural intention (BI). The model posits that PU and PEU are the main factors that affect BI, which is explained by AT. Also, TAM suggests that many peripheral variables like user traits and organizational elements can influence PU and PEU. Again, the peripheral variables tend to affect BI by swaying beliefs (PU and PEU) and AT, which then have an impact on actual behaviour. Based on the related literature, the present study has adopted TAM variables. The independent variables are perceived ease of use (PEU) and perceived usefulness (PU); the dependent variable is the intention to adopt industry 4.0 (II)

technologies; while attitudes (AT) acts as a mediator to evaluate the impact of the adoption and usage of ICTs by small and medium dairy farms. The respondents were asked about their opinion on attitude, subjective norms, perceived behavioural control, perceived usefulness, and perceived ease of use. The five-point Likert scale was used for independent variables. And Seven-point Likert scale was used for dependent variable (Intention).

The Theory of Planned Behaviour (TPB) which is an offshoot of the Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen in 1975. The TRA is a basic theory for measuring social normative views and behaviour which, in a particular manner ensures an intention to execute a behaviour (Montano and Kasprezyk, 2002). TPB evolves based on the norm of aggregation. It focuses on the gathering of a particular behaviour from different circumstances in order to predict attitudes and other qualities; TPB emphasises discrete motivational factors within distinctive situations to justify the broad behavioural pattern (Ajzen, 1991). The assumption is that intentions are based on the motivational factors that impact behaviour, which, suggests that an intention is a predictive element behind the determination of the level of commitment to work by an individual as well as the degree of energy one is willing to put in, to execute a behaviour (Ajzen, 1991). A normative faith is an individual's opinion of social normative stresses, as well as those of others (i.e. a father, mother, spouse, sibling, nurse, or confidant) that he or she can implement the behaviour (Ajzen, 2011). Subjective norm is a person's own opinion about a specific behaviour and the power of motivation to obey or to agree, with the belief systems of others (Ajzen, 2011). These linkages are shown in Figure 1.
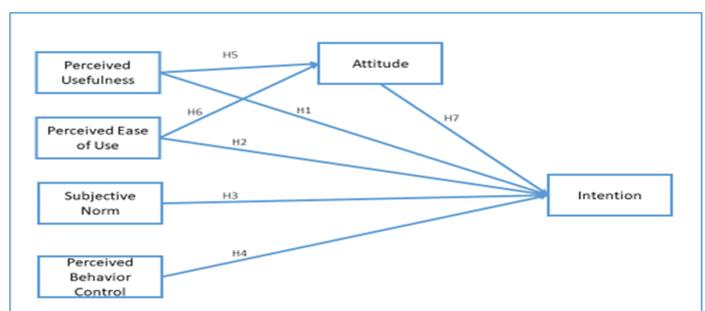

Figure 1. Research model

In line with TAM, the presumption is that perceived usefulness (PU) is the extent to which small and medium dairy firms believe that using ICTs would improve their enterprises' activities in the manufacturing industry. However, many research efforts have shown that intentions to engage IT systems were supported strongly by PU (Davis and Venkatesh, 2004; Kim *et al.*, 2009; Loo *et al.*, 2009; Wang and Wang, 2010; Teo and Noyes, 2011; Sentosa and Mat, 2012). King and He (2006)

revealed that a strong relationship exists between PU and behavioural intention (β = 0.51, 95% CI = 0.46–0.55). Based on findings from past studies, the following hypothesis was proposed:

H1: Perceived Usefulness has a positive impact on intention to adopt Industry 4.0 ICT technologies.

According to Davis (1989), the second determining element of technology acceptance with respect to TAM is PEU. The PEU is the level to which small and medium firms believe that the adoption of ICT brings about more comfort than other systems, thus, the expectation of its acceptance by other firms within the industry. Nevertheless, Gefen and Straub (2000) assert that there is a positive effect of PEU on intention to use technology. Meanwhile, results from other researchers have attested to the fact that PEU impacts on usage of an IT system (Cater-Steel and McBride, 2007; Bhattacherjee and Hikmet, 2008; Loo *et al*., 2009; Teo and Noyes, 2011; Sentosa and Mat, 2012). Therefore, the following hypothesis is proposed.

H2: Perceived ease of use has a positive impact on intention to adopt Industry 4.0 ICT technologies.

Subjective norm refers to a person's opinion in relation to an agreement or disagreement with the behaviour substantially by others (Fieshbein and Ajzen, 1975; Ajzen, 1991). Subjective norms are a function of normative beliefs and motivation to agree with the belief systems. Nevertheless, the subjective norm is influenced by various groups such as friends, colleagues and family. Nonetheless, based on TRA and TPB, the subjective norm is a direct cause of behavioural intention (Ajzen, 1991; Hagger *et al*., 2002; Davis and Venkatesh, 2004). However, some research has reported that subjective norm and intention have no direct relationship (Davis *et al*., 1989). In a collectivistic culture like in India, the social norm is an important means for assessing a person's life. Accordingly, society significantly recognises a relationship as the emotional part of the decision making in contrast to the rational cost-benefit analysis. Based on the literature, the third hypothesis is:

H3: Subjective norms have a positive significant effect on the intention to adopt Industry 4.0 ICT technologies.

Perceived behavioural control (PBC) is a person's view in relation to the simplicity or strain in carrying out the behaviour of interest, based on the existence or lack of basic resources and prospects (Ajzen, 1991). An upsurge in the means (time, money) will create the emergence of better-perceived control in a specific behaviour (Ajzen, 1991). PBC valuation relates to an entire set of control beliefs that are about the availability of elements that may enhance or prevent the execution of

behaviour. Studies have shown that PBC and intention have a positive relationship (Taylor and Todd, 1995; Downs and Hausenblas, 2005). Therefore, with the availability of the required resources, a firm is likely to exhibit a greater confidence level of capability, thus, the likelihood that it will show a positive effect towards using Industry 4.0 technologies. On the strength of the above literature, the fourth hypothesis is:

H4: Perceived Behavioural Control has a positive impact on intention to adopt Industry 4.0 ICT technologies.

Both the TPB and TAM have shown that attitude is an essential antecedent to intention when it comes to developing a particular behaviour. According to Fishbein and Ajzen (1975), attitude can be defined as a multi-dimensional construct. But the study used a uni-dimension construct. According to the present study, it was expected that attitude facilitates transactions and serve to reduce barriers toward the adoption of innovation (Pavlou, 2002; Liébana-Cabanillas *et al*., 2014). Attitude is expected to favour the intended use of Industry 4.0 technologies (Saghafi *et al*., 2017). According to the above, the research has proposed the following hypothesis:

H7: Attitude has a positive effect on the intention to adopt Industry 4.0 ICT technologies.

The adoption of ICT by small and medium firms is with respect to intention to use, which ICTs established the belief by the firms in relation to usefulness and ease of use. TRA gave birth to TAM (Fishbein and Ajzen, 1975), thus, the belief that PU and PEU are fully mediated by AT in relation to technology. Besides, the empirical studies by Davis *et al*. (1989), allow for re-definition of TAM with the omission of AT due to partial mediation effect on BI by AT, a weak direct association between PU and AT, and a strong direct relationship between PEU and BI (Venkatesh and Davis, 2000). However, for evolving the theoretical background, emphasis was on the concept of AT strength and acceptance of studies on the relevance of technology. Therefore, the research suggests that:

H5: Attitude mediates the relationship between perceived usefulness and intention to adopt Industry 4.0 ICT technologies.

H6: Attitude mediates the relationship between perceived ease of use and intention to adopt Industry 4.0 ICT technologies.

2.2 Definitions of terms

Perceived usefulness is again described as the amount an individual think to improve his/her work

output using a given scheme (Ochola, 2013). Perceived Ease of Use is the degree to which a person believes that the use of a particular technology will be free of effort is defined as perceived ease of use (PEU) (Davis, 1989). Subjective Norm refers to the conviction that other important individuals think that he or she is going to conduct. It concerns an individual's perception of his or her social environment (Netemeyer *et al*., 1991). Perceived Behavioral Control (PBC) relates to the perception by the individual of how simple or hard conduct output is (Ajzen, 1991). It increases when people perceive that they possess more resources and trust (Netemeyer *et al*., 1991). Attitude refers to the extent to which a person has positive or negative behavioural feelings. The results of conduct are taken into account (Netemeyer *et al*., 1991; Yusliza and Ramayah, 2011). Intensions are variables, which capture how difficult people would be willing to conduct behaviour (Azjen, 1991). The intention is also a third-party service indicator for behaviour. It is the motivating factor of an individual in the context of his or her purposeful plan or course of action to perform a certain activity (Conner and Armitage, 1998).

2.3 Sample size and sampling procedure

A structured questionnaire was constructed, printed and distributed to prospective respondents (managers or owners of SMEs' dairy manufacturing companies) to collect primary data. Subjective norm (SN), perceived behaviour control (PBC), perceived usefulness (PU), perceived ease of use (PEU) were the independent variables, while attitude (Att) was the meditating variable and intention to adopt was the dependent variable used. According to SMEs Corporation Total registered SMEs selected for the study were 156 companies. From this number, 114 companies had successfully completed and returned the questionnaires, giving a response rate of 73%.

2.4 Data analysis

2.4.1 Measurement model

Internal consistency, reliability and factor loading of every construct were determined (Table 1). Factor loading of items below 0.50 was discarded from the analysis.

Data analysis was carried out by using Statistical Package for the Social Sciences (SPSS) software (v24). Demographic data were analysed using descriptive statistics which include mean, standard deviation (SD),

Table 1. Reliability and factor loading

Variables	OI	UI	α	Factor Loading
Intention	5	4	0.848	0.859
				0.863
				0.905
				0.717
Attitude	7	5	0.86	0.732
				0.795
				0.792
				0.831
				0.861
Perceived behaviour control	5	5	0.812	0.783
				0.774
				0.760
				0.755
				0.714
Perceived usefulness	8	6	0.915	0.853
				0.852
				0.841
				0.840
				0.829
				0.821
Subjective norm	5	4	0.82	0.842
				0.875
				0.833
				0.747
Perceived ease of use	6	5	0.904	0.854
				0.851
				0.829
				0.826
				0.826

OI: Observed item, UI: Unobserved item

with reliability and correlation analyses. Normality test on data was conducted through skewness, kurtosis and data outlier identified by the univariate and z-score test. (Mahalanabis test, cook's distance). The Z-score was within ± 3.00 and the Mahalanabis distance was higher than 0.005 which indicates that there was no outlier or extreme value in the dataset. The mean, standard deviation and correlation are shown in Table 2.

Regression is a technique used to model and analyze the relationships between variables and oftentimes how they contribute and are related to producing a particular outcome together. Linear regression is a type of model where the relationship between an independent variable and a dependent variable is assumed linear while nonlinear regression is a form of regression analysis in which data is fit to a model and then expressed as a mathematical function. It is computed by first finding the difference between the fitted nonlinear function and every Y point of data in the set. Then, each of those differences is squared. Also, probability is the branch of mathematics concerning numerical descriptions of how likely an event is to occur, or how likely it is that a proposition is true. The probability of an event is a number between 0 and 1, where, roughly speaking, 0 indicates the impossibility of the event and 1 indicates certainty. In addition, Multilevel modelling (MLM) is an elaboration of multiple regression that is designed for use with clustered data. Also known as hierarchical linear modelling (HLM), random coefficient modelling, contextual analysis, mixed linear modelling, and mixed-effects modelling.

3. Results and discussion

A total of 114 companies participated in the study. Seventy-eight% were males and 22% were females showing that the owners or managers of participating SMEs were males. Of the total respondents based on marital status, 67.50% were married and the rest were single. The majority (72%) of the respondents were Malays, 12% were Chinese, 11% were Indians while the remaining respondents were other nationals (Pakistani, Nepali, Bangladeshi and more). Based on the responses received, SMEs in the dairy manufacturing industry in Malaysia was dominated by entrepreneurs whose age groups were in the range of 25 to 45 years old (77%). Among the respondents, 74% were owners and managers who obtained tertiary certificates in education, while 24% obtained had secondary school certificates. Seventy-eight% of the companies had below 30 employees and 18% had 30 to 60 employees. In terms of business operating experience, the entrepreneurs had varied experiences of between one to more than 10 years. About 42% of the respondents had been operating their businesses for 3 years, 37% for 4 to 6 years and 7% had been in operation for 7 to 9 years. Currently, the SMEs are using different levels of technology: High-level technology: More maintenance, more training, complex electronics. Medium level technology: some maintenance, some training, some electronics and low-level technology: simple little maintenance, no or limited electronics, lower, middle or high level. Based on the survey, 32% were using lower-level technology, 54% were in medium level and 13% were using high-level technology.

This section presents the relationships between variables and their direction. In order to test the general relationship, multiple regressions were conducted. Prior to running the regressions, correlation among variables was tested along with multicollinearity tests. As shown in Table 2, correlation among independent variables was low (the highest correlation was 0.64 for subjective norm) and correlation between an independent variable and dependent variable was moderate with the lowest being 0.70 and highest, 0.83). Variance inflation factors (VIF) for multicollinearity evidence were within the range of 1 to 3 (the highest VIF was 2.519). This is an indication of no evidence of multicollinearity effect. Based on the results, the ANOVA table shows an F value was 131.432 and p-value was 0.000 therefore the regression model fitted well. The model summary table shows that R-value and R^2 were 0.927 and 0.859 respectively. This indicates that 85.90% of the variance in intention can be explained by subjective norm (SN), perceived behaviour control (PBC), perceived usefulness (PU), perceived ease of use (PEU) and attitude (Att) (Table 3).

Table 2. Mean, SD and Correlation

| | Mean | SD | Pearson's correlation | | | | | |
			Intention	Att.	PBC	PU	SN	PEU
Intention	5.47	1.16	1.00					
Att.	3.82	0.75	0.76	1.00				
PBC	3.63	0.71	0.73	0.55	1.00			
PU	3.86	0.69	0.83	0.64	0.60	1.00		
SN	3.76	0.71	0.76	0.53	0.64	0.67	1.00	
PEU	3.63	0.79	0.70	0.52	0.52	0.64	0.64	1.00

Note: SD: Standard deviation, Att.: Attitude, PBC: Perceived behaviour control, PU: Perceived usefulness, SN: Subjective norm, PEU: Perceived ease of use

Table 3. Multiple Regression Coefficients

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
	B	SE	Beta			Tolerance	VIF
(Constant)	-5.089	1.067	-	-4.771	0	-	-
Att	0.340	0.061	0.276	5.604	0	0.538	1.860
SN	0.341	0.092	0.209	3.725	0	0.416	2.406
PBC	0.251	0.066	0.193	3.801	0	0.506	1.977
PU	0.368	0.064	0.33	5.751	0	0.397	2.519
PEU	0.124	0.061	0.105	2.049	0.043	0.494	2.024
Dependent variable: Intention							

SE: Standard error, VIF: Variance Inflation Factor, Att.: Attitude, SN: Subjective norm, PBC: Perceived behaviour control, PU: Perceived usefulness, PEU: Perceived ease of use

From Table 3, perceived ease of use (B: 0.124, t-value: 2.049, p-value: 0.043) was significant and H1 was accepted. There is a relationship between perceived ease of use and intention to adopt Industry 4.0 ICTs. Perceived usefulness (B: 0.368, t-value: 5.751, p-value: 0.000) was significant. This suggested that the second hypothesis (H2) was accepted. There was a positive relationship between perceived usefulness and intention. Subjective norm (B: 0.341, t-value: 3.725, p-value: 0.000) was significant and supported the third hypothesis (H3). The data implied that subjective norm had a positive effect on the intention to adopt Industry 4.0. Perceived behaviour control (B: 0.251, t-value: 3.801, p-value: 0.000) was significant and supported the fourth hypothesis (H4), indicating that there was a relationship between perceived behaviour control and intention. Finally, attitude (B: 0.340, t-value: 5.604, p-value: 0.000) was also insignificant.

From the output of the regression estimation, the model is: Intention = -5.089 + 0.340 * attitude + 0.251 * PBC+ 0.368 * PU + 0.341 * SN + 0.124 * PEU. Standardized coefficient (Beta) shows that perceived usefulness (0.330) had maximum impact on intention, followed by attitude (0.175), subjective norm (0.209), and perceived behaviour control (0.193). The lowest impact was drawn by perceived ease of use (0.105).

Multiple regression for mediating effect of attitude, the fifth and sixth hypotheses (H5, H6) proposed that attitude mediates the relationship between perceived ease of use and intention and perceived usefulness and intention. In order to test the mediating effect, process macro Andrew F. Hayes v.3.2 in the regression was used.

3.1 Attitude's relationship with perceived ease of use and intention

Indirect effect: Effect size was 0.3359, BootLLCI: 0.2236 and BootULCI: 0.4516. As there was no '0' (zero) value in between LCL and UCL, it is significant. Therefore, attitude mediates between perceived ease of use and intention. Direct effect: Effect on size was 0.4856, LLCI: 0.3431 and ULCI: 0.6281; t value was 6.7539 and p-value was 0.000. As there was no '0' (zero) value in between LCL and UCL and a p-value less than 0.05, it was also significant. Therefore, the relationship between perceived ease of use and intention was positive as predicted. Since both direct effects and indirect effects were significant, attitude played a role as a partial mediator.

3.2 Relationship between attitude, on one hand, and perceived usefulness and intention

Indirect effect: Effect size was 0.2775, BootLLCI was 0.1898 and BootULCI was 0.3630. As there was no '0' (zero) value in between LCL and UCL, it was significant. Therefore, attitude mediates between perceived usefulness and intention. Direct effect: Effect size was 0.6480, LLCI 0.5196 and ULCI was 0.7764; t value was 10.0019 and p-value was 0.000. As there was no '0' (zero) value in between LCL and UCL and the p-value was less than 0.05, it was also significant. Therefore, the relationship between perceived usefulness and intention was predicted to be positive. Since direct effects and indirect effects are both positive and significant, attitude plays a role as a partial mediator. therefore the fifth and sixth hypotheses (H5, H6) were supported. Therefore, the present study adopted TAM and TPB theories with their components to explore the relationships and effects of attitude, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm on intention to adopt Industry 4.0 among SMEs in dairy manufacturing companies in Malaysia. All the hypotheses were supported which imply that attitude, perceived usefulness, perceived ease of use, perceived behavioural control and subjective norm have positive influences on intention to adopt Industry 4.0 technologies.

Results generated from multiple linear regression on attitude (Att), perceived usefulness (PU), perceived ease of use (PEU), perceived behavioural control (PBC) and subjective norm (SN) were found to influence the

adoption of Industry 4.0 ICT technologies. The results of the regression estimation also show that attitude (β = 0.276), perceived usefulness (β = 0.330), perceived ease of use (β = 0.105), perceived behavioural control (β = 0.193) and subjective norm (β = 0.209) primarily and positively affected intention to adopt Industry 4.0 technologies. From the results, it was also found that perceived usefulness was the most influential on intention. Similar results were also reported by Pikkarainen *et al*. (2004). They studied the acceptance of internet banking in Finland and Hong Kong and concluded that perceived usefulness was the most influential factor in adopting new technology. Other researchers show that perceived usefulness was always the vital construct of attitude on the technology acceptance model(TAM). Results showed that attitude had a significant impact (β = 0.276) on an intention to adopt Industry 4.0 and subjective norms also had a significant impact (β = 0.209) on an intention to adopt Industry 4.0.

The results of the present study are similar to the results reported by (Park, 2000; Smith and Terry, 2003; Baker et al., 2007; MdNor et al., 2008; AbuShanab et al., 2010; Al-Majali, 2011; Al-Ajam and Nor, 2013). The effect of attitude on intention was desirable, obvious and contributory. The attitude was the vital issue to think, adapt and use new innovation. Results of the present study also show that perceived usefulness and perceived ease of use had a significant positive relationship with intention to adopt. The result refers to the fact that SME entrepreneurs and companies use technology to facilitate production, quality and process and security. This outcome is similar to those of other studies (Davis, 1989; Eriksson and Lindström, 2005; Prompattanapakdee, 2009; Thulani et al., 2009; Yusoff et al., 2009). In addition, the present study found that perceived behaviour control had a positive and significant relationship with the intention to adopt Industry 4.0 ICT technologies. This finding is comparable to or consistent with the finding of several other studies (Smith and Terry, 2003; Baker et al., 2006; MdNor et al., 2009; AbuShanab et al., 2010; Al-Majali and Nik, 2010; Jaruwachirathanakul and Fink, 2005; Al-Majali, 2011; Al-Ajam and Nor, 2013). Based on the present findings, perceived behavioural control is a critical predictor of behavioural intention. However, this finding was in contrast with the findings of Scannell et al. (2012), who published that perceived behavioural control did not have a significant impact on intentions.

4. Conclusion

The study develops and tests the technology acceptance model and theory of planned behaviour to identify factors that may influence intentions to adopt Industry 4.0 Technologies among SMEs in the Malaysian dairy manufacturing industry. The government of Malaysia has designed strategies that encourage the adoption of Industry 4.0 Technologies to ensure the efficient performance of their activities through productive mechanisms. Using the context of Industry 4.0 technologies, the study identified key factors (perceived usefulness) related to SMEs in the Malaysian dairy manufacturing industry. The results of the study will not only facilitate advancement in the understanding of the adoption of Industry 4.0 technologies but will also assist policymakers in the formulation of new policies regarding the usage of ICT in entrepreneurial endeavours. Nevertheless, this study did not focus on any variables (e.g. level of technology in current usage) that are external with respect to TAM.

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