International Journal of Finance, Insurance and Risk Management
Volume X, Issue 4, 2020

pp. 95-122

Embracing Technology and Propelling SMEs through Open Innovation Transformation

Submitted 28/10/20, 1st revision 26/11/20, 2nd revision 05/12/20, accepted 28/12/20

Sanmugam Annamalah[1], Murali Raman[2], Govindan Marthandan[3], Aravindan Kalisri Logeswaran[3]

Abstract:

Purpose: *Open innovation exploration in Small Medium Enterprises (SMEs) lack comprehensive review. This study integrates empirical findings in analyzing open innovation adoption by integrating relevant theories to support the arguments.*
Design/Methodology/Approach: *The research uses cross sectional data from the survey mode from SMEs industries. Simple random sampling technique was used and hierarchical multiple regression was employed to test the related hypothesis variables. The theories utilized in this research are drawn from multiple theoretical perspectives from Open Innovation concept, Social Exchange Theory and Actor Network theory. Cross-sectional data were collected using the survey method in obtaining data. Hierarchical multiple regression was employed to test the hypothesized relationships. This research utilizes quantitative techniques and the findings of this study will support SMEs in fostering new tools and technologies that are driven by open innovation concept.*
Findings: *The results indicate that the relationships between organizational citizenship behaviour, organizational culture, managerial ties and transactional costs are significant and thus all the hypothesis are supported.*
Practical Implications: *The study will benefit SMEs in adopting technologies that are driven by open innovation concept in achieving sustainable productivity and performances in the long run. From theoretical aspect, the dimensions of various behaviours provide guidelines to SMEs for tackling employees' obstacles in adopting technology based productions.*
Originality/Value: *To the best of the authors' knowledge, lack of research is attempted to study the open innovation concept which is a an influential factors that affect SMEs as well as the behavioural and cost factors that determines the success of open innovation adoption.*

Keywords: *Open innovation, SMEs, organizational behaviour, organisational cost, manufacturing.*

JEL codes: *M14, M15, M31.*

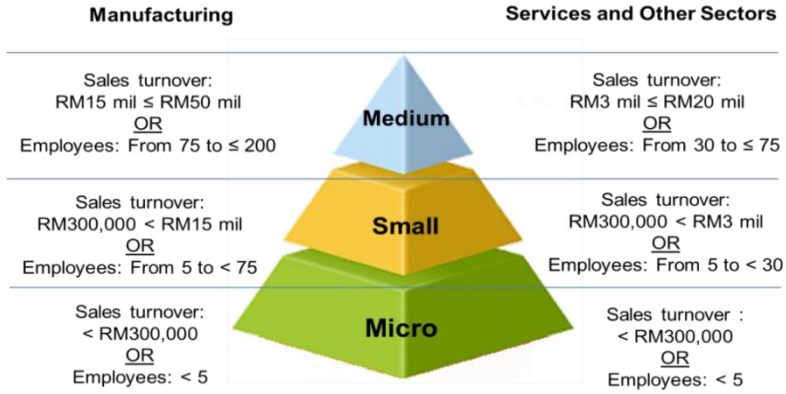
Paper Type: *Research study.*

[1]*School of Business & Accounting, Segi University College, Kuala Lumpur, Malaysia, e-mail: sanmugam1@gmail.com;*
[2]*Deputy Vice Chancellor, Inti International University, Nilai, Negeri Sembilan, Malaysia.*
[3]*Faculty of Management, Multimedia University, Cyberjaya, Malaysia.*

1. Introduction

Two criteria used in determining the definition of SMEs, i.e. sales turnover and number of full-time employees. For the manufacturing sector, SMEs are defined as firms with sales turnover not exceeding RM50 million or number of full-time employees not exceeding 200 whereas the services and other sectors, SMEs are defined as firms with sales turnover not exceeding RM20 million or number of full-time employees not exceeding 75 as shown in Figure 1 (SME Corp, 2019).

Figure 1. *Types of SMEs*



Source: *Own study.*

Many companies face problems as they cannot rely solely on closed innovation concept where they lack the resources and capabilities enabling them to innovate as well as face challenges in competing globally to serve international customers (Distanont and Khongmalai, 2018; Lazzarotti, Manzini, and Pellegrini, 2015). Open innovation studies have been focused on large and high tech companies, however, open innovation appears to be more important for small and medium-sized enterprises (SMEs) rather than large firms due to frequent collaboration with large firms (Tajudin and Musa, 2018). The successful adoptions of open innovation are mostly found in larger corporation, and therefore studies are focused on such organisations (Chesbrough 2003; van de Vrande, De Jong, Vanhaverbeke, and De Rochemont, 2009). Studies on SMEs are still in its infancy stages and most of the studies concentrate in qualitative studies (Spithoven, Clarysse, and Knockaert, 2011). Studies on open innovation in SMEs context are still in the early stages and most of the researches are focussed on case studies (Pierre and Fernandez, 2018).

SMEs have been facing technological capabilities concerns that are partly due to culture and strategies in implementing advance technologies for efficient productions (Okundaye, Fan, and Dwyer, 2019). SMEs are able to accomplish high quality products through open innovation as their ability to respond to the changing environments is better when compared to larger organisations (Parida, Westerberg, and Frishammar, 2012). Such approach enables SMEs to overcome technology

obstacles and become more successful in their business. SMEs also lack internal resources, such as the management, technical, financial resources as well as R&D to pursue innovation activities (Mohamad Radzi, Mohd Nor, and Mohezar Ali, 2017).

Hence, SMEs are able to benefit from Open Innovation (OI) practices (Gama, Frishammar, and Paridaa, 2019) and thereby narrow the research gap in innovation adoption among SMEs and innovation with large firms (Okamuro, Nishimura, and Colombo, 2019). In order to overcome the obstacles of adopting open innovation, several approaches have been undertaken to study the issue (Bianchi, Campodallorto, Frattini, and Vercesi, 2010; Colombo, Piva, and Rossi-Lamastra, 2014), however, the objective of this study is to look into the adoption behaviour as well as costs associated with the adoption.

2. Literature Review

2.1 Open Innovation (OI)

Open innovation has been defined by Chesbrough (2003) as the inflow and outflow of technological knowledge to advance innovation at creating values in productions and market positioning (Brunswicker and Chesbrough, 2018). The open innovation concept relates to the importance of assimilating the acquired knowledge with the existing one (Zobel, Lokshin, and Hagedoorn, 2017). Openness enables knowledge flows across boundaries (Bengtsson *et al.,* 2015). Open innovation concept enables firms to develop productions through external technologies and improve firms' innovation capability to compete in the industry (Chesbrough, 2017; Gassmann, Enkel and Chesbrough, 2010; Schuster and Brem, 2015). The Open Innovation paradigm has not only led to many successful innovative products and services but also to the success of the innovation processes (Curley and Salmelin, 2013). As SMEs, the ability to access technological knowledge and enhance capabilities is still lacking, open innovation could be one of the solutions for SMEs to gain such knowledge outside the organization (Dahlander, O'Mahony, and Gann, 2016).

Employee's behaviours and attitudes are crucial for technology adoption and these factors are found to impede innovation adoption among SMEs (Burcharth, Knudsen, and Sondergaard, 2017). Employee characteristics are very important in ensuring that organisations are able to depend on them to provide their expertise in adopting any new forms of technology in productions (Harison and Koski, 2010). The mind-set of the management and employees are crucial in ensuring the willingness of all internal stakeholders to participate, and that will determine the promotion of a more participatory culture (Angerer, 2014).

Therefore organisations need to incorporate innovative culture by fostering practices that encourages open innovation practices. Another issue that is hampering open innovation adoption is networking and SME managers are unable to build ties with

various individuals and organisations in order to secure technological knowledge (Sivam, Dieguez, Ferreira, and Silva, 2019).

There is a need for diverse networks to develop strong ties to gain capabilities and new knowledge. Adopting open innovation strategy requires various internal and external parties and in an uncertain environment, collaborating partners may lead to opportunistic behaviour (Kim, Kim, and Lee, 2015). In order to prevent such behaviour, there is a need to weigh the risk that is associated with collaboration. Reducing or preventing opportunistic behaviour requires transactional costs to outweigh the benefits (den Butter, 2010). Open Innovation concept requires the paradox of openness and such paradox requires openness and therefore transaction costs are crucial in ensuring that the knowledge retrieved through innovative ideas (Laursen and Salter, 2014) do not exceed beyond the desired costs. The objective aims to identify factors that motivate and endorse open innovation adoption and strategies to transform SMEs.

2.2 Organisational Citizenship Behaviour (OCB)

The issue with most of the employees is that they are more focused on their primary duties that were assigned to them but unable to embark onto jobs that are outside their formal job description. OCB is a concept which encompasses employees with discretionary actions that are outside their formal job description. In addition, managers should be aware of the advantages of OCBs that can help employees contribute optimally to the organization (Organ, 1988). OCB will be able to reduce the need for supervision, improve workplace morale as well as instil individuals with forward-thinking behaviours. Forward-thinking employees who are willing to go beyond formal job requirements will help organizations cope with change and unpredictable circumstances. Therefore, understanding OCB is necessary to the organizations' social systems because individuals willingly contribute to the successful change, regardless of formal job requirements positively impacts the organisations.

Any innovation initiatives require the changes in behaviour and environment as well as commitment of management by engaging with all the stakeholders (Markkula and Kune, 2013). Enhancing OCB improves organizational functioning and performance (Omari, K'Obonyo, and Kidombo, 2012) and the organisation effectiveness, therefore, the management should utilise the concept of OCB to empower employees (Mukhtar, Sial, Imran, and Jilani, 2012). OCB determinants, such as employee attitudes, characters and support from management are examined on individual OCB levels on how organisation will be able to create employees satisfaction, thereby enhancing work commitment. The objective of this study is to identify the best

working behaviour that suits to the organisational effectiveness and the most important dimensions of OCB that influence working culture (Ishak, 2005; Naqshbandi and Kaur, 2013). This study explores the role of OCB in responses to

open innovation adoption. Hypotheses were tested and the outcome is that OCB is significantly related to open innovation adoptions but the impact of the dimensions of OCB varies. The behaviour study is important to support the psychological and social component of organisations (Podsakoff, Whiting, Podsakoff, and Blume, 2009). Antecedents of OCB include altruism, conscientiousness, courtesy, civic virtue, and Sportsmanship among the employees.

Altruism refers to the voluntary behaviour of employees who provide support to other members in the organization in completing tasks or solving problems, even though it is not of the particular concern as it is not stated in his or her officially assigned tasks (Smith, Organ, and Near, 1983). Altruism also refers to the willingness of an employee to help a co-worker, and it is a form of selflessness of an employee towards the working environment. This behaviour will certainly boost the morale of the overall work force which could lead to organizational performances (Podsakoff, Mackenzie, and Paine, 2000). This will lead to a reduction in the need for supervision, training and costs to manage any forms of crisis.

Conscientiousness, on the other hand refers to individuals who are organized, accountable and meticulous and hardworking (Organ, 1988). In addition it also involves individuals who are dedicated to their jobs by far exceeding the formal working requirements, such as volunteering in performing jobs beyond their normal routine as well as working long hours. In addition, conscientiousness also refers to employees who are well informed and will keep their knowledge and abilities up to date about products or services offered by the organization (Yen and Niehoff, 2004). This will enable the management to reduce the need for supervision, training and costs of managing any form of crisis.

Courtesy is established by avoiding organization problems with work associates by taking the vital step to lessen the effects of the problem in the future through proper communication and consideration for all the workers in the organization (Podsakoff *et al.,* 2000). In addition it also safeguards members of the organization and encourages them when they are demoralized and feel discouraged about their professional growths. This would reduce inter-group conflicts and thereby reduce management time spent on managing conflicts (Podsakoff *et al.,* 2000). As such, it will enable management to minimize the need for supervision, training and resources in managing crisis.

Civic virtue is defined as participation of individuals in an organization's political life and supporting the administration (Deluga, 1998) by attending meetings and other events which are not required by the firm, as well as keeping updated with the current changes in the organization (Organ, 1988). In other words, employees should be responsible and put forward their opinions on important organizational issues and also be a good citizen of the organization (Graham, 1991). This will lead to a reduction in the need for supervision, training and costs to manage any forms of crisis. Employees

may provide constructive suggestions by identifying actions or behaviours that were not effective, and offer alternatives or suggestions for improvement by way of saving costs for the organisations.

Sportsmanship is defined as the behaviour of tolerating by not complaining and bringing out the frustrations, such as lack of certain facilities that are usually unavoidable in most of the originations (Organ, 1988). Sportsmanship enhances the morale of the work force and thereafter reducing employee turnover. It also involves work force that do not take part in any harmful activities that are associated with the organization such as not engaging in gossip and voicing out grouses about office matters (Podsakoff, Ahearne, and MacKenzie, 1997). The willingness to sacrifice over minor inconveniences without demanding or protesting allows organization to focus on more important issues. Therefore sportsmanship is associated with positive attitudes as well as being loyal to the company by focusing on quality in the best interest of the organisation by avoiding any negative roles.

Many firms find it difficult to adopt technologies and exploit them to the fullest due to the unwillingness of the workforce to adopt it (Burton-Jones and Hubona, 2006). OCB is also involved in preventing any problems that may arise for workers in an organisation (Podsakoff *et al.,* 2009) and being considerate to the workers and hold regular communication with workers to prevent any unwanted issues from happening in the organisation.

H1: There is a relationship between Organisational Citizenship Behaviour and firm's open innovation acceptance,

2.3 Organisational Culture

Culture is normally defined as the way things are expected to be done traditionally in an organisation (Patel and Conklin, 2012). Therefore, the structure and the control system influence employees' behaviours which impacts the performances (Hartnell, Ou, and Angelo, 2011). The availability of resources, effective collaborations and supports facilitate open innovation adoption (de Jong, Vanhaverbeke, and van de Vrande, 2007). However, adverse organisational culture causes collaboration problems van de Vrande *et al.* (2009). The study exposed the negative relationship between culture and innovation performance. On the contrary, many studies support organisational cultures and indicated that it is positively associated with innovation performances (Naranjo-Valencia, Jimenez-Jimenez, and Sanz-Valle, 2011).

The nature of organisational culture need to be analysed in order to find out which type of culture supports innovation adoption and the type of culture that needs to be avoided (Lichtenthaler, 2011). Studies examining the organisational culture influencing open innovation among SMEs and the contributing factor towards innovativeness are lacking (Saunila, 2014). The studies that reflects the relationship between organisational culture and open innovation is scarce and further research

complements theoretical and empirical research (Lichtenthaler, 2011). Antecedents of organisational culture include employee development, harmony, innovative culture and customer orientation.

Employee development programs are crucial for organisations as it enables employees to gain knowledge, creative thinking and resolve problem (Kottke, 1999). It also encompasses core competencies, appropriate structure and strategic goals of business by facilitating learning chances so that employees will be more productive with suitable training as per the requirement of the job. The key element of employee development is to enhance their performance instead of increasing their work competencies (Gerbman, 2000). This enables employees to perform better and therefore proper tools need to be provided for employees to perform their jobs better. Harmony among employee has a positive effect on performances (Amos and Weathington, 2008) and at the same time the values will influence the employees' behaviours. In addition, concept of harmony is important as an influence to the personality, values, goals and individuals directions that affect the organizational outcomes. Employees that work in a harmonious environment successfully perform their assigned tasks, ensuring acceptable job performance as well as improve their job satisfaction in an organisation (Chang, Tsai, and Tsai, 2011).

Innovative culture is important in determining organizational innovativeness Tucker, Edmondson, and Spear (2002) as it provides opportunities to explore and experiment ideas. Therefore, it is about creating a culture where new ideas are generated, valued, and supported (Streets and Boundary, 2004). Competency in producing new ideas and transforming them into successful propositions is fostered by innovative culture (Gregory, Aarons, and Carmazzi, 2005). In order to nurture and sustain innovative culture, organizations need to develop a conducive environment where workforces feel free to contribute (Beck, 2004). Therefore environment of openness, trust, encouragement, supportive structure, and learning and knowledge acquisition approaches are fundamentally important in creating an innovative culture (Jaskyte, and Dressler, 2004).

Global market survival is not going to be easy unless focus on customers become a key factor to an organisation. Customer-orientation emphasises on focussing the efforts on appreciating and satisfying customers (Huff and Kelley, 2005). Customer-orientation increases both customers' interests and organizational success (Korunka, *et al.,* 2007). The basic principles are serving the customers as well as creating relationships and in return gaining customers' loyalty and retention. Strategic planning need to be incorporated to create changes in its internal environment to suite its customers' needs. In other words, creating customer centric environment is crucial in understanding and satisfying customer requirements in a profitable manner (Iriana and Buttle, 2006).

This study highlights an investigation framework of the organisational culture variables that affects open innovation adoption. The main hypothesis of organizational culture labelled as innovative culture which fosters creativity that will correspond with a greater scope of employee development and higher levels of productivity. Culture is closely related to human factor and that will influence innovation acceptances (Krasnicka, Glod, and Wronka-Pospiech, 2018). Therefore understanding the capacity of employees and nurturing and promoting innovative culture is crucial in responding to the external environment (Pullen, Weerd-Nederhof, Groen, and Fisscher, 2012).

H2: There is a relationship between Organisational Culture and firm's open innovation acceptance.

2.4 Managerial Ties

Ties with external parties are effective for innovation networking Torok and Toth (2013) and SMEs are able to select which parties to work with to ensure the successfulness of innovation adoption (Theyel, 2013). However weaker ties with external parties will widen the barriers to accept open innovation notion (Dodourova and Bevis, 2014). Managerial ties are an important vehicle to facilitate the management of favours (Puffer, McCarthy, Jaeger, and Dunlap, 2013). Ties with managers at other firms, ties with government officials as well as ties with experts such as universities, industry professionals or organisation that represents the industry have been the common associated parties in emerging economies (Puffer *et al.*, 2013). Firms that have excellent managerial ties with external parties are more likely to attain better performance compared to firms that do not (Li, Poppo, and Zhou, 2008; Peng and Luo, 2000). In emerging economies, due to inefficient formal market-supporting institutions that necessitates an environment where managers depend on external ties to gain access to resources and information (Estrin and Prevezer, 2011).

Funding for technological developments is crucial and therefore ties with government official will help SMEs to gain financial assistance (Brown and Mason, 2014). Selection of external parties is essential in refining the parties that can be collaborated to gain innovative ideas from the selected partners (Theyel, 2013). The result indicate that firms that rely heavily on external interaction increases the ability to contact, acquire, use, and associate new and existing knowledge. Business activities are surrounded with networking and interpersonal relationships which influences firms to strategize the source of innovation. Strong networking is important to pursue open innovation through suitable external parties such as other firms, universities, research organisations and government officials (Brunswicker and Vanhaverbeke, 2014) to increase the response rate of open innovation adoption. As such, ties with external parties will enable SMEs to make strategic moves (Colombo *et al.*, 2014) for productions. Business ties and political ties provide direct impact towards enhancing opportunities of knowledge creation processes Identifying the right partners and building cordial relationship is important for positive outcomes (Naqshbandi and Kaur, 2014) and further cultivate open innovation adoption.

H3: There is a relationship between Managerial Ties and firm's open innovation acceptance.

2.5 Transactional Costs

Transactions costs include ex-ante costs such as scanning for suitable external parties and ability to evaluate the information such as negotiations, drafting and safeguarding the agreements by means of monitoring and enforcements (Williamson, 1985). Transactional costs encompasses three phases such as contact, contract and control that foresee and regulate all possible eventualities are impossible (Chiles and McMakin, 1996). This theory presupposes that humans are subject to any forms of opportunism as well as dishonesty in transactions. Therefore, firms need some sort of confirmation that partners who are involved in transactions are reliable. As such, contingency plans need to be employed if there are any breach of contractual promises (Rahman and Kumaraswamy, 2004). Firms have to make decisions on the effectiveness of external innovation capabilities as to whether to continue with closed innovation or adopt open innovation or combinations of both (Bogers, 2011). SMEs transformation in innovation adoption would have impact in transaction costs Tebaldi and Elmslie (2013) Studies conducted also agreed that lower transaction costs reduces overall production costs (Bogers, Chesbrough, and Moedas, 2018).

Asset specificity is a term that refers to the assets or resources deployed in one activity that can also be utilised in another activity (Williamson, 1985). Asset specificity improves the efficiency of productions through specialized equipment or tooling, specific skills or knowledge where resources are worth more when deployed in various activities. Therefore, asset specificity designates the specialization of resources to suit the external technology incorporated in the productions. The main focus of the asset specificity in this study is the physical asset specificity and human capital specificity in ensuing adapted external technology to be efficient to maximize the value of items produced and reduce costs.

Environmental uncertainty refers to unexpected changes in the setting in which exchange occurs (Schrader, Riggs, and Smith, 1993). Environmental uncertainty refers to external factors such general market and specific business environments that are beyond the control of management that influences the costs of production and transactions that are associated with it (Yang, Zhao, Yeung, and Liu, 2016). Environmental uncertainty forces managers to look for alternatives such as eternal party's collaboration to incorporate into their current productions and ways of doing things (Vincent, Bharadwaj, and Challagalla, 2004).

External collaboration requires competent internal technology in order to work in cross-functional teams (Phene, Tallman, and Almeida, 2012) and therefore technological areas of competences and expertise is vital for firms to sustain a competitive advantage (Chiesa, 2001). Organisation need to keep up with changes in

technology (Higgins and Rodriguez, 2006), or to acquire the expertise and knowledge required for external collaborations (Carayannopoulos and Auster, 2010).

Collaboration risks are highly connected with knowledge loss and opportunistic behaviour, if external parties allow each other to build skills in area important to their business and then sell their expertise to the competitors or possibly leak information concerning valuable technologies (Oxley and Sampson, 2004). External parties with differences incentives or expectations which increase coordination costs and make external partnerships less attractive may also dilute the scope of the collaboration. As such, it will affect the quality of the innovation outcome and therefore the complexity environment requires strategic management control skills and abilities to mitigate the uncertainties that arise (Cheng and Huizingh, 2014). Opportunity risk is another facet of collaboration barriers, since difficulty in finding the right partner to innovate is high, and even if once that partner finds that there is a need to professionally balance open innovation activities with daily, routinely, business.

Competition spurs innovation in competitive markets and therefore firms would strive to develop new products and services to outperform their rivals (Beneito, Coscolla-Girona, Rochina-Barrachina, and Sanchis, 2015). Technologies has become the basic component of competitive power and considered as one of the main conditions for organisations to sustain their existence within the market (Distanont and Khongmalai, 2018). Successful organisations thrive in the industry because of innovation, which creates competitive advantages for them (Goksoy, Vayvay, and Ergeneli, 2013).

Study furthermore demonstrates that SMEs competitive advantage is primarily based on technology competencies as successful SMEs primarily tend to not only focus on core technologies but also on non-core technologies. Poor mechanism placed in organisations will lead to inadequate means of motivating and retraining employees causing hindrance to innovation adoption and increases TC (Chadee and Roxas, 2013). Therefore, this study aims to examine existing internal production capabilities and how it can be enhanced through OI with a low degree of TC.

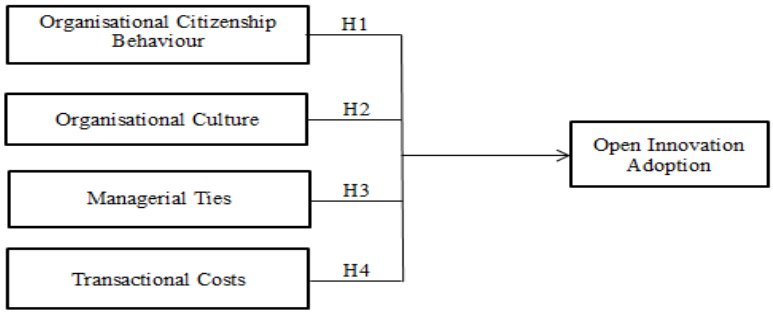
H4: There is a relationship between Transactional Costs and firm's open innovation acceptance.

2.6 Model Selection

Social exchange theory and Actor Network Theory are used to analyse the workplace behaviour (Malinowski, 1922; Mauss, 1925), relationships (Blau, 1964), networks (Brass, Galaskiewicz, Greve, and Tsai, 2004). Social exchange theory is a concept based on the notion that there is relationship between people, and it is very crucial in any organisations. Actor Network Theory is an approach in interpreting networks which involves human and non-human actors to explain relationships between these actors. Both theories addresses the complex structure of humans and technology and how both works as networks (Bloomfield and Vurdubakis, 1999; Spicer, Alvesson,

and Karreman, 2009). The conceptual framework indicates the relationship of the variables as displayed in Figure 2.

Figure 2. *Conceptual Framework*



Source: *Own study.*

3. Research Methodology

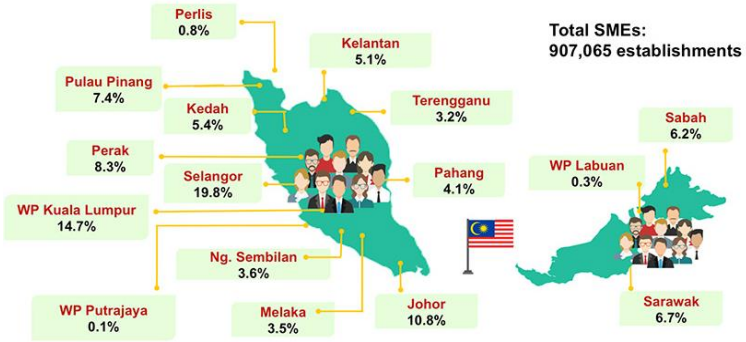
This study employed quantitative model that adopts a reductionist (positivist) approach (Creswell, 2012). Likert 5 point scale was used in constructing questionnaires for survey. Survey questions were developed to collect primary data and the questionnaires were distributed to managers, owners or senior executives who have been empowered to make decisions. Simple random sampling method is best suited to determine and locate the population sample on manufacturing companies as the population is known. There are 25,615 establishments of manufacturing SMEs in Malaysia (SME Corp., 2016). Hypothesized is tested to explain the nature of relationships (Sekaran and Bougie, 2016). The data were collected from Selangor and WP Kuala Lumpur SMEs as both states represents the highest number of SMEs (34.5%) of the total SMEs in Malaysia.

This study is based on Malaysian SMEs and the respondents selected are the managerial staffs who are sitting at the managerial position and have an influence on firm's decision making activities. This study is only based on those manufacturing related SMEs which are listed in Malaysian SME Business Directory by SME Corp. Questionnaires were distributed personally. The 5-point Likert scale was used for data collection. The survey include evaluations of different attributes on an ordinal scale of 5-point.

Likert scale ranging from 'strongly disagree' to 'strongly agree' was employed. A survey was carried out between October 2018 to February 2019 to obtain feedback from the samples. A sample size of two hundred fifty five (245) respondents was selected. In this study, 300 questionnaires were distributed and the response rate was 81.67 percent whereby only 245 valid responses were used to analyse the data as shown in Table 1. Smart PLS 3 (SEM) was used to analyze the data and was based on the sample size of Hair, Hult, Ringle, and Sarstedt (2014). PLS-SEM has the capacity

to attain high levels of statistical power, even though the sample size is small (Reinartz, Haenlein, and Henseler, 2009) and studies supports that Smart PLS is adequate in analyzing small sample size data (Rigdon, 2016). In addition, PLS-SEM is evolving as a statistical modelling technique, as it estimates coefficients that maximize the R-squared values of the endogenous constructs. Therefore, PLS-SEM is the preferred method in explaining the variance prediction of the constructs (Hair, *et al.*, 2014). Figure 3 shows the distributions of SMEs by states in Malaysia.

Figure 3. *Overview of SMEs in Malaysia by state*



Source: *Economic Census 2016, Department of statistics Malaysia.*

Table 1. *Response from respondents*

Response	
Questionnaires distributed	300
Questionnaires returned	250
Questionnaires useable	245
Questionnaires excluded	5
Response rate	81.67

Source: *Survey data estimates.*

4. Research Analysis

Table 2 shows the result of Cronbach's Alpha, which is the alpha coefficient for each variable. Organizational ctizenship behaviours comprise 14 items and the result of Cronbach's Alpha coefficient is 0.795. Organizational culture comprises 10 items and the coefficient is 0.758. Managerial Ties comprise 9 items and the coefficient is 0.852. Transactional costs comprise 14 items and the coefficient is 0.809. Open Innovation contains 3 items and the coefficient is 0.801. The total of items is 48a and the result of the coefficient is 0.951. The result shows that all the factors demonstrated a high degree of reliability which can be used for further analysis.

Table 2. *Reliability Analysis – Cronbach's Alpha test*

Component	Number of items	Cronbach's Alpha
Organizational Citizenship Behaviours	14	0.795

Organizational Culture	10	0.758
Managerial Ties	9	0.852
Transactional costs	12	0.809
Open Innovation	3	0.801
Total	48	0.951

Source: *Own study.*

Partial least squares structural equation modelling (PLS-SEM) has been used for data analysis and such approach is suitable to identify the relationships between factors that influences open innovation adoption (Henseler, Hubona, and Ray, 2016). In addition PLS-SEM able to handle non-normally distributed data (Hair, Hult, Ringle, and Sarstedt, 2017). Table 3 shows the highest mean (mean = 5.903) among managerial ties construct and the lowest mean of 4.124 for organization culture. The lower the standard deviation indicates that there is a great uniformity in the respondents' responses. Among the current constructs, organizational culture has the lowest mean (4.124) with highest standard deviation (0.758).

There are few ways for testing multicollinearity in the data but most significant test is through Tolerance and Variance Inflation Factor (VIF) (Hair *et al.*, 2017). Multicollinearity exists among independent variables when the value of Tolerance is less than 0.20 and the value for VIF is more than 5. Therefore it can be concluded from Table 4 that collinearity is not at critical levels in any of the independent constructs and is not an issue for the estimation of the research model.

Table 3. *Mean and standard deviation*

Constructs	Mean	Std. Deviation
Organizational citizenship behaviors	5.244	0.624
Organization culture	4.124	0.758
Managerial Ties	5.903	0.605
Transactional costs	5.003	0.730

Source: *Own study.*

Table 4. *Multicollinearity test*

Independent Variables	Dependent Variable	Collinearity Statistics	
		Tolerance	VIF
Organizational Citizenship Behaviours	Open Innovation	0.818	1.011
Organizational Culture		0.865	1.033
Managerial Ties		0.837	1.017
Transactional costs		0.881	1.021

Source: *Own study.*

Table 5 shows that, the variance explained for dependent construct. In this study, the dependent construct (Open Innovation) has an R^2 value of 0.533. As a result, the managerial ties, organizational culture, organizational citizenship behaviours and

transactional costs explained 53.3 percent of variance in open innovation. The f^2 measure the strength of each predictor variable in explaining endogenous variables. As a rule of thumb, values ≥ 0.02 represents small effect, ≥ 0.15 represents medium effect, and ≥ 0.35 depicts large effect sizes (Cohen, 1988). Nevertheless, predictive relevance (Q^2) is 0.215 for firm's open innovation adoption which validates the predictive relevance (Q^2) as it is greater than zero (Henseler, Ringle, and Sinkovics, 2009). This study has proven that managerial ties repreenst substantial effect followed by transactional costs, organisational citizenship behaviour and organisational culture.

Table 5. *Result of the path coefficient*

Path	β	f^2	R^2	Q^2
OCB Open Innovation	0.262	0.145	0.533	0.215
Organizational Culture Open Innovation	0.847	0.034		
Managerial Ties Open Innovation	0.583	0.714		
Transactional costs Open Innovation	0.312	0.205		

Source: *Own study.*

Table 6. *Significance test of path coefficient for constructs and Open Innovation*

Relationship	β	*t*-statistic	P-value	Supported
OCB Open Innovation	0.262	3.723	0.000	H1 - YES
OC Open Innovation	0.847	3.274	0.001	H2 - YES
MT Open Innovation	0.583	6.516	0.000	H3 - YES
TC Open Innovation	0.312	4.390	0.000	H4 - YES

Source: *Own study.*

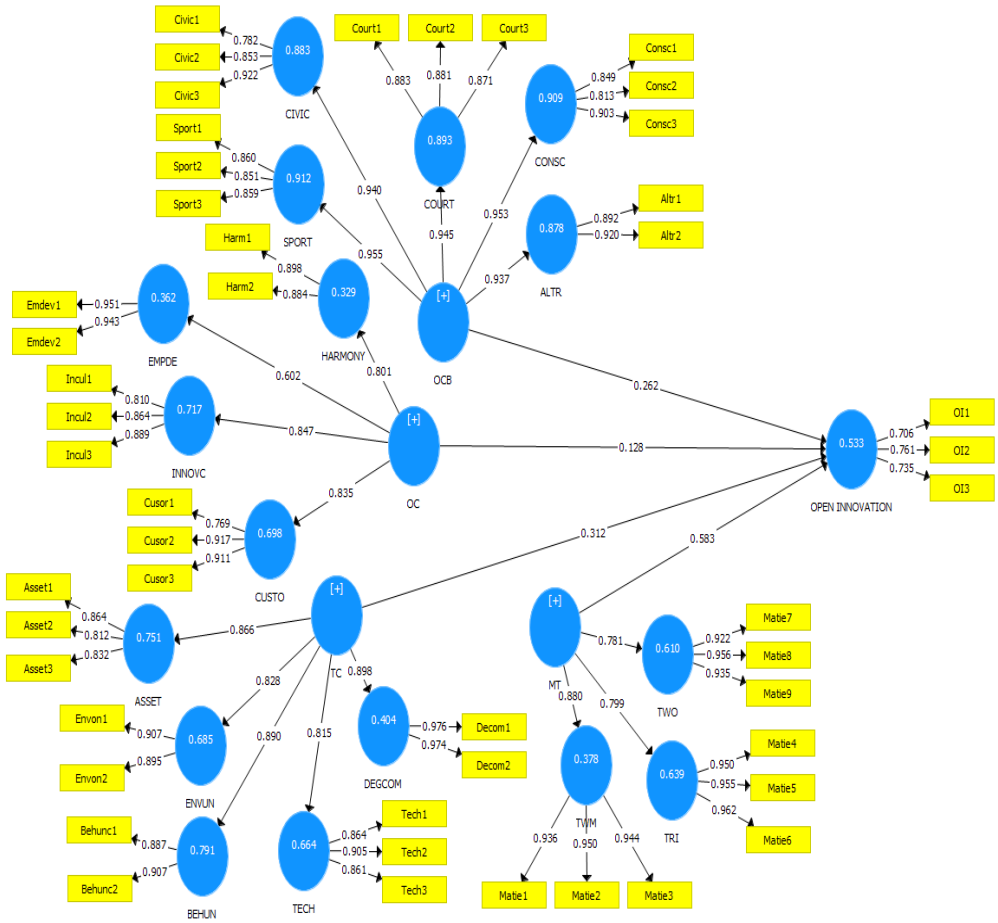
Table 6 shows that all constructs were positively related to the open innovation and therefore all it can be concluded that all hypotheses are supported.

This study reveals the determinants of SMEs open innovation adoption as indicated in Table 6, the T-value and β-value show a significant positive relationship on firm's open innovation. Table 6 confirms that all hypotheses (H1, H2, H3, and H4) were accepted as the t-value was greater than 1.96. Moreover, Figure 4 shows that the absolute correlation between the construct and its measuring manifest items (i.e., factor loading) were above the minimum threshold criterion 0.40; all the factor loading were above 0.7 and fulfilled the requirements of the psychometric reliability test (Henseler and Fassott, 2009). Therefore, in this study convergent validity was attained. Figure 4 and Table 7 shows the factor loading of all the constructs. All the constructs have factor loading of more than 0.7. whereby each loading for the multi-item variables of organizational citizenship behaviours, organizational culture managerial ties and transactional costs is significantly related to its underlying factor. Factor loading should be at least more than 0.5 to realise the acceptable level of convergent validity (Hair, Black, and Babin, 2010). Hence, this study has proven that the convergent validity was attained.

The outcome of the structural model shows that there is significant positive relationship between organizational citizenshp behaviour and open innovation acceptance (β = 0.262, t = 7.23 p < .000) and therefore hypotheses was strongly supported. The same relatiosnhip applied to organisational culture, managerial ties and transactional costs whereby H2, H3 and H4 were also strongly supported.

Cronbach's alpha for all the variables of the study is above the 0.70 threshold, thus confirming the reliability of the measurements used in this study (Hair *et al.*, 2010; Nunnally, 1978). Composite reliability of 0.70 or greater is considered acceptable (Fornell and Larcker, 1981) Therefore it can be concluded that the measurements are reliable. AVE is another way that suggested by researchers to evaluate the convergent validity. An AVE of 0.5 or higher is a good rule of thumb suggesting adequate convergence (Hair *et al.*, 2010). Table 7 shows that all constructs have acceptable AVE (>0.5) and CR (>0.7).

Figure 4. *Measurement Model*



Source: *Own study.*

Table 7. *Internal Consistency, Convergent Validity, composite reliability and AVE*

Construct	Indicators	Loadings	Cronbach's alpha	Composite Reliability	AVE
Organizational Citizenship Behaviours	Altr1	0.892	0.962	0.966	0.673
	Altr2	0.920			
	Consc1	0.849			
	Consc2	0.813			
	Consc3	0.903			
	Court1	0.883			
	Court2	0.881			
	Court3	0.871			
	Civic1	0.782			
	Civic2	0.853			
	Civic3	0.992			
	Sport1	0.860			
	Sport2	0.851			
	Sport3	0.859			
Organizational Culture	Emdev1	0.951	0.848	0.881	0.511
	Emdev2	0.943			
	Harm1	0.898			
	Harm2	0.884			
	Incul1	0.810			
	Incul2	0.864			
	Incul3	0.889			
	Cusor1	0.769			
	Cusor2	0.917			
	Cusor3	0.911			
Managerial Ties	Matie1	0.936	0.859	0.891	0.508
	Matie2	0.950			
	Matie3	0.944			
	Matie4	0.950			
	Matie5	0.955			
	Matie6	0.962			
	Matie7	0.922			
	Matie8	0.956			
	Matie9	0.935			
Transactional costs	Asset1	0.864	0.911	0.926	0.533
	Asset2	0.812			
	Asset3	0.832			
	Envon1	0.907			
	Envon2	0.895			
	Behunc1	0.887			
	Behunc2	0.907			
	Tech1	0.864			

	Tech2	0.905			
	Tech3	0.861			
	Decom1	0.976			
	Decom2	0.974			
Open Innovation	OI1	0.706	0.725	0.878	0.539
	OI2	0.761			
	OI3	0.735			

Source: *Own study.*

There are few ways for testing multicollinearity in the data but most significant test is through Tolerance and Variance Inflation Factor (VIF) (Hair *et al.*, 2017). Multicollinearity exists among independent variables when the value of Tolerance is less than 0.20 and the value for VIF is more than 5. Therefore it can be concluded from the Table 4 that collinearity is not at critical levels in any of the independent constructs and is not an issue for the estimation of the research model. Upon examining the measurement model analysis and achieving an acceptable outcome, the following stage is the estimate of the structural model.

The structural model relationships were measured using PLS-SEM 500 bootstrapping for the significance of the correlation. PLS (SEM) bootstrapping was selected to observe the relationship as stated by Hair Hult, Ringle, and Sarstedt, (2014) which explained that this is one of the suitable techniques in analysing samples. PLS (SEM) bootstrapping was selected to observe the relationship following the recommendations of (Hair *et al.*, 2014). The bootstrapping results show significant relationship between the exogenous variables and endogenous variable of the PLS-SEM analysis as in Figure 5.

5. Discussion

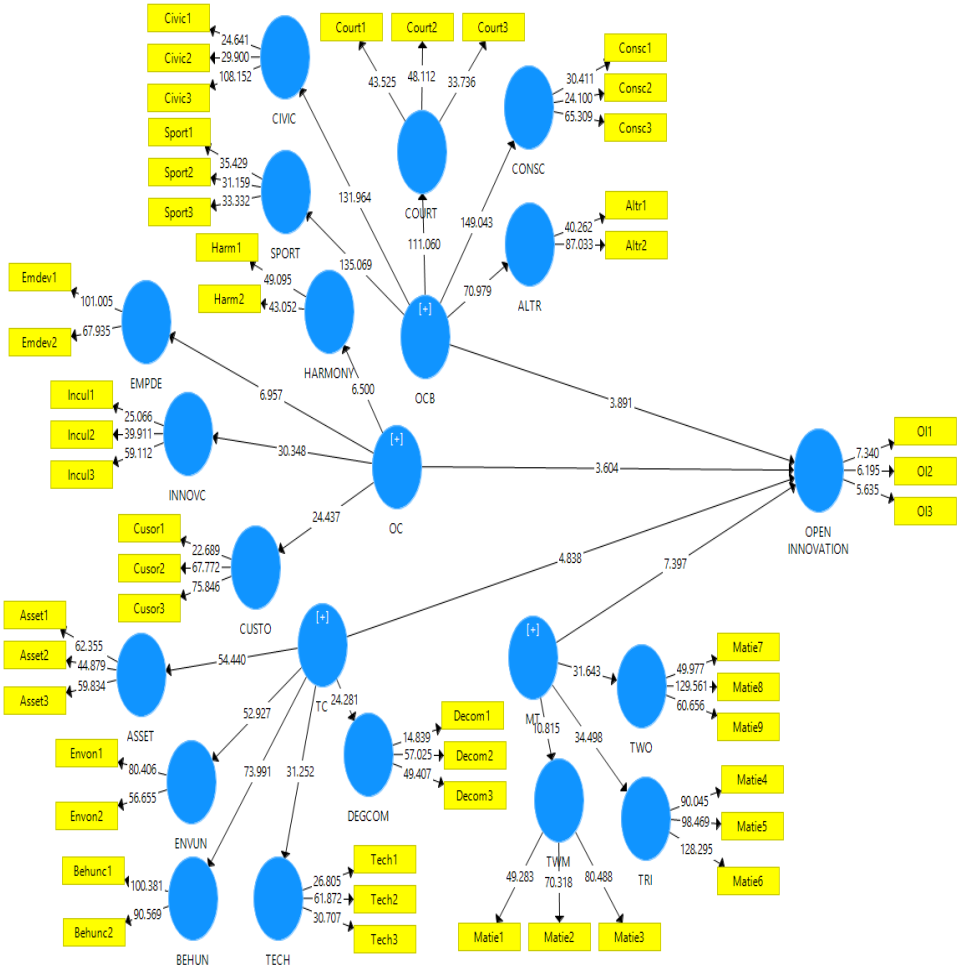
The results indicate that the relationships between organizational citizenship behaviour, organizational culture, managerial ties and transactional costs are significant and thus H1, H2, H3 and H4 are supported. The research model was evaluated through the coefficient of determination (R^2), which indicates the model is accurate in predicting the variance explained by the exogenous constructs. Since R^2 is 0.53, it is also possible to calculate the f^2 to explain the effect size whether an exogenous construct has a relevant impact on endogenous constructs (Lowry and Gaskin, 2014). Other test were conducted to explain the fitness of the data as well as data which has been explain in the analysis section

The statistical findings confirmed a positive association between employees and management to enhance the scope of open innovation adoption. The results supported the hypothesis and suggested that organizational citizenship behaviour and culture enhances commitment towards open innovation adoption and the relationship strengthens and improves SMEs performances.

Personal networking is found to be initiators of firm performance as the networking benefits SMEs overall by accessing external resources through various opportunities. Since most of the SMEs supply their products to large companies, they often need to develop technological based products to meet standards and in order to attain it, they need to explore and exploit opportunities, to increase their competencies rather than maintain existing technology.

Greater sensitivity in resolving protection mechanisms depends on the complexity of the openness and therefore the suitability of mechanisms founded on legal protection and or non-legal protections may go some way to resolve the issues. It was also noted that the relationship between appropriation and OI differs according to information source. The extent of innovation collaboration and networking in SMEs is strongly correlated with the kind of appropriation strategies chosen.

Figure 5. *Boot Strapping result*



Source: *Own study.*

Therefore, moving from a closed innovation concept to an open innovation concept may require SMEs to anticipate activities that employees need to perform. As such, organizational citizenship behaviour help employees to maintain a positive attitude even when things do not go in a right way or when any minor setbacks occur. Employees' willingness to sacrifice their personal interests for organisations benefits through helping behaviours within or outside the organisations (Organ, Podsakoff, and MacKenzie, 2006). Some of the behaviours that would be helpful for organisations efficiencies are reduce taking excessive breaks, not using working time for personal matters, helping co-workers with relevant tasks etc., which naturally increases productivity.

One of key factors of open innovation model is that organisations need to acquire ideas and knowledge from external parties. Therefore, networking among business communities and building relationship with wide range of external actors are crucial to develop trusting relationships as well as gaining business functionalities. Therefore, managers must have the ability to contact, obtain, use, and recombine existing and new knowledge in open innovation model. As such ties are considered as valuable not only for managers but also benefit the organisations in terms of knowledge channel.

Hence, SMEs need to develop capabilities to test external technologies and to coordinate the integration of new technologies. By doing so, SMEs can synthesize and acquire technological knowledge and transform these ideas of knowledge into applications. These solutions may address the rapid changes in technological environments and have controls over the changes in technological perspectives. Furthermore, open innovation paradigm would lead to the interpretation that SMEs must act accordingly with strategies to govern innovation by undertaking various possibilities to change the production directions. The main objective of the study is to determine the acceptance of innovation and to nurture a culture of innovation in SMEs. Implementing OI will definitely influence SMEs usual operating structures. However open innovation need to be initiated to ensure complete implementation across the SMEs sectors. As SMEs are involved in the OI projects, stakeholders should be searching and identifying innovative ideas for successful implementation. The acceptance and diffusion of OI is often a time-consuming process and SMEs have to initiate them before they can be answered, especially when success is measurable.

5.1 Theoretical Contribution

This study focusses on particular characteristics that could contribute more effectively to the mechanisms and outcomes of firms operating in closed innovation concept (Lazzarotti *et al.,* 2015; Schuster and Brem, 2015). This study also contributes to the open innovation literature by providing adequate information to avoid potential ambiguous prescriptions as well as providing an alternative with more focused inferences for open innovation research and practice (Tidd, 2014). In addition, this study contributes to literature by discovering the openness role in terms of models and

practices by supporting the open innovation model in safeguarding the SMEs performance (Schuster and Brem, 2015). This study supplements the current research streams, by providing the relevant evidence that adopting open innovation model enable SMEs to improve their innovativeness practices (Bengtsson *et al.,* 2015). As SMEs face resource constraints, the choice of open innovation could provide opportunities to diversify innovation directions as well as improve overall innovation performance (Ahn, Minshall, and Mortara, 2015). In this study it was perceived that behavioural and costs are important factors in determining open innovation practices, suggesting that technology scouting and training personnel are regarded as highly important in order to increase their level of innovativeness in open innovation model (Cheng and Huizingh, 2014; Parida *et al*., 2012). Open innovation model encourages collaborations with various parties; however focusing on the most appropriate partners could be the optimal choice for SMEs to provide a variety of mechanisms to improve the level of innovativeness (Jang, Lee, and Yoon, 2017).

5.2 Practical Implications

This study attempted to provide managers with some insights on how SMEs should specialize in various industries that could adopt OI, allowing them to explore different approaches (Ebersberger, Bloch, Herstad, and Van de Velde, 2012). In addition, this study is also relevant for SMEs and other actors that use these insights for potential collaboration with external firms to enable them in specialization strategies. This study can also be applied to SMEs in traditional industries, by exploring in technical specialization (Chesbrough, 2017) to allow them to produce innovative products. This study enables SMEs managers to have different perceptions about the benefits of adopting open innovation practices as well as policy makers to make a considerable contribution to transform the current policies encouraging sustainability in industries (De Backer and Cervantes, 2008).

It is also believed that SMEs will be able to use this opportunity by endorsing this study as empirical evidence by adopting open innovation to increase their level of innovativeness in order to achieve competitiveness, resource-efficient and sustainability. The potentials to obtain specialized expertise through collaboration is important for SMEs, to transform their operational skills into best practices (Zanzouri and Francois, 2013). In the era of globalization, SMEs should adopt open innovation practices to collaborate with large firms especially to be more open with non-competing parties who do not threaten their business (Ahn *et al.,* 2015). Diversification approaches can also be undertaken with open innovation practices by incorporating with other firms in other industries, thus creating additional value for the whole networks (Funk and Luo, 2015).

6. Conclusions

SMEs face difficult market environments and changes need to be made in order to seek new methods in differentiating their products as well the creation of new

businesses. Therefore collaboration with external partners enables SMEs to gain technology to produce more innovate products successfully and to gain market shares. Open Innovation is considered to be a new model for and the advantages of it is that SMEs are not required to be fully involved in R&D in order to be successful. SMEs collaborations with external parties in achieving external technology will become a major boost for SMEs not only to capture the local market but also the global market and continue to be profitable in the long term.

In addition, the social factors also indirectly impacts and determines the range, volume of production, pushing the requirements for an innovative product, and ultimately affects the quality. Therefore, social factors have a substantial influence on innovative activity and, as a consequence on the results of their innovative activity. Stability of the political environment in the country also determines the innovation efficiencies, thus increases the investment attractiveness of the domestic and foreign partners in fostering technology partnerships. This study established a need for SMEs to update their productions by implementing open innovation concept. In addition, open innovation study in SMEs helps to understand the concept and the approaches that will be a great helpful tool for practitioners and academic researchers.

7. Research Limitations and Recommendations for Future Research

Through enhancement in technology, SMEs capability in commercialising innovative ideas to other micro sectors would be another means of breakthrough of technology in smaller industries. Limitations of this study could further assist in identifying insights and directions for future research. The drawback of this study is the sample size and some biasness in the response rate due to language barriers. This study also focused in SMEs and further studies could be explored in other sectors such as traditional industries or luxury products to design unique products. Many new entrants are entering the industry and therefore timing is important to collect more comprehensive data, as such longitudinal studies should be explored to develop a robust level of overall sustainability performance. Open innovation is also considered as a multidimensional construct and therefore, future research can be complemented by introducing it as a mediating and moderating new framework relationships with other relevant variables.

References:

Ahn, J.M., Minshall, T., Mortara, L. 2015. Open innovation: a new classification and its impact on firm performance in innovative SMEs. Journal of Innovation Management, 3(2), 33-54.

Amos, E., Weathington, B.L. 2008. An analysis of the relation between employee organization value congruence and employee attitudes. The Journal of Psychology, 142(6), 615-631.

Angerer, M.L. 2014. Desire after affect. Lanham, MD, Rowman & Littlefield.

Beck, C. 2004. Developing a Culture of Innovation: A Workshop in Creativity through Communication Climate. International Journal of Knowledge and Change Management, 4, 78-94.

Beneito, P., Coscolla-Girona, P., Rochina-Barrachina, M.E., Sanchis, A. 2015. Competitive Pressure and Innovation at the Firm Level. Journal of Industrial Economics, 63(3), 422-457.

Bengtsson, L., Lakemond, N., Lazzarotti, V., Manzini, R., Pellegrini, L., Tell, F. 2015. Open to a Select Few? Matching Partners and Knowledge Content for Open Innovation Performance. Creativity and Innovation Management, 24(1), 72-86.

Bianchi, M., Campodall'orto, S., Frattini F., Vercesi, P. 2010. Enabling open innovation in small- and medium sized enterprises: how to find alternative applications for your technologies. R&D Management, 40(4), 414-431.

Blau, P.M. 1964. Exchange and power in social life. New York, John Wiley.

Bloomfield, B.P., Vurdubakis, T. 1999. The outer limits: Monsters, actor networks and the writing of displacement. Organization, 6(4), 635-655.

Bogers, M. 2011. The open innovation paradox: Knowledge sharing and protection in R&D collaborations. European Journal of Innovation Management, 14(1), 93-117.

Bogers, M., Chesbrough, H.W., Moedas, C. 2018. Open Innovation: Research, Practices, and Policies. California Management Review, 60(2), 5-16.

Brass, D.J., Galaskiewicz, J., Greve, H.R., Tsai, W. 2004.Taking stock of networks and organizations: A multilevel perspective. Academy of Management Journal, 47, 795-817.

Brown, R., Mason, C. 2014. Inside the high-tech black box: a critique of technology entrepreneurship policy. Technovation, 34(12), 773-784.

Brunswicker, S., Chesbrough, H. 2018. The Adoption of Open Innovation in Large Firms: Practices, Measures, and Risks: A survey of large firms examines how firms approach open innovation strategically and manage knowledge flows at the project level. Research-Technology Management, 61(1), 35- 45. https://doi.org/10.1080/08956308.2018.1399022.

Brunswicker, S., Vanhaverbeke, W. 2014. Open Innovation in small and medium sized enterprises. Journal of Small Business Management. doi:10.1111/jsbm.12120.

Burcharth, A.L.A., Knudsen, M.P., Sondergaard, H.A. 2017. The role of employee autonomy for open innovation performance. Business Process Management Journal, 23(6), 1245-1269. https://doi.org/10.1108/BPMJ-10-2016-0209.

Burton-Jones, A., Hubona, G.S. 2006. The mediation of external variables in the technology acceptance model. Information & Management, 43(6), 706-717.

Carayannopoulos, S., Auster, E.R. 2010. External knowledge sourcing in biotechnology through acquisition versus alliance: a KBV approach. Research Policy, 39(2), 254-267.

Chadee, D., Roxas, B. 2013. Institutional environment, innovation capacity and firm performance in Russia. Critical Perspectives on International Business, 9(1), 19-39.

Chang, C.C., Tsai, M.C., Tsai, M.S. 2011. Influences of the Organizational Citizenship Behaviors and Organizational Commitments on the Effects of Organizational Learning in Taiwan. International Conference on E-business, Management and Economics (IPEDR), 3, 37-41.

Cheng, C.C.J., Huizingh, E.K.R.E. 2014). When is open innovation beneficial? The role of strategic orientation. Journal of Product Innovation Management, 31(6), 1235-1253.

Chesbrough, H.W. 2003. The Era of Open Innovation. MIT Sloan Management Review, 44(3), 35-41.

Chesbrough, H.W. 2017. The Future of Open Innovation. Research-Technology Management, 60(1), 35-38.

Chiesa, V. 2001. R&D Strategy and Organisation: Managing Technical Change in Dynamic Contexts. London, Imperial College Press.

Chiles, T.H., McMackin, J.F. 1996. Integrating variable risk preferences trust and transaction cost economics. Academy of Management Review, 21(7), 73-99.

Cohen, J. 1988. Statistical Power Analysis for the Behavioral Sciences (2nd ed.). Hillsdale, NJ, Lawrence Erlbaum Associates, Publishers.

Colombo, M.G., Piva, E., Rossi-Lamastra, C. 2014. Open innovation and within-industry diversification in small and medium enterprises: The case of open source software firms. Research Policy, 43(5), 891-902.

Creswell, J.W. 2012. Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Boston, Pearson.

Curley, M., Salmelin, B. 2013. Open Innovation 2.0: A New Paradigm. White paper. EU Open Innovation Strategy and Policy Group.

Dahlander, L., O'Mahony, S., Gann, D.M. 2016. One Foot in, One Foot out: How Does Individuals' External Search Breadth Affect Innovation Outcomes? Strategic Management Journal, 37(2), 280-302.

De Backer, K., Cervantes, M. 2008. Open Innovation in Global Networks. OECD Publishing, Paris.

de Jong, J.P.J., Vanhaverbeke, W., van de Vrande, V. 2007. Open innovation in SMEs: Trends, motives and management challenges. Technovation, 29 (6-7), 423-437.

Deluga, R.J. 1998. Leader-member exchange quality and effectiveness ratings: The role of subordinate-supervisor conscientiousness similarity. Group and Organization Management, 23(2), 189-216.

den Butter, F.A.G. 2010. Transaction management: Value creation by reducing transaction costs. Ti Discussion Papers Series, No. 10-051/3. Amsterdam, Tinbergen Instituut.

Distanont, A., Khongmalai, O. 2018. The role of innovation in creating a competitive advantage. Kasetsart Journal of Social Sciences. https://doi.org/10.1016/j.kjss.2018.07.009.

Dodourova, M., Bevis, K. 2014. Networking innovation in the European car industry: Does the Open Innovation model fit? Transportation Research Part A: Policy and Practice, 69, 252-271.

Ebersberger, B., Bloch, C., Herstad, S.J., van de Velde, E. 2012. Open innovation practices and their effect on innovation performance. International Journal of Innovation and Technology Management, 9(6), 1-22.

Economic Census. 2016. Overview of SMEs in Malaysia by state. Department of statistics Malaysia (DOSM). Retrieved from: https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=RDRSYVRzK1JFcmh0dm5mV1I 4NkFJQT09.

Estrin, S., Prevezer, M. 2011. The role of informal institutions in corporate governance: Brazil, Russia, India, and China compared. Asia Pacific Journal of Management, 28(1), 41-67.

Fornell, C., Larcker, D.F. 1981. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Funk, J.L., Luo, J. 2015. Open Standards, Vertical Disintegration and Entrepreneurial Opportunities: How Vertically-Specialized Firms Entered the U.S. Semiconductor

Industry. Technovation, 45-46, 52-62. https://doi.org/10.1016/j.technovation.2015.07.001.

Gama, F., Frishammar, J., Parida, V. 2019. Idea generation and open innovation in SMEs: When does market-based collaboration pay off most? Creativity and Innovation Management, 28(1), 113-123. https://doi.org/10.1111/caim.12274.

Gassmann, O., Enkel, E., Chesbrough, H. 2010. The future of open innovation. R&D Management, 40(3), 213-221.

Gerbman, R.V. 2000. Corporate universities. HRMagazine, 45(2), 101-106.

Goksoy, A., Vayvay, O., Ergeneli, N. 2013. Gaining competitive advantage through innovation strategies: An application in warehouse management processes. American Journal of Business and Management, 2(4), 304-321.

Graham, J.W. 1991. An essay on organizational citizenship behavior. Employee Responsibilities and Rights Journal, 4, 249-270.

Gregory, A., Aarons, G., Carmazzi, A. 2005. Organizational Culture and Climate and Attitude toward Innovation Adoption. In 20th Annual SIOP Conference California.

Hair, J.F., Black, W.C., Babin, B.J. 2010. Multivariate Data Analysis-A Global Perspective, (7th Ed.). Harlow, Essex, UK, Pearson Education Ltd.

Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M. 2014. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Thousand Oaks, Sage.

Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M. 2017. A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM), (2nd ed.). Thousand Oaks, CA, Sage Publications, Inc.

Harison, E., Koski, H. 2010. Applying open innovation in business strategies: Evidence from Finnish software firms. Research Policy, 39(3), 351-359.

Hartnell, C.A., Ou, A.Y., Angelo, K. 2011. Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. Journal of Applied Psychology, 96, 677-694. doi: 10.1037/a0021987.

Henseler, J., Fassott, G. 2009. Testing moderating effects in PLS path models: An illustration of available procedures. In: V. Esposito Vinzi, W.W. Chin, J. Henseler, H. Wang (Eds), Handbook of partial least squares: Concepts, methods, and applications. Berlin, Springer.

Henseler, J., Hubona, G., Ray, P.A. 2016. Using PLS path modeling in new technology research: updated guidelines. Industrial Management & Data Systems, 116(1), 2-20.

Henseler, J., Ringle, C., Sinkovics, R. 2009. The Use of Partial Least Squares Path Modeling in International Marketing. Advance in International Marketing, 20, 277-319. http://dx.doi.org/10.1108/S1474-7979(2009)0000020014.

Higgins, M.J., Rodriguez, D. 2006. The outsourcing of R&D through acquisition in the pharmaceutical industry. Journal of Financial Economics, 80, 351-383.

Huff, L., Kelley, L. 2005. Is Collectivism a Liability? The Impact of Trust on Organizational Trust and Customer Orientation: A Seven-Nation Study. Journal of Business Research, 58(1), 96-102.

Iriana, R., Buttle, F. 2006. Customer Relationship Management (CRM) System Implementations. The international journal of knowledge, culture and change management, 6(2), 137-147.

Ishak, N.A. 2005. Promoting Employees' Innovativeness and Organizational Citizenship Behaviour through Superior-Subordinate Relationship in the Workplace. Research and Practice in Human Resource Management, 13(2), 16-30.

Jang, H., Lee, K., Yoon, B. 2017. Development of an open innovation model for R&D collaboration between large firms and small-medium enterprises (SMEs) in manufacturing industries. International Journal of Innovation Management, 21(1), 1-29.

Jaskyte, K., Dressler, W.W. 2004. Studying Culture as an Integral Aggregate Variable: Organizational Culture and Innovation in Nonprofit Organizations. Field Methods, 16(3), 265-284.

Kim, N., Kim, D.J., Lee, S. 2015. Antecedents of open innovation at the project level: empirical analysis of Korean firms. R&D Management, 45(5), 411-439.

Korunka, C., Scharitzer, D., Carayon, P., Hoonakker, P., Sonnek, A., Sainfort, F. 2007. Customer orientation among employees in public administration: A transnational, longitudinal study. Applied Ergonomics, 389(3), 307-315.

Kottke, J.L. 1999. Corporate universities: Lessons in building a world-class work force (revised). Personnel Psychology, 52, 530-533.

Krasnicka, T., Glod, W., Wronka-Pospiech, M. 2018. Management innovation, proinnovation organisational culture and enterprise performance: testing the mediation effect. Review of Managerial Science, 12, 737-769.

Laursen, K., Salter, A. 2014. The paradox of openness: Appropriability, external search and collaboration. Research Policy, 43(5), 867-878.

Lazzarotti, V., Manzini, R., Pellegrini, L. 2015. Is your open-innovation successful? The mediating role of a firm's organizational and social context. The International Journal of Human Resource Management, 26(19), 2453-2485.

Lichtenthaler, U. 2011. Open innovation: past research, current debates, and future directions. Academy of Management Perspectives, 25(1), 75-93.

Li, J.J., Poppo, L., Zhou, K.Z. 2008. Do managerial ties in China always produce value? Competition, uncertainty, and domestic vs. foreign firms. Strategic Management Journal, 29(4), 383-400.

Lowry, P.B., Gaskin, J. 2014. Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. IEEE Transactions on Professional Communication, 57(2), 123-146.

Malinowski, B. 1922. Argonauts of the western Pacific: An account of native enterprise and adventure in the archipelagos of Melansian New Guinea. London, Routledge.

Markkula, M., Kune, H. 2012. Pioneering regions and societal innovations as enablers for the Europe 2020 strategy, Open Innovation 2012. European Commission, 56-59.

Mauss, M. 1925. The gift: Forms and functions of exchange in archaic societies. New York, The Norton Library.

Mohamad Radzi, K., Mohd Nor, M.N., Mohezar Ali, S. 2017. The impact of internal factors on small business success: A case of small enterprises under the FELDA scheme. Asian Academy of Management Journal, 22(1), 27-55. https://doi.org/10.21315/aamj2017.22.1.2.

Mukhtar, A., Sial, M.A., Imran, A., Jilani, S. 2012. Impact of HR practices on organizational citizenship behavior and mediating effect of organizational commitment in NGOs in Pakistan. World Applied Sciences Journal, 18(7), 901-908.

Naqshbandi, M.M., Kaur, S. 2013. A Study of Organizational Citizenship Behaviours. Organizational Structures and Open Innovation.

Naqshbandi, M.M., Kaur, S. 2014. Do managerial ties support or stifle open innovation? Industrial Management & Data Systems, 114(4), 652-675.

Naranjo-Valencia, J.C., Jimenez-Jimenez, D., Sanz-Valle. R. 2011. Innovation or imitation? The role of organizational culture. Management Decision, 49(1), 55-72. doi:10.1108/00251741111094437.

Nunnally, J.C. 1978. Psychometric theory (2nd ed.). New York, McGraw-Hill.

Okamuro, H., Nishimura, J., Colombo, M. 2019. Promoting SME R&D and Innovation, SME policy faced with development of financial technology. Retrieved from: https://t20japan.org/wp-content/uploads/2019/03/t20-japan-tf9-2-promoting-research-development-innovation-smes.pdf.

Okundaye, K., Fan, S.K., Dwyer, R.J. 2019. Impact of information and communication technology in Nigerian small- to medium-sized enterprises. Journal of Economics, Finance and Administrative Science. https://doi.org/10.1108/JEFAS-08-2018-0086.

Omari, S.M., K'Obonyo, P., Kidombo, A.H. 2012. Human Resource Practices, the Relationship between Locus of Control and Employee Outcomes. DBA Africa Management Review, 90-99.

Organ, D.W., Podsakoff, P.M., MacKenzie, S.B. 2006. Organizational citizenship behavior: Its nature, antecedents, and consequences. USA, Sage Publications, Inc.

Oxley, J.E., Sampson, R.C. 2004. The scope and governance of international R&D alliances. Strategic Management Journal, 25, 723-749.

Parida, V., Westerberg, M., Frishammar, J. 2012. Inbound Open Innovation Activities in High-Tech SMEs: The Impact on Innovation Performance. Journal of Small Business Management, 50(2), 283-309.

Patel, P.C., Conklin, B. 2012. Perceived Labor Productivity in Small Firms-The Effects of High-Performance Work Systems and Group Culture Through Employee Retention. Entrepreneurship Theory and Practice, 36(2), 205-235.

Peng, M.W., Luo, Y. 2000. Managerial ties and firm performance in a transition economy: The nature of a micro- macro link. Academy of Management Journal, 43(3), 486-501.

Phene, A., Tallman, S., Almeida, P. 2012. When do acquisitions facilitate technological exploration and exploitation? Journal of Management, 38(3), 753-783.

Pierre, A., Fernandez, A.S. 2018. Going Deeper into SMEs' Innovation Capacity: An Empirical Exploration of Innovation Capacity Factors. Journal of Innovation Economics, De Boeck Universite, 25(1), 139-181.

Podsakoff, P.M., Ahearne, M., MacKenzie, S.B. 1997. Organizational citizenship behavior and the quantity and quality of work group performance. Journal of Applied Psychology, 82(2), 262-270.

Podsakoff, P.M., Mackenzie, S.B., Paine, J.B. 2000. Organizational Citizenship Behaviors: A Critical Review of the Theoretical and Empirical Literature and Suggestions for Future Research. Journal of Management, 26, 513-563. http://dx.doi.org/10.1177/014920630002600307.

Podsakoff, N.P., Whiting, S.W., Podsakoff, P.M., Blume, B.D. 2009. Individual-and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. Journal of Applied Psychology, 94(1), 122-141.

Puffer, S.M., McCarthy, D.J., Jaeger, A.M., Dunlap, D. 2013. The use of favors by emerging market managers: Facilitator or inhibitor of international expansion. Asia Pacific Journal of Management. doi:10.1007/s10490-012-9299-3.

Pullen, A.J., Weerd-Nederhof, P.C., Groen, A.J., Fisscher, O.A. 2012. Open innovation in practice: goal complementarity and closed NPD networks to explain differences in innovation performance for SMEs in the medical devices sector. Journal of Product Innovation Management, 29(6), 917-934.

Rahman, M.M., Kumaraswamy, M. 2004. Potential for implementing relational contracting and joint risk management. ASCE Journal of Management in Engineering, 20(4), 178-189.

Reinartz, W.J., Haenlein, M., Henseler, J. 2009. An empirical comparison of the efficacy of covariance-based and variance-based SEM. International Journal of Research in Marketing, 26(4), 332-344.

Rigdon, E.E. 2016. Choosing PLS path modeling as analytical method in European management research: A realist perspective. European Management Journal, 34(6), 598-605.

Saunila, M. 2014. Innovation capability for SME success: perspectives of financial and operational performance. Journal of Advances in Management Research, 11(2), 163-175.

Schrader, S., Riggs, W., Smith, R. 1993. Choice Over Uncertainty and Ambiguity in Technical Problem Solving. Journal of Engineering and Technology Management 10(1-2), 73-99.

Schuster, G., Brem, A. 2015. How to benefit from open innovation? An empirical investigation of open innovation, external partnerships and firm capabilities in the automotive industry. International Journal of Technology Management, 69(1), 54-76.

Sekaran, U., Bougie, R.J. 2016. Research Methods for Business: A Skill Building Approach, (7th ed.). West Sussex, England, John Wiley & Sons.

Sivam, A., Dieguez, T., Ferreira, L.P., Silvaa, F.J.G. 2019. Key settings for successful Open Innovation Arena. Journal of Computational Design and Engineering. https://doi.org/10.1016/j.jcde.2019.03.005.

SME Corp. 2019. SME Definitions, Retrieved from: http://www.smecorp.gov.my/index.php/en/policies/2015-12-21-09-09-49/sme-definition.

Smith, C.A., Organ, D.W., Near, J.P. 1983. Organizational citizenship behavior: Its nature and antecedents. Journal of Applied Psychology, 68(4), 653-663. http://dx.doi.org/10.1037/0021-9010.68.4.653.

Spicer, A., Alvesson, M., Kärreman, D. 2009. Critical performativity: The unfinished business of critical management studies. Human Relations, 62(4), 537-560.

Spithoven, A., Clarysse, B., Knockaert, M. 2011. Building absorptive capacity to organize inbound open innovation in traditional industries. Technovation, 31(1), 10-21. https://doi.org/10.1016/j.technovation.2010.10.003.

Streets, R., Boundary, C. 2004. Managing Innovation. Australian Institute of Management - Version 1.0.

Tajudin, M.M., Musa, N.C. 2018. Issues and Trends in Open Innovation amongst Malaysian Fintech Start-ups. International Journal of Academic Research in Business and Social Sciences, 8(9), 1949-1964. http://dx.doi.org/10.6007/IJARBSS/v8-i9/4874.

Tebaldi, E., Elmslie, B. 2013. Does institutional quality impact innovation? Evidence from cross country patent grant data. Applied Economics, 45(7), 887-900.

Theyel, N. 2013. Extending open innovation throughout the value chain by small and mediumsized manufacturers. International Small Business Journal, 31(3), 256-274.

Tidd, J. 2014. Introduction: why we need a tighter theory and more critical research on open innovation. In Tidd, J. (Ed.), Open Innovation Research, Management and Practice, Hackensack, NJ, 1-11, World Scientific.

Torok, A., Toth, J. 2013. Open characters of innovation management in the Hungarian wine industry. Agricultural Economics/Zemedelska Ekonomika, 59(9), 430-439.

Tucker, A.L., Edmondson, A.C., Spear, S. 2002. When problem solving prevents organizational learning. Journal of Organizational Change Management, 15(2), 122-137. https://doi.org/10.1108/09534810210423008.

Van de Vrande, V., De Jong, J.P., Vanhaverbeke, W., De Rochemont, M. 2009. Open innovation in SMEs: trends, motives and management challenges. Technovation, 29(6), 423-437.

Vincent, L.H., Bharadwaj, S.G., Challagalla, G.N. 2004. Does innovation mediate firm performance? A meta-analysis of antecedents and consequences of organizational innovation. Working paper, Atlanta, GA, Georgia Institute of Technology.

Williamson, O. 1985. The economic institutions of capitalism. New York, Free Press.

Yang, Q., Zhao, X., Yeung, H.Y.J., Liu, Y. 2016. Improving logistics outsourcing performance through transactional and relational mechanisms under transaction uncertainties: Evidence from China. International Journal of Production Economics, 175, 12-23.

Yen, H.R., Niehoff, B.P. 2004. Organizational Citizenship Behaviors and Organizational Effectiveness: Examining Relationships in Taiwanese Banks. Journal of Applied Social Psychology, 34(8), 1617-1637. http://dx.doi.org/10.1111/j.1559-1816.2004.tb02790.x

Zanzouri, C., Francois, J.C. 2013. Knowledge management practices within a collaborative R&D project: case study of a firm in a cluster of railway industry. Business Process Management Journal, 19(5), 819-840.

Zobel, A.K., Lokshin, B., Hagedoorn, J. 2017. Formal and informal appropriation mechanisms: The role of openness and innovativeness. Technovation, 59.