



Acceptance of Open Innovation Model in Malaysian SMIs

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Studies on open innovation in Small Medium Industries (SMIs) lack comprehensive review. The objective of this study is to analyse adoption of open innovation in SMIs by integrating empirical findings. Findings suggest that most studies conducted on larger companies and studies focussed on organisational structures but lacking in behavioural and cost aspects. In addition, most of the studies conducted based on qualitative studies and only few studies conducted using quantitative analysis. Most of the studies conducted in Europe and other developed countries, while studies in developing countries are lacking and no studies have been conducted in Malaysian SMIs. Relevant theories and models for managers have been established to support the arguments. This study will investigate whether open innovation enables productivity and improve the performances of SMIs or otherwise. This is a conceptual paper undertakes to study the adoption of Open Innovation (OI) model in Malaysian SMIs. This study examines the effects of organizational behaviour and organizational cost in determining the adoption of OI. Therefore the factors that have been initiated to analyse the level of adoption are Organisational Citizenship Behaviour (OCB), Organisational Culture, Managerial Ties, and Transaction Cost on open innovation adoption. Appropriability Regimes has been used as moderating effect to analyse the strength of the relationship. The factors outlined in the paper were analysed with the support of theoretical framework of Social Exchange Theory and Actor Network theory.

Keywords: Open Innovation, Small Medium Industries, Adoption, Malaysia



Introduction

Open innovation concept was introduced by Chesbrough (2003a) and defined it as inflow and outflow of technological knowledge to increase and to expand the use of external innovation (Chesbrough et al. 2006). Most studies focused on the strategies and the successful adoption of open innovation in large organisations (Chesbrough 2003b; van de Vrande et al. 2009; Bianchi et al. 2010). However, studies on open innovation in the context of SMIs are still in early stages and most of them are based on qualitative analysis. According to Rahman and Ramos (2010), SMIs faces managerial and technological capabilities for an effective productions and merely 20% and less SMIs are adopting open innovation concept due to culture and strategies (Colombo et al. 2014). Studies on SMIs are fragmented Bianchi et al. (2010) and Colombo et al. 2014) and therefore it is argued that SMIs would be able to achieve more benefits from the open innovation as the ability to react to changing environments are greater than larger organisations (Parida et al. 2012).

There are various approaches that can assist SMIs in overcoming obstacles to adopt open innovation successfully and other options needed to explore issues that have not been studied. The objective of this study is to examine organisational behaviour and costs in adoption of open innovation among SMIs through empirical findings. Collaborations with external partners enable SMIs to gain technological knowledge which are not achievable for the closed innovation (Colombo et al. 2014). Social capital and human capital is the main determinant of SMIs adoption of open innovation as the activities includes boundary spanning role (Comacchio et al. 2012). Closeness among external players is the main obstacles in innovative activities (Idrissia et al. 2012) and therefore SMIs need to focus significantly on the selection of partners (Theyel, 2013). Searching activities is not an easy task as it involves partners' innovative ideas, knowledge etc. and according to Lee et al. (2010) and Spithoven et al. (2013), searching strategies provides less beneficial to SMIs as it involves costs. The costs involved are resources, complexity of the technology, coordination, operations and upgrading relevant technologies (Abouzeedan et al. 2013).

In developing countries, such as Malaysia use of innovation hubs might help SMIs to communicate, connect and collaborate with external parties to jumpstart innovation practices (Vrgovic et al. 2012). Managerial capability and competencies are few factors that are crucial in determining open innovation practices among SMIs Wynarczyk (2013). Kim et al. (2014) proposed that workforce size and openness policies are essential for the successful of open innovation as it supports cooperation and collaboration within internal and external players. Therefore SMIs need to embrace informal organisational approaches Bocken et al. (2014) by formulating policies to participate in network support programs to encourage the development of external networks in the industry (McAdam et al. 2014) which also includes government's initiatives in setting up public funding to focus on SMIs needs. Managerial capabilities should be integrated with the current managerial system for open innovation adoption (Brunswick and Ehrenmann 2013). This is crucial if SMIs intend to integrate the concept of absorptive capacity (Grimaldi et al. 2013). In addition Teirlinck and Spithoven (2013) argued that open innovation will complement closed innovation but in order for that to happen, there is a need to incorporate absorptive capacity through managerial skills.

The survival of SMIs in a dynamic environment depends on SMIs strategies Milling and Stumpfe, (2000) and how innovative they are for competitive advantages (Dess and Picken, 2000; Tushman and O'Reilly, 1996). The question of 'how to innovate' in SMIs still draws many researchers attention. Clausen, et al (2013) used past theory to categorize innovation in four modes such as



open exploration, closed exploration, open exploitation, and close exploitation. However, according to researchers, SMIs have limited internal innovation capabilities and capacities as compared to large corporations. Though, this notion has been refuted by Kaufmann and Todtling (2002) who pointed out that SMIs are more innovative due to their diverse character but are constrained in innovative due to human resource and financial capacities. Despite the government's priority and emphasis on SMIs, researchers question the role of innovation in the overall performance of the SMIs. Hill et al (2012) evidenced the downfall of SMIs growth. Therefore, it is important to evaluate the role of innovation towards SMIs performance and growth. According to SME International Malaysia (2013), SMIs in advanced countries have been successful in their businesses unlike in Malaysia where the successful rate is still declining. Developing stronger SMIs require major changes in the manufacturing sector, as 90% of SMEs in Malaysia's comprises of manufacturing sector. Many researchers who are investigating SMIs have given limited attention to innovation especially in Malaysian context (Hin et al., 2013).

Problem Statement

Innovation is crucial for SMIs to gain opportunities from new inventions and create new markets Kuhn & Marisck, (2010) and achieving competitive advantage (Birkinshaw, 2011; Clawson, 2009; Grant, 2010; Hamel, 2002; Kim & Mauborgne, 2005). As businesses compete, the capability to innovate at a faster pace and managing the innovation processes is extremely important due to the limited resources. Open innovation provides a platform for SMIs to alter the production perception from relying on internal R & D to external R & D. Many big companies have succeeded in their productions by adopting open innovation but some have failed in the adoption (Chesbrough, 2003b). The first problem to be addressed in this research is that most researchers do not view behaviours as a crucial factor in determining the adoption of open innovation especially in SMIs as researchers' view that there is no connection.

There are instances of managers who commonly known as owner or person managing in most SMIs take a position on company rules and regulations without having insight in the welfare of workers. Therefore, managers in small organisations play an important role in the adoption of open innovation as successful organisations have innovative managers that provide doorways to pay attention to new ideas, needs and opportunities (Gassmann, et al. 2010). As such, innovative behaviour of managers is important in addressing the issue of having to do more in terms of innovation (Amo 2006). Managers that participate in innovation initiatives by exploring new ways to encourage employees to adopt innovative behaviours and innovation itself are crucial in the implementation of open innovation.

Discussion of the Literature

Organisational Citizenship Behaviour

Behaviour is considered to have critical impact on firms operations and effectiveness (Motowidlo, 2000). The founding researches of Organisational Citizenship Behaviour (OCB) stressed on extra-role functions and separate from in-role job functions (Bateman & Organ, 1983; Smith, et al. 1983). OCB concept aims at identifying work behaviours among managers that lead to effectiveness of organisations Van Dyne, et al., (1994) which exceeds the minimum role requirements and expectations and promotes the welfare of co-workers, work groups or the organisation. OCB can contribute to organisational performance as these behaviours provide an effective means of managing the interdependencies between members of a work unit and resultantly increase the collective outcomes achieved (Naqshbandi and Kaur, 2011 & 2013). OCB is not enforceable by any agreements as they are not considered as formal role requirements (Smith, et al., 1983). The relationship between OCB and managers' performances has only been investigated in the closed



innovation paradigm but less study has been undertaken to study the relationship between OCBs and performance in open innovation paradigm (Naqshbandi, and Kaur, 2011) but no studies has been conducted on SMIs.

Organisational culture

Obstacles to open innovation adoption were studied by Mortara et al., (2009); Lichtenhaler & Ernst (2006) and Golingy et al., (2012) and concluded that the common barriers that were related to organisational culture are procedure, motivation, employee, structures and innovation skills. The culture impact is crucial among old and well established firms as these firms are accustomed with conventional norms and corporate values (Golingy et al., 2012). Therefore, opening up the innovation process may require things to be done in a different ways which contradicts to the previous system. This may require a transformation in the organisational culture which is the fundamental in an organisation that is proven to be very challenging (Mortara et al., 2009). The importance of innovation to the organisational culture has been emphasized by various authors such as Baldwin (1995), Martins and Terblanche (2003), Angel (2006) and Turock (2001).

Managerial ties

Managerial ties has been an eye opener for SMIs to capture opportunities Peng & Luo, (2000) as innovative managers involved in boundary-spanning activities through interaction with external actors (Geletkanycz & Hambrick, 1997). In developing countries like Malaysia, gaining resources need supports from external parties and therefore ties with external parties are crucial Sheng, Zhou, & Li, (2011) to access scarce resources (Li, et al. 2008). This is due to uncertainty environment Li & Zhou, (2010) and therefore managing and improving firms' performance is the ultimate goals (Adler & Kwon, 2002). Bonding with external parties empowers SMI managers to reach their potential and to grow (Naqshbandi & Kaur, 2011). This is to ensure that firms business grow without failures since SMIs challenged with uneven, complex and challenging economic environment (Naqshbandi & Kaur, 2011). SMIs need to prepare themselves for challenges as they always lack the preparation (Velegrakis, et al. 2009 & Velegrakis, et al. 2011).

Transactional Costs

Transactional Costs focuses on firm's size effectiveness, experience and knowledge as to either to adopt open innovation or make decision to proceed with closed innovation concept. Different viewpoints, sources and consideration of various factors that impacts the probabilities of SMIs venturing in open innovation model. It includes technological knowledge, competencies, current knowledge base and the capability to learn. A closely related stream of literature is one that deals with 'make-or-buy' decisions (Masten and Meehan, 1989; Monteverde and Teece, 1982; Williamson, 1971; Wolter and Veloso, 2008), indicating that companies should use external technology for production if TC is considered low and use internal technology if TC is higher compared to external technology. Transaction cost has not been examined to the best knowledge of the researcher from an open innovation (OI) perspective for SMIs where there seem to be a lack of light shed in this aspect. The challenges faced by SMIs especially in terms of transaction costs incurred due to resources, complexity of open innovation procedures, coordination and operations functions (Abouzeedan et al. 2013). In addition, licensing with external parties in short term is not beneficial as it will increase the overall costs of productions (Andries and Faems 2013). The complexity of relationship between SMIs and external parties might incur high transaction costs (Dodourova and Bevis 2014) as SMIs have weak ties with external parties. However, according to Pullen et al. (2012) SMIs practice open innovation activities even though faces barriers while adopting open innovation.



Appropriability regime

There are lack of researches in an attempt to acknowledge the appropriability regime relationship and influence towards the effectiveness of open innovation adoption. Effectiveness of IPs is important in making open innovation successful. Laursen and Salter (2005) found positive relationship between intellectual property and open innovation. SMIs easily end up losing to competitors and imitators in the business race. Many methods of blocking imitation have been found and examined (Teece 1998, Dierickx and Cool 1989; Lippman and Rumelt 1982; Polanyi 1966 and Barney 1991). However those are numerous studies on the relationship between appropriability regime and closed innovation model (Dosi et al. 2006). In this study, it investigates the types openness is required for a conducive appropriability in which SMIs will be able to choose and adopt such approach for an effective protection mechanisms (Fischer and Henkel, 2013). The choice that SMIs make will determine the degree of openness to external parties.

Therefore this study is important to analyse the relationship between various forms of protectionism instruments and the category of openness that is accepted by SMIs. In addition, the choices of appropriability will shape the openness and SMIs performances. This study will provide guidance for SMIs to meet the requirements for open innovation adoption and the types of policies that should be in place when associating with external parties. In addition, the appropriability environment consequences can be improved if the suggestions of this study could assist SMIs in deciding whether is it beneficial or disadvantage to adopt open innovation (Chesbrough, et al., 2006). The study of appropriability is critical in open innovation setting as it may have adverse outcome if not done so. This study is intended to identify and understand the factors that affect the SMIs adoption of open innovation. Therefore, this study is significant because it will explore a number of factors that affect the SMIs organisational behaviour towards innovation and examines those factors and make recommendations for future research.

Theoretical Framework

This study is based on Social Exchange Theory (SET) and Actor Network Theory (ANT). Both theories have been chosen as it covers wide knowledge such as organisational behaviour, networks and innovation management. Social Exchange Theory (SET) deals with people's interaction and in return anticipates reward and expectations (Emerson, 1976). At present both theories are equally important in management research. SET also indirectly adopts extra role behaviours which are acknowledged, valued and rewarded (Ishak, 2005). SET extended to managers in this study setting by gaining benefits from employees if OCB has been practiced. This is important for firms to overcome challenges when adopting open innovation. SET benefits can also be rewarded in the form of recognition. Social Exchange Theory (SET) deals with people's interaction and in return anticipates reward and expectations (Emerson, 1976).

Meanwhile Actor Network theory (ANT) is a network based and all actors agree that the networks are worth creating and preserve it (Law & Hassard, 1999). Both theories have been chosen as it covers wide knowledge such as organisational behaviour, networks and innovation management. SET indirectly adopts extra role behaviours such as acknowledgment, values and rewards (Ishak, 2005). SET extended to managers in this study setting by gaining benefits from changes in employees' behaviour if OCB practiced. This is important for SMIs to overcome challenges when adopting open innovation as the benefits can also be rewarded in the form of recognition. ANT identifies the relevant actor such as managers who represents the main actors and able to identify the internal staff and external partners whom can act as a team. Securing the actors such as internal staffs or external partners and negotiate the condition of their involvement in crucial in ensuring



the success rate of open innovation adoption (Beauregard, 2012). The task of the primary actor is to define the roles for the actors and able to influence the actors to accept their roles that have been defined for them (Andrea & André 2008). These actors have the potentials to exhibit OCBs and finally these actors in the network represent the multitude and the benefits for SMIs to grow (Latour, 2005).

The SET and ANT model is appropriate for this study because it allows the researcher to understand the behaviour and cost perceptions which is crucial in influencing the adoption level. Literatures used in this study are based on theoretical aspects and the methods adopted based on minimal biasness. Databases in fields such as sociology, social sciences, psychology, organisational behaviour and economics were used to acquire literature on the topic. The findings of the research include the factors that influence the level of adoption and what factor seems to be most influential and whether SMIs perceptions of innovation has changed over time.

Conclusions from the literature are drawn that states that open innovation plays a key role in SMI's survival but the SMIs interpretation and perception towards open innovation should also be taken into consideration. The paper ends with recommendations on future research on how SMI's experience with open innovation perceptions and attitudes towards innovation and future research to better SMIs perceptions of innovation.

Research Methodology

Based on the literature review it is believed that the key business challenges facing Malaysian SMIs is the inaccessibility to technology, innovation infrastructure, behaviours and costs. Factor analysis will be conducted to examine the questionnaire structure which emphasizes on Likert scale. Item analysis and internal consistency of the derived factors is then assessed using SPSS and AMOS. Survey will be conducted through questionnaires, interviews and observations. Data will be gathered from managers who own or works in SMIs companies to study their behaviour, organisational culture, external ties, awareness of transactional costs, and protection towards open innovation. The unit of analysis for this study is individual responses and purposive sampling method is best suited to determine and locate the population sample and it is based on companies that are adopting open innovation. The selection of the sample SMIs was limited to companies undertaking manufacturing businesses.

Data Collection

This is a conceptual paper that is based solely on perceptions towards adopting open innovation. Quantitative method mainly used in this research because the research question would be a casual one and the procedures for conducting research would be to create a valid instrument that measures behavioural and cost perceptions toward open innovation. That survey questions will be validated by academicians and industry experts and the sample population to be studied ranging 300 SMIs. The sample would consist of managers who are operating SMIs with at least 5 years experiences, and the company is undertaking some form of open innovation practices.

Data Analysis Strategies

The questions from the survey use 5 point likert scale it will be easier to analyse the data. The responses to each question will be tallied in an SPSS spread sheet. In the event, respondents who are inexperienced will be placed in a separate SPSS sheet to analyse further. Structural Equation Modelling (SEM) is selected in this study because it is a very powerful multivariate analysis technique. Structural equation models (SEM) allow both confirmatory and exploratory modelling, meaning they are suited to both theory testing and theory development (Garson, 2015). According to Garson, (2015), the use of SEM was successful in various studies especially in testing models



with moderating relationships (Byrne, 2010). Hierarchical regression is used to evaluate the relationship between a set of independent variables and the dependent variable and the impact of a different set of independent variables on the dependent variable Hair et al. (1998) where the independent variables are analysed in a sequence of groups. From the responses, conclusions will be made about whether experience SMI managers able to adopt open innovation with behaviour and welfare affects and whether those managers who have Innovative behaviour have a more positive attitude toward open innovation.

Ethical Considerations

The respondents of this research will be briefed of the purpose of the study and the expectation from them. Respondents who participate in the survey will be briefed that all the information provided by respondents will be treated as highly confidential. Respondents also will be informed that their participation is voluntary and are free to exit whenever they want.

Conclusions

The findings of this study will draw conclusions about what are the most significant factors that will affect SMI perception towards open innovation in terms of organisational behaviour and costs and make recommendations for future research. It will be obvious that no single factor would be responsible for perceptions about open innovation. The society constantly receiving information and opinions and being informed of the various technological goods that are available in the market. In order to gain the acceptance of public towards products, SMI must access all the factors that impact innovation and access those factors to promote their products. Some factors have more influence on perceptions than others. OCB is able to influence employees, culture is able to influence the way the organisation operates and manager ties enables more inflows of external ideas. Cost factor is crucial as it involves whether the products produces is compatibles to other produces in terms of price. The criterion variable in this study is Open Innovation and the predictor variables in predicting both the dimensions of the criterion variable, hierarchical multiple regressions conducted to test all the hypotheses. This study also tests Appropriability Regime as a moderator between the dimensions of the predictor variables and the criterion variables which is outlined by (Baron and Kenny 1986).

Recommendations for Future Research

Based on the literature the following recommendations for future research should be conducted to test whether experience with open innovation acts as an influential factor on productions. Further research should be conducted to improve open innovation adoption across border.

References

- Abouzeedan, A, Klofsten, M, & Hedner, T. (2013). Internetization Management as a Facilitator for Managing Innovation in High-Technology Smaller Firms. *Global Business Review*, 14(1), 121–136
- Adler, P. S., & Kwon, S.W. (2002). Social capital: Prospects for a new concept, *Academy of Management Review*, 27: 17– 40.
- Andrea W. & André, S., (2008). Is actor network theory critique? *Organization Studies* 2008 29: 611



- Andries, P, & Faems, D. (2013). Patenting activities and firm performance: Does firm size matter? *Journal of Product Innovation Management*, 30(6), 1089–1098
- Angel, R. (2006). "Putting an Innovation Culture into Practice", *Ivey Business Journal*, January/February 2006, pp. 1-5
- Amo, B.W., (2006). "Employee innovation behaviour in health care: the influence from management and colleagues." *International Nursing Review* (53): 231–237
- Baldwin, J. (1995). *Innovation: The Key to Success in Small Firms*, Statistics Canada and Canadian Institute for Advanced Research
- Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management*, Vol. 17, pp.99–120.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Bateman, T. S., & Organ, D. W. (1983). Job satisfaction and the good soldier: The relationship between affect and employee citizenship. *Academy of Management Journal*, 26, 587–595.
- Beauregard, R. (2012). "Planning with 'Things'". *Journal of Planning Education and Research* 32:182–190.
- 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.
- Birkinshaw, J., Bouquet, C., & Barsoux J.-L. (2011). The 5 myths of innovation. *MIT Sloan Management Review*, 52(2), 42-43.
- Bocken, NMP, Farracho, M, Bosworth, R, & Kemp, R. (2014). The front-end of eco-innovation for eco-innovative small and medium sized companies. *Journal of Engineering and Technology Management*, 31, 43–57.
- Brunswicker, S, & Ehrenmann, F. (2013). Managing open innovation in SMEs: A good practice example of a German software firm. *International Journal of Industrial Engineering and Management*, 4(1), 33–41.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS*, (2nd ed.). New York: Routledge
- Chesbrough, H. W. (2003a), *Open innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business Press.
- Chesbrough, H. W. (2003b). The era of open innovation, *Mit Sloan Management Review*, 44(3), 35-41.



- Chesbrough, H. W. (2006). The era of open innovation. In D. Mayle (Ed.), *Managing Innovation and Change* (pp. 127-138). London: Sage Publications Ltd.
- Clausen, T. H., & Pohjola. M. (2009). 'International Competitiveness: Internal Capabilities and Open Innovation as Sources of Export Performance.' *Micro-Dyn Working Paper 05/09*
- Clawson, J. G. (2009). *Level three leadership* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Colombo, MG, 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
- Comacchio, A, Bonesso, S, & Pizzi, C. (2012). Boundary spanning between industry and university: the role of Technology Transfer Centres. *Journal of Technology Transfer*, 37(6), 943–966
- Dess, G. G. & Picken, J. C. (2000), Changing roles: leadership in the 21st century, *Organizational Dynamics*, 28, 18–34.
- Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35(12): 1504-1511
- 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.
- Dosi, G., Marengo, L. & Pasquali, C., (2006). How much should society fuel the greed of innovators?, On the relations between appropriability, opportunities and rates of innovation. *Research Policy*, 35(8): 1110-1121.
- Dyne, V., Cummings, L. & Perks, J. M. (1995). Extra role behaviors: In pursuit of construct and definition clarity (A bridge over muddied waters). In L. L. Cummings, & B. M. Staw (Eds.), *Research in organizational behavior*, 17, (pp. 215–285). Greenwich, CT: JAI Press.
- Emerson, R. M.. (1976). Social Exchange Theory. *Annual Review of Sociology*, 2, 335–362. Retrieved from <http://www.jstor.org/stable/2946096>
- Fischer, T., Henkel, J., (2013). Contingencies of profiting from innovation: appropriability mechanisms' non-linearities. SSRN Working Paper No. 2318065 (Retrieved on 9 August 2015 from <http://ssrn.com/abstract=2318065>).
- Garson, D.G. (2015) *Structural Equation Modelling*, http://www.statisticalassociates.com/sem_p.pdf
- Gans, J.S., & Stern, S., (2003). The product market and the market for 'ideas': commercialization strategies for technology entrepreneurs. *Research Policy* 32, 333–350.
- Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The future of open innovation. *R & D Management*, 40(3), 213-221.



- Geletkanycz, M. A., & Hambrick, D. C. (1997). The external ties of top executives: Implications for strategic choice and performance. *Administrative Science Quarterly*, 42: 654-681.
- Golings, J., Ford, C., Sureka, P., & Reid, B. (2012). Realizing the Value of Open Innovation, Big Innovation Centre (2014), Retrieved from: <http://biginnovationcentre.com/Publications/20/Realising-the-Value-of-OpenInnovation>, Accessed on 20th December 2015.
- Grant, R. M. (2010). *Contemporary strategy analysis*, 7th ed, West Sussex, UK: John Wiley & Sons.
- Grimaldi, M, Quinto, I, & Ripa, P. (2013). Enabling open innovation in small and medium enterprises: A dynamic capabilities approach. *Knowledge and Process Management*, 20(4), 199–210
- Hair, J.F., Anderson, R., E; Tatham, R., L. & Black, W., C. (1998), *Multivariate Data Analysis*, 5th Edition, Upper Saddle River, NJ: Prentice Hall.
- Hamel, G. (2002). *Leading the revolution: How to thrive in turbulent times by making innovation a way of life*. Boston, MA: Harvard Business School Press.
- Hill, H., Tham, S. Y., & Zin, R. H. M. (Eds.). (2012). *Malaysia's development challenges: Graduating from the middle*, Routledge
- Hin, C. W., Kadir, K. A., & Bohari, A. M. (2013). The strategic planning of SMEs in Malaysia: Types of strategies in the aftermath of economic downturn. *Asian Journal of Business and Management Sciences*, 2(8), 51-59.
- Idrissia, M, Amaraa, N, & Landrya, R. (2012). SMEs' degree of openness: the case of manufacturing industries. *Journal of Technology Management & Innovation*, 7(1), 186–210
- Ishak, N.A. (2005). Promoting Employees' Innovativeness and Organisational Citizenship Behaviour through Superior-Subordinate Relationship in the Workplace. *Research and Practice in Human Resource Management*, 13(2), 16–30.
- Kaufmann, A., & Tödtling, F. (2002). How effective is innovation support for SMEs? An analysis of the region of upper Austria. *Technovation*, 22(3): 147-159
- Kim, N, Kim, DJ, Lee, S. (2014). Antecedents of open innovation at the project level: empirical analysis of Korean firms. *R&D Management* (in press).
- Kim, W. C., & Mauborgne, R. (2005). *Blue ocean strategy: How to create uncontested market space and make competition irrelevant*. Boston, MA: Harvard Business School Press.
- Kuhn, J. S., & Marisck, V. J. (2010). Action learning for strategic innovation in mature organizations: Key cognitive, design and contextual considerations. *Action Learning: Research and Practice*, 2(1), 27-48.
- Latour, B. (2005). *Reassembling the social, An introduction to Actor-Network Theory*. Oxford: Oxford University Press.



Laursen, K., & Salter, A. (2005). The paradox of openness of knowledge for innovation. Paper presented at the All-Academy Symposium "Open Innovation: Empirical Research on Locating and Incorporating External Innovations", August 9, 2005, 2:30 p.m. (Session #1064), Academy of Management Conference 2005, August 5-10., Honolulu, Hawaii, USA.

Law, J. & Hassard, J. (1999). Actor-Network Theory and after. Oxford: Blackwell Publishing.

Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs-An intermediated network model. *Research Policy*, 39, 290–300. <http://doi.org/10.1016/j.respol.2009.12.009>

Lichtenthaler, U. & Ernst, H. (2006). Attitudes to externally organizing knowledge management tasks: a review, reconsideration and extension of the NIH syndrome. *R&D Management*, 36, 367-386

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

Li, J. J., & Zhou, K. Z. (2010). How foreign firms achieve competitive advantage in the Chinese emerging economy: Managerial ties and market orientation. *Journal of Business Research*, 63(8): 856–862.

Lippman, S. A. & Rumelt, R. P. (1982). "Uncertain imitability: an analysis of inter firm deficiency under competition". *The Bell Journal of Economics* 13: 418-438.

Martins, E., C. & Terblanche, F., (2003) "Building organisational culture that stimulates creativity and innovation", *European Journal of Innovation Management*, Vol. 6 Issue: 1, pp.64 - 74

Masten, S., & Meehan, J. (1989). Vertical Integration in the US Auto Industry: A Note on the Influence of Transaction Specific Assets. *Journal of Economic Behavior & Organization*, 12(2), 265-273.

McAdam, M, McAdam, R, Dunn, A, & McCall, C. (2014). Development of small and medium-sized enterprise horizontal innovation networks: UK agri-food sector study. *International Small Business Journal*, 32(7), 830–853

Milling, P. M. & Stumpfe, J. (2000). 'Product and process Innovation. A system dynamics-based analysis of the interdependencies', *Industrieseminar der Universität Mannheim* [online] Available at: <http://www.systemdynamics.org/conferences/2000/PDFs/milling1.pdf> (Accessed: 17 March 2016).

Monteverde, K. & Teece, D., J.(1982). Supplier Switching Costs and Vertical Integration in the Automobile Industry, *The Bell Journal of Economics*, Vol. 13, No. 1. (Spring, 1982), pp. 206-213, Retrieved from: <http://links.jstor.org/sici?sici=0361-915X%28198221%2913%3A1%3C206%3ASSCAVI%3E2.0.CO%3B2-4>, Accessed on 30th March 2016



- Mortara, L., Napp, J., Slacik, I., & Minshall, T. (2009). How to implement open innovation: Lessons from studying large multinational companies. Cambridge: University of Cambridge Institute for Manufacturing
- Motowidlo, S.J. (2000). Some basic issues related to contextual performance and organizational citizenship behavior in human resource management. *Human Resource Management Review*, 10, 115-126.
- Naqshbandi, M. & Kaur, S. (2011). A study of Organizational Citizenship Behaviours, Organizational Structures and Open Innovation, *International Journal of Business and Social Science* Vol. 2 No. 6; April 2011, ISSN 2219-1933, Retrieved from: <http://www.ijbssnet.com/journal/index/278>, assessed on 9th February 2015.
- Naqshbandi, M. & Kaur, S. (2013). A Study of Organizational Citizenship Behaviours, Organizational Structures and Open Innovation, Retrieved from: <http://ssrn.com/abstract=2361122> or <http://dx.doi.org/10.2139/ssrn.2361122>, Accessed on 20th May 2015.
- 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.
- Peng, M.W. and Luo, Y.D. (2000), “Managerial ties and firm performance in a transition economy: the nature of a micro-macro link”, *Academy of Management Journal*, Vol. 43 No. 3, pp. 486-501.
- Polanyi, M. (1966). *The tacit dimension*. Garden City, New York: Doubleday & Company, Inc.
- 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.
- SME International Malaysia. (SMEIM) (2013). [Online] Available: <http://smeinternational.org/sme-information/developing-malaysian-smes>.
- Spithoven, A, Clarysse, B, & Knockaert, M. (2011). Building absorptive capacity to organise inbound open innovation in traditional industries. *Technovation*, 31(1), 10–21.
- Rahman, H, & Ramos, I. (2010). Open Innovation in SMEs: From closed boundaries to networked paradigm. *Issues in Informing Science and Information Technology*, 7, 471–487
- Sheng, S., Zhou, K. Z., & Li, J. J. (2011). The effects of business and political ties on firm performance: Evidence from China. *Journal of Marketing*, 75: 1–15
- Smith, C.A., Organ, D.W., & Near, J.P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology*, 68, 653-663.
- Teece, D.J. (1988). Capturing value from technological innovation: Integration, strategic partnering, and licensing decisions. *Interfaces*, 18(3), 46-61.



Teirlinck, P. and Spithoven, A. (2013), "Research collaboration and R&D outsourcing: different R&D personnel requirements in SMEs", *Technovation*, Vol. 33 Nos 4/5, pp. 142-153.

Turock A. (2001), "Strategic Innovation", *Executive Excellence*, vol 19, n° 9, pp. 9-10

Tushman, M. L. and O'Reilly, C. A. (1996). 'Ambidextrous organizations: managing evolutionary and revolutionary change, *California Management Review*, 38, 8–30.

Van de Vrande, V., de Jong, J. P. J., Vanhaverbeke, W., & de Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges, *Technovation*, 29(6-7), 423-437.

Van Dyne, L., J. W. Graham, R. M. Dienesch. (1994). Organizational citizenship behavior: Construct redefinition, measurement, and validation. *Acad. Management J.* 37 765–802.

Velegrakis G., Rodrigues C., Coelho D., Varajão J., Morgado L., Dominguez C., Sancin C., Doppler G., Koivusalo H., Jokinen P., Haidimoschi A., (2009) Profile of the SME manager Competences defining the profile of the European Entrepreneur, poster scientifico sottomesso e approvato, CENTERIS 2009, Ottobre 2009

Velegrakis, G., Varajão, J., Morgado, L., Dominguez, C., Rodrigues, C. (2011) SME managers' required entrepreneurship and business competences, E-business managerial aspects, solutions and case studies. - Hershey, Pa. [u.a.] : Business Science Reference, ISBN 978-1-60960-463-9. - 2011, p. 42-49

Vrgovic, P, Vidicki, P, Glassman, B, & Walton, A. (2012). Open innovation for SMEs in developing countries-An intermediated communication network model for collaboration beyond obstacles. *Innovation: Management, Policy & Practice*, 14(3), 290–302.

Williamson, O. E. (1971). The Vertical Integration of Production: Market Failure Considerations. *The American Economic Review*, 61(2), 112-123.

Wolter, C. & Veloso, F. (2008). The Effects of Innovation on Vertical Structure: Perspectives on Transaction Costs and Competences, *Academy of Management Review*, 33, 586-605.

Wynarczyk, P. (2013). Open innovation in SMEs: A dynamic approach to modern entrepreneurship in the twenty-first century. *Journal of Small Business and Enterprise Development*, 20(2), 258–278.