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The Longitudinal Impact of Intellectual Capital on Innovation Performance in SMEs

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Abstract

In the 1980's, many economists emphasize on the importance of innovation in promoting the country's economic growth. The issue of innovation performance has received considerable critical attention among SMEs. Scholars have long debated the impact of Research and Development (R&D) on the creation and diffusion of innovation in companies. The key drivers of firms' innovation should be explored beyond R&D. To date, most public policy still relies on the assumption of the number of patents and the amount of investment made on R&D. Recently, a significant literature on the theme of intangible assets such as skills, knowledge management and intellectual capital has been developed around innovation performance. In fact, several researchers proposed that intellectual capital can benefit innovation performance in several ways. This study investigated from various industries of SMEs in Australia using data from the Business Longitudinal Database (BLD) from the Australian Bureau of Statistics (ABS). The findings concluded that the relational capital and structural capital links with innovation performance are significant after two years-lagged. SC is the most significant predictor of innovation performance while human capital does not significant related to innovation performance in SMEs. Nevertheless, in the long term, SC plays an important role in organisational innovation. The enduring outcomes of this study emphasize several possibilities which would help SME managers and policy makers to better foster innovation performance.
Keywords: SMEs; Intellectual capital; Innovation performance; Australia.

1.Introduction

The success and ability for Small and Medium Enterprises (SMEs) to sustain depends on the constant innovation that these firms managed to adopt (Rhee *et al.*, 2010). Constant innovation has become crucial in every organisation regardless of their size. Every company in any country needs to compete in the competitive and dynamic market environment of globalisation. According to the The Australian Small Business and Family Enterprise Ombudsman (2016), SMEs in Australia contribute between 33 percent of the Gross Domestic Product (GDP), pay 12 percent of total company tax revenue and employ more than 40 percent of Australia's workforce. Most of the companies are competing in the cutting edge of technology and design; however, only 30 percent of SMEs in Australia engage in innovation. Since innovation is not an option for companies' survival, searching ways to develop and enhance the capabilities for every organisation, especially SMEs for being more creative and innovative have become necessities.

In order to create new innovation, these SMEs need to have sufficient capital and resources. However, SMEs are also usually at a disadvantage when it comes to intangible resources such as human, structural and relational capital, as they have access to a smaller range of knowledge comparable to larger firms (Rogers, 2004). In the literature on innovation, the relative importance of intangible resources or intellectual capital is debated. Several researchers agree that intellectual capital is one of the antecedent of innovation performance (Buenechea-Elberdin and Buenechea-Elberdin, 2017); (Dost *et al.,* 2016); (Subramaniam and Youndt, 2005).

Intellectual capital (IC) is the valuable knowledge that belongs to the organization. IC is difficult to own or control, thus analysing how intellectual capital affect innovation performance in SMEs can be sources of competitive advantage (Coff, 1997; Dean and Kretschmer, 2007). Hence, the main focus of the research is to study the effects of IC on organizational innovation. Prior literatures of intellectual capital focus on high tech firms or on single industry segments. Unlike this study that used SME data from different industries. Therefore, the research question is: Which elements of intellectual capital are positive and significant predictors to the organizational innovation?

The rest of the paper continues with the review of the literature; follow by the next section explaining on the methodology used. The fourth section of the paper presents the findings. Finally, the last section of the paper outlines the discussion and conclusion of the findings which are based on the insights and critique of the literature.

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2. Literature Review

Intellectual capital research has attracted the interest of many scholars from different field such as management, accounting, marketing and economics, and it has been defined in different ways in the literature according to the fields and perspectives. For the purpose of this study, the IC term will adapt the definition by Edvinsson and Sullivan (1996) that defines IC as the knowledge that can be transformed to create value to the firm. At the same time, most scholars agree that intellectual capital construct consists of human capital, relational capital and structural capital (Buenechea-Elberdin and Buenechea-Elberdin, 2017; Dost *et al.*, 2016);(Subramaniam and Youndt, 2005); (Zambon and Monciardini, 2015).

2.1. Human Capital (HC)

Human capital (HC) can be define as the capabilities that exists in workers, such as knowledge, problem-solving skills and experience. This study apply similar definition of HC that adopted by Coff (2002) as the knowledge, skills and abilities in a person that will focus on static approach. Wright *et al.* (1994), study from a Resource Based View (RBV) perspective, claim that in certain situations, sustained competitive advantage can accumulate from a pool of HC. As long as firm emphasise in developing HC, workers can improve their job performance and contribute towards firm's performance. Unlike large firms, human capital in SMEs is quite different due to the lack of availability of expert employees compared to large firms Daft and Weick (1984). It was claimed by several researcher that companies with greater HC are likely to have better innovation performance (De and Sels, 2010); (Hsu and Fang, 2009); (Prajogo and Ahmed, 2006); (Smith *et al.,* 2005); (Wu *et al*., 2007).

2.2. Relational Capital (RC)

According to several scholars, Kostova and Roth (2003); Shipilov and Danis (2006) relational capital can be defined as any combination of resources that was created based on interactions among individuals or organizations. This study defined RC as the external collaboration activities among external parties such as individuals or firms embedded in the firm. In order to achieve better innovation performance, SMEs need to build their relational capital with the external partners (Desouza and Awazu, 2006). Previous study has suggested that, there is significance relationship between collaboration between external parties that can promote towards competitive advantage (Dyer and Singh, 1998). RC represents the exchange of information and the networks between the firms and the external parties. Firm that has good networking with external parties such as customers, suppliers, government agencies, competitors and universities will have better current knowledge and information will allow the firms to combine information and knowledge in a unique way in order to contribute towards innovations.

2.3. Structural Capital (SC)

Structural capital (SC) refers to establishing knowledge in order to integrate and pass over knowledge throughout the organisation through specific technology or system that will ease the transfer of information and knowledge in the firm (Youndt *et al.,* 2004). Other researcher (Cabrita and Bontis, 2008) define SC as codified knowledge or information that was developed through repetitive activity. This study defined SC as information technology(IT) and organizational processes. Information and knowledge that is kept in the software and hardware that is easily accessible by respective staff can promote to competitive advantage. Firm's memory is an archive of important information that leads to ensure cautious decision making in the future and at the same time, may act as a Standard Operation Procedures (SOP) to the firm (Carmona-Lavado *et al.*, 2010). SMEs need to have appropriate technology or system that represents the structural capital in order to combine these resources for innovation performance.
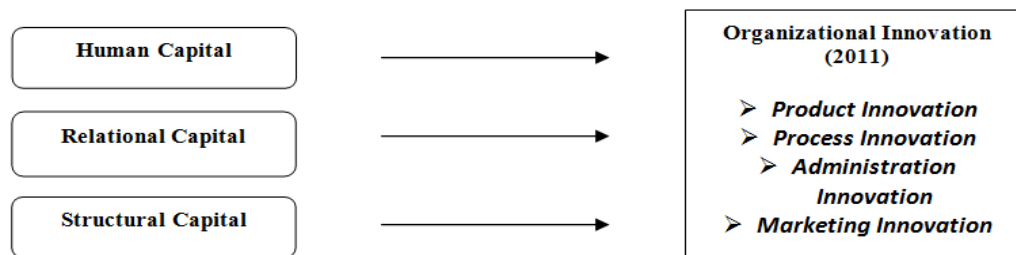
2.4. Innovation Performance (IP)

The Oslo Manual (OECD, 2005) identifies innovation as '...the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations' (OECD, 2005). This study adapts innovations performance (IP) in terms of innovation in product, process administrative and marketing processes. Innovation is created through new knowledge and information gain through investigation, testing, inspecting and encountering new opportunities (Shafiq *et al*., 2018). Based on *The Global Innovation Index* for 2016, Australia was in the 19th position, placing it below Singapore and Japan. Australia is facing a critical situation in introducing new inventions to the market since most of the firm in Australia invest minimal in research and development (R&D), thus lead to poor outcome in the country (Khan, 2016); (Khan and Kamaruddin, 2016). On the other hand, previous research failed to provide clear and reliable effects on the 'best practices' towards innovation.

2.5. Research Hypotheses

The relationship between IC and innovation performance is developed based on the conceptual framework of the Resource Based View (RBV) (Barney, 1991) that is gained through unique resources and the combination of knowledge to create innovation and product development (Danneels, 2002). In order for SMEs to survive, dealing with limited resources becomes challenging (Kim *et al*., 2008).

Figure-1. Conceptual Framework

2.5.1. Human Capital and Innovation Performance

According to Creelman (2004) SMEs have smaller amount of resources to offer to their employees, therefore they need to be primarily considerate about human capital. it is important for SMEs to be sustained competitive advantage by having a group of important employees. The success of SMEs depends on their ability to obtain and develop knowledge from the talented staff. The accessibility of a skilled workforce will ensure the competitiveness of firms (Bartlett and Ghoshal, 2002). Based on the foundation of RBV conducted by several researchers, recruiting expertise employees are likely to influence new product development (Barney, 1991; Finkelstein, 1992). Recruiting talented workers facilitates firms to acquire new skill and knowledge that can be the source of competitive advantage that will lead towards innovation performance. Hence, the above discussion leads to the formulation of hypotheses 1: *Hypothesis 1 (H1): Human Capital has a positive and significant relationship with Innovation Performance.*

2.5.2. Relational Capital and Innovation Performance

Several literatures supported that, collaboration has a positive influence on the innovative performance of firms (Baum *et al.,* 2000; Rogers, 2004);. (Arndt and Sternberg, 2000) concluded that high levels of collaboration and communication between firms explain positives effects on innovation. This finding was supported by Bougrain and Haudeville (2002), that found that throughout the time, SMEs will depend on relational capital since the complexity of the technological process become more challenging. SMEs can gain valuable information, knowledge or support from it's the external parties such as customers, suppliers or competitors through collaboration (Gulati *et al.,* 2006). The relevance of this hypothesis is based on the potential for the justification of the influence of relational capital in terms of collaboration activities and the flow of knowledge through firms on the innovation activities. Therefore, the second hypothesis is going to analysed this situation further:

Hypothesis 2 (H2): Relational Capital has a positive and significant relationship with Innovation Performance.

2.5.3. Structural Capital and Innovation Performance

Based on several researcher, continued investments in technology and capability in handling these systems will improved the competence of the firm to stimulate information and strengthen other organizational capabilities (Carmona-Lavado *et al.,* 2010; Mithas *et al.,* 2012). The method of handling IT and technology in particular firm by which innovation is improved is considered to be a black box. Firm's knowledge is kept in different locations such as hardware and software in the firm. Considering the location and existence of knowledge, it contributes towards competitive advantage to the firm. Since the preserved knowledge will recaps the firms what lesson has already been learned (Subramaniam and Youndt, 2005). At the same time, internal knowledge is the compilation of routine activities that inspire systematic application in decision making (Fernandez *et al.,* 2000; Nelson and Winter, 1982);. Knowledge and information which is captured, classified and adaptable enough has potential to be used for the new situations. Thus, our final hypotheses state:

Hypothesis 3 (H3): Structural Capital has a positive and significant relationship with Innovation Performance.

3. Methodology

The data was taken from the Confidentialised Unit Record File (CURF) from the Australian Bureau of Statistics (ABS). The database used for the purposed of this study was adopted from Business Longitudinal Database (BLD). BLD contains information on small and medium size businesses from various industries located throughout Australia. The data was surveyed once a year for a period of five years. The latest panel available from BLD currently was the Panel 3 that consists of data from the year 2007 until 2011. The firm was stratified based on the firm's size and industry type. The total of the sample in the BLD contains 3,075 firms. BLD is a self-administrated questionnaire using structured and closed questions. The response rate for BLD is more that 90 percent and it covered the population of SME throughout Australia that makes BLD forte and reliable database (Sawang and Matthews, 2010). According to Australian Bureau of Statistics (2014), small firms employ less than 19 workers and medium firm consist between 20-199 staffs. Some of the criteria such as non-employing companies and variables with missing data were excluded from the database.

3.1. Measures of the Variables

Both intellectual capital and innovation performance measurement in this study was based on perception measure. It is proven that manager's opinions is similar with the subjective measures of performance (Venkatraman

and Ramanujam, 1986). The independent variables in the BLD are categorical data, thus, each item in a variable need to be summed up. All the independent variables (HC, RC and SC) were taken from the year 2009.

The first element of intellectual capital is human capital. The items that measure this variable is based on the working hour, employee's skilled in innovation and performance, job sharing, and employee's knowledge. Relational capital is the second variable that consist of six items and these items evaluate on the collaboration in R&D, purchasing, manufacturing, marketing, cooperative agreement and supply. The last independent variable is structural capital. Structural capital measure the investment made in the information technology in the firm. The items are; upgrade of IT hardware; upgrade of equipment or machinery; purchase of additional IT hardware or software; replacement of IT hardware; replacement of other equipment or machinery; purchase of additional other equipment or machinery and purchasing additional assets.

Innovation performance can be define as new or improved goods or services, working processes, administrative processes, or marketing methods (Australian Bureau of Statistics, 2013);(OECD, 2005). Based on the definition, innovation performance is measured based on the four dimensions: product, process, administrative and marketing innovations. Fifteen items pertaining to innovation performance was taken from BLD. Innovation performance is the dependent variables in this study and the data was taken in the year 2011.

The time-lag analyses apply a two-year interval between the intellectual capital components (2009) and innovation performance (2011) from the BLD.

4. Results and Discussion

The purpose of this section is to discuss the major findings and to summarise the result of this study. The data were analysed using STATA version 10. This study, conducted a Poisson regression analysis (PRA) to test the three hypotheses proposed. Normally for count data, Poisson regression is the most appropriate analyses to be used. On the other hand, the basic principles of Poisson distribution is the mean of the data need to be equals the variance, however if the data shows overdispersion, negative binomial regression analysis (NBRA) is used. Overdispersion can be defined as the change in the data that is larger than the value of the mean.

Based on the analysis, innovation performance is positively related with human, relational and structural capital. Standard deviations, mean and correlation coefficients of the variables are presented in Table 1.

Poisson regression analysis (PRA) was used to test the links between the intellectual capital elements (HC, SC, and RC) and innovation performance. The goodness-of-fit chi-squared test was used on the model and if the result shows that the data is not Poisson distributed ($p < 0.05$), then Negative Binomial regression analysis (NBRA) is used.

Table-1. Descriptive statistics and Spearman's rho Correlation Coefficients with innovation performance

	Variables	Std. Dev	Mean	1	2	3	4
1	Human Capital(2009)	1.23	1.42	1			
2	Relational Capital(2009)	0.30	0.76	0.12**	1		
3	Structural Capital(2009)	1.23	1.42	0.17**	0.04	1	
4	Innovation Performance(2011)	1.05	1.85	0.19**	0.14**	0.11*	1

N = 2, 154
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, two-tailed.

Since there is significant evidence of overdispersion (W=151.38, $p < 0.001$) in the innovation performance data, the NBRA model is preferred to the Poisson regression model. The goodness-of-fit of 763.03 on 339 d.f. ($p = 0.00$) shows that the model does not fit the data (Long and Freese, 2001). PRA shows that only SC significantly predicts innovation, but not RC. However, NBRA analysis in Table 2 shows that RC and SC (p < 0.05) significantly predict innovation performance. Since, the model exhibits significant lack of fit for PRA, NBRA is used to justify the findings.

Each factor increased in RC lead to exp (0.17) = 1.18. It can also be said that each additional factor of RC increased the chances of innovation performance by 18 percent; i.e $100(e_{0.17} - 1) = 18\%$. The 95% confidence interval for the multiplicative factor for RC is ($e_{0.01}$, $e_{0.32}$) = (1.01, 1.38).

Beside RC, SC shows significance towards innovation performance, exp(0.15) = 1.16. For each additional improvement in SC, innovation performance gets multiplied by 1.16: there is about 16 percent [$100(e_{0.15} - 1)$ = 16%] increase in innovation performance. For SC, the 95% confidence interval for multiplicative factor is ($e_{0.06}$, $e_{0.25}$) = (1.06, 1.28).

Table-2. Poisson regression and Negative binomial regression: Intellectual capital elements and Innovation performance

Variables	Innovation Performance (2011)	
	PRA	NBRA
Control Variables		
Industry: Manufacturing	0.75***	0.74***
Industry: Logistics	0.56**	0.62**
Industry: Retail	0.63*	0.70*
Industry: Services	0.47*	0.53*
Medium Firm	0.40**	0.38*

Small Firm	0.08	-0.01
Independent Variables (2009)		
Human capital	0.01	0.01
Relation capital- Collaboration	0.13	0.17*
Structural capital- Investing in IT	0.15**:	0.15**
Pseudo R²	0.07	
Chi Square	47.93***	50.26***
Log pseudolikelihood	-628.81	-553.11
No. of observations	349	349

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, two-tailed.

HC was insignificant in predicting innovation performance. The findings contradict previous findings by Leitner (2011) and Hsu and Fang (2009) who found a positive effect of HC on innovation, but according to (Herrmann *et al*., 2007), the more a company focusses on improving the knowledge of its employees, the more likely the firm will be in a position to convert its capabilities into creativity. Employees can promote innovation; however they do not support the realisation of innovation in a less conducive creative firm environment (Leitner, 2011).

The direct influence of RC on innovation performance is similar with the findings by Chen *et al.* (2006) and (Hsu and Fang, 2009). Challenging hurdles may prevent SMEs from taking advantage the collaborating activities. These obstacles exist because SMEs are often unconscious of their necessities or have problems stating the requirements (Lambrecht and Pirnay, 2005).

The study by Tovstiga and Tulugurova (2007), Jardón and Martos (2009) and Chen *et al.* (2006) had also found that SC-innovation link in SMEs is significance. This outcome indicates that firms' effort to codify organisational knowledge through structural capital eventually contributes to sustainable competitive advantage. Therefore, H2 and H3 were supported, while H1 was rejected in this study.

5. Conclusion

The direct outcome of human capital on innovation performance is insignificant. SME managers should develop their human capital and at the same time, SME need to make sure that the firm stimulate creative culture in the firm to enhance the creativity among employees. Employees with higher skills and knowledge will be more efficient and creative in generating new ideas to improve the innovation performance of the firm.

The results indicate that, relational capital has significant but weak relationship with innovation performance. SMEs may not know which technological partners have the most significant abilities (Geisler, 1997). Therefore, clear communication between technological partners and SMEs is important (Smallbone *et al.*, 1993). SMEs should build trust in their relationships with external parties so that collaboration can be increased in order to improve SME performance. Several studies shows that RC is the most significant in predicting innovation in SME (Chen *et al*., 2006); (Nieto and Santamaría, 2010); (Zeng *et al.,* 2010).This is an important finding due to its strategy concerns; RC must be involved in R&D or any other collaboration activities in order to stimulate innovation. The SME's survival can be revealed from the success of external relationships (Brüderl and Preisendörfer, 1998),

The findings show that, structural capital has the strongest significant relationship with innovation performance. SC is the foundation that supports the creation of new ideas to improve innovation performance. SC performs as a medium to accumulate and promote knowledge and information and transform it into routines by the use of existing IT and technology to gain a stable practices cycle. Processes directly affect the efficiency of the workers' actions. From the findings, SME's managers must bear in mind that investing in ICT will not be a waste to their firms, but IT could contribute to better innovation performance. Therefore, managers should constantly replace and upgrade their IT hardware, machinery or equipment in order to be competitive in the market place. Therefore, SMEs must be aggressive in R&D while constantly searching for the latest technology in order to improvise and create new products. It also demonstrates that R&D strategies are significantly related to product innovation (Ilker and Birdogan, 2011).

Policymakers are encouraged to introduce and promote new IT and other technology to SMEs so that all such businesses are aware of its existence. Indeed, many SMEs lack the latest information and may be unaware of efficient and effective ways of operation (Lee *et al*., 2010). Entrepreneurs need government assistance to keep up-to-date with information pertinent to their enterprise. Secondly, governments should provide attractive collaborative activities by being the mediator for business-matching. When the government acts as the mediator, Australian SMEs will have more confidence in collaborating with external parties. Last but not least, in order to promote the human capital side, the government should promote sustainable SMEs by providing more opportunities for those SMEs employees to become involved in training programs.

References

Arndt, O. and Sternberg, R. (2000). Do manufacturing firms profit from intraregional innovation linkages? An empirical based answer. *European Planning Studies,* 8(4): 465-85.

Australian Bureau of Statistics (2013). Summary of it use and innovation in australian business. Available: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8166.0

Australian Bureau of Statistics (2014). Counts of australian businesses, including entries and exits june 2009 to june 2013. Cat. No. 8165.0.: Available:

http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202008%20to%20Jun%202012?OpenDocument

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal Of Management,* 17(1): 99.

Bartlett, C. A. and Ghoshal, S. (2002). Building competitive advantage through people. *Mit Sloan Management Review,* 43(2): 34-41.

Baum, J. A., Calabrese, T. and Silverman, B. S. (2000). Don't go it alone, Alliance network composition and startups' performance in canadian biotechnology. *Strategic Management Journal,* 21(3): 267-94.

Bougrain, F. and Haudeville, B. (2002). Innovation, collaboration and SMEs internal research capacities. *Research Policy,* 31(5): 735-47.

Brüderl, J. and Preisendörfer, P. (1998). Network support and the success of newly founded business. *Small Business Economics,* 10(3): 213-25.

Buenechea-Elberdin, M. and Buenechea-Elberdin, M. (2017). Structured literature review about intellectual capital and innovation. *Journal of Intellectual Capital,* 18(2): 262-85.

Cabrita, M. D. R. and Bontis, N. (2008). Intellectual capital and business performance in the Portuguese banking industry. *International Journal Of Technology Management,* 43(1): 212-37.

Carmona-Lavado, A., Cuevas-Rodríguez, G. and Cabello-Medina, C. (2010). Social and organizational capital, Building the context for innovationq. *Industrial Marketing Management,* 39(4): 681-90.

Chen, Y. S., Lin, M. J. J. and Chang, C. H. (2006). The influence of intellectual capital on new product development performance–the manufacturing companies of Taiwan as an example. *Total Quality Management And Business Excellence,* 17(10): 1323-39.

Coff, R. W. (1997). Human assets and management dilemmas, Coping with hazards on the road to resource-based theory. *Academy Of Management Review*: 374-402.

Coff, R. W. (2002). Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions. *Journal Of Management,* 28(1): 107-28.

Creelman, D. (2004). Talent management: the special challenges of small and medium-sized enterprises. *Human Capital Institute*:

Daft, R. L. and Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *The Academy Of Management Review,* 9(2): 284.

Danneels, E. (2002). The dynamics of product innovation and firm competences. *Strategic Management Journal,* 23(12): 1095-121.

De, W. S. and Sels, L. (2010). Interrelationships between human capital, HRM and innovation in Belgian start-ups aiming at an innovation strategy. *The International Journal Of Human Resource Management,* 21(11): 1863-83.

Dean, A. and Kretschmer, M. (2007). Can idea be capital? Factors of production in the postindustrial economy, A review and critique. *Academy Of Management Review,* 32(2): 573-94.

Desouza, K. C. and Awazu, Y. (2006). Knowledge management at smes, Five peculiarities. *Journal Of Knowledge Management,* 10(1): 32-43.

Dost, M., Dost, M., Badir, Y. F., Badir, Y. F., Ali, Z., Ali, Z. and Tariq, A. (2016). The impact of intellectual capital on innovation generation and adoption. *Journal of Intellectual Capital,* 17(4): 675-95.

Dyer, J. H. and Singh, H. (1998). The relational view, Cooperative strategy and sources of interorganizational competitive advantage. *Academy Of Management Review,* 23(4): 660-79.

Edvinsson, L. and Sullivan, P. (1996). Developing a model for managing intellectual capital. *European Management Journal,* 14(4): 356-64.

Fernandez, R. M., Castilla, E. J. and Moore, P. (2000). Social capital at work, Networks and employment at a phone center. *American Journal Of Sociology*: 1288-356.

Finkelstein, S. (1992). Power in top management teams, Dimensions, measurement, and validation. *The Academy Of Management Journal,* 35(3): 505-38.

Geisler, E. (1997). Intersector technology cooperation. *Hard Myths, Soft Facts. Technovation,* 17(6): 309-20. Available: http://dx.doi.org/10.1016/S0166-4972(96)00117-4

Gulati, R., Nohria, N. and Zaheer, A. (2006). Strategic networks. *Strategic Management Journal,* 21(3): 203-15.

Herrmann, A., Gassmann, O. and Eisert, U. (2007). An empirical study of the antecedents for radical product innovations and capabilities for transformation. *Journal Of Engineering And Technology Management,* 24(1-2): 92-120. Available: http://dx.doi.org/10.1016/j.jengtecman.2007.01.006

Hsu, Y.-H. and Fang, W. (2009). Intellectual capital and new product development performance: the mediating role of organizational learning capability. *Technological Forecasting and Social Change,* 76(5): 664-77. Available: http://dx.doi.org/10.1016/j.techfore.2008.03.012

Ilker, M. A. and Birdogan, B. (2011). Antecedents and performance impacts of product versus process innovation, Empirical evidence from smes located in turkish science and technology parks. *European Journal Of Innovation Management,* 14(2): 172-206.

Jardón, C. M., F. and Martos, M. S. (2009). Intellectual capital and performance in wood industries of Argentina. *Journal Of Intellectual Capital,* 10(4): 600-16. Available: http://dx.doi.org/10.1108/14691930910996670

Khan, Y. K. (2016). *Impact of structural capital on innovation in the australian smes.* Paper presented at the Future Academy, Universiti Teknologi MARA Shah Alam.

Khan, Y. K. and Kamaruddin, L. M. (2016). The longitudinal study of the effect of human capital on organisational innovation in australian smes. *Asean Entrepreneurship Journal,* 2(2): 59.

Kim, K. S., Knotts, T. L. and Jones, S. C. (2008). Characterizing viability of small manufacturing enterprises (sme) in the market. *Expert Systems with Applications,* 34(1): 128-34.

Kostova, T. and Roth, K. (2003). Social capital in multinational corporations and a micro-macro model of its formation. *The Academy Of Management Review,* 28(2): 297-317.

Lambrecht, J. and Pirnay, F. (2005). An evaluation of public support measures for private external consultancies to smes in the walloon region of belgium. *Entrepreneurship & Regional Development,* 17(2): 89-108.

Lee, S., Park, G., Yoon, B. and Park, J. (2010). Open innovation in smes—an intermediated network model. *Research policy,* 39(2): 290-300.

Leitner, K.-H. (2011). The effect of intellectual capital on product innovativeness in SMEs. *International Journal Of Technology Management,* 53(1): 1-18.

Long, J. S. and Freese, J. (2001). Predicted probabilities for count models. *Stata Journal,* 1(1): 51-57.

Mithas, S., Tafti, A., Bardhan, I. and Goh, J. M. (2012). Information technology and firm profitability, Mechanisms and empirical evidence. *MIS Quarterly,* 36(1): 205-24.

Nelson, R. R. and Winter, S. G. (1982). *An evolutionary theory of economic change.* Harvard University Press.: Cambridge.

Nieto, M. J. and Santamaría, L. (2010). Technological collaboration: bridging the innovation gap between small and large firms. *Journal Of Small Business Management,* 48(1): 44-69.

OECD (2005). *The measurement of scientific and technological activities, Proposed guidelines for collecting and interpreting technological innovation data.* Retrieved from Paris.

Prajogo, D. I. and Ahmed, P. K. (2006). Relationships between innovation stimulus, innovation capacity, and innovation performance. *R&D Management,* 36(5): 499-515.

Rhee, J., Park, T. and Lee, D. H. (2010). Drivers of innovativeness and performance for innovative smes in South Korea. *Mediation of learning orientation..Technovation,* 30(1): 65-75.

Rogers, M. (2004). Networks, Firm size and innovation. *Small Business Economics,* 22(2): 141-53.

Sawang, S. and Matthews, J. H. (2010). Positive relationships among collaboration for innovation, past innovation abandonment and future product introduction in manufacturing smes. *Interdisciplinary Journal Of Contemporary Research In Business,* 2(6): 106-17.

Shafiq, M., Tasmin, R., Takala, J., Qureshi, M. I. and Rashid, M. (2018). Mediating role of open innovation between the relationship of blue ocean strategy and innovation performance, a study of malaysian industry. *International Journal of Engineering and Technology (UAE),* 7(29): 1076-81.

Shipilov, A. and Danis, W. (2006). TMG social capital, strategic choice and firm performance. *European Management Journal,* 24(1): 16-27.

Smallbone, D., North, D. and Leigh, R. (1993). The use of external assistance by mature smes in the UK, Some policy implications. *Entrepreneurship & Regional Development,* 5(3): 279-95.

Smith, K. G., Collins, C. J. and Clark, K. D. (2005). Existing knowledge, knowledge creation capability, and the rate of new product introduction in high-technology firms. *Academy Of Management Journal,* 48(2): 346-57.

Subramaniam, M. and Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *The Academy Of Management Journal,* 48(3): 450-63.

Tovstiga, G. and Tulugurova, E. (2007). Intellectual capital practices and performance in Russian enterprises. *Journal Of Intellectual Capital,* 8(4): 695-707. Available: http://dx.doi.org/10.1108/14691930710830846

Venkatraman, N. and Ramanujam, V. (1986). Measurement of business performance in strategy research, A comparison of approaches. *The Academy Of Management Review,* 11(4): 801-14.

Wright, P. M., McMahan, G. C. and McWilliams, A. (1994). Human resources and sustained competitive advantage, A resource-based perspective. *International Journal Of Human Resource Management,* 5(2): 301-26.

Wu, S.-H., Lin, L.-Y. and Hsu, M.-Y. (2007). Intellectual capital, dynamic capabilities and innovative performance of organisations. *International Journal Of Technology Management,* 39(3): 279-96.

Youndt, M. A., Subramaniam, M. and Snell, S. A. (2004). Intellectual capital profiles: an examination of investments and returns. *Journal Of Management Studies,* 41(2): 335-61.

Zambon, S. and Monciardini, D. (2015). Intellectual capital and innovation. A guideline for future research. *Journal of Innovation Economics & Management,* (2): 13-26.

Zeng, S. X., Xie, X. and Tam, C. (2010). Relationship between cooperation networks and innovation performance of SMEs. *Technovation,* 30(3): 181-94.