2016

The Relationship of Corporate Financial Performance and Innovation among Manufacturing Industries

Charlaine T. Chong

Samantha R. Chua

Ma. Catrina S. Dy

Antonio Miguel E. Villavicencio

POLICY BRIEF
YOUNG ECONOMISTS' PERSPECTIVE
Volume VII, No. 3, 2016
ISSN # 2094-3342
De La Salle University
AKI
Angelo King Institute
for Economic and Business Studies

The Relationship of Corporate Financial Performance and Innovation among Manufacturing Industries

Innovation is becoming a critical determinant of the survival and advancement of firms. Despite this realization, there is a dearth of literature that tackles the subject matter and its specific role in corporate settings remains vague. Using corporate data on East and Southeast Asian manufacturing firms from 2008 to 2013, this study aims to identify the impact of corporate financial performance on R&D expenditure as a measure of innovation. On the whole, the researchers utilized random effects (REM) and fixed effects (FEM) models to establish the relationship between R&D and corporate performance. The researchers, then, identified the factors that affected R&D. The researchers found that sales, profitability, and cash flow have positive relationships with R&D. Moreover, when firm size is considered, the researchers discovered that R&D determinants for large manufacturing firms were different - total profitability and liabilities and debt - from those of SMEs - number of employees and sales for SMEs.

INTRODUCTION

Competition increasingly intensifies as the world shifts to a more globalized economy. Now, more than ever, innovation is proving to be an important issue; one that plays a pivotal role in fueling growth and increasing competitive advantage (Crescenzi, n.d.). The discovery and cultivation of new knowledge can potentially become a key input in society and instigate economic growth. Apart from its utilization, the dissemination of newly acquired information is just as imperative. On a micro-economic level, firms have begun to re-examine their market strategies, product placements, and corporate practice so as to sustain competitiveness in a knowledge-driven economy (Mobbs, 2010). Consequently, it is crucial for researchers to recommend courses of action that firms can take to strengthen their innovative activities.

This study, therefore, aims to ascertain the effects of financial performance on research and development expenditure; compare the financial performance of sample firms – based on firm size – to their level of innovative activity; and propose viable strategies stemming from the analyses of the data.

LITERATURE REVIEW

Innovation is mainly about changes and advancements. Generally, it is the concept of creating something new that is still unknown to the public or building on an existing idea. Numerous economists over the years have argued that innovation can be a main driving force for economic efficiency and competitiveness (Schumpeter, 1934; Hazlitt, 1979; Hayek, 1960). In 1934, Joseph Schumpeter, for instance, put forward the term "creative destruction" – defined as the evolution of a free market economy through innovation or wherein old inventories, ideas, technologies, skills, and equipment are changed into new and better ones.

He described innovation as the reason behind the continuous progress and improvement in the standards of living. At the same time, however, innovation disrupts the status quo – leaving some better or worse off in the process. Hence, one cannot move forward with a new idea without sweeping away previously established practices. The findings of Bessler and Bittelmeyer's (2008) study corroborated the Schumpeterian theory of creative destruction. The authors

Written by
Charlaine T. Chong
Samantha R. Chua
Ma. Catrina S. Dy
Antonio Miguel E. Villavicencio
School of Economics
De La Salle University

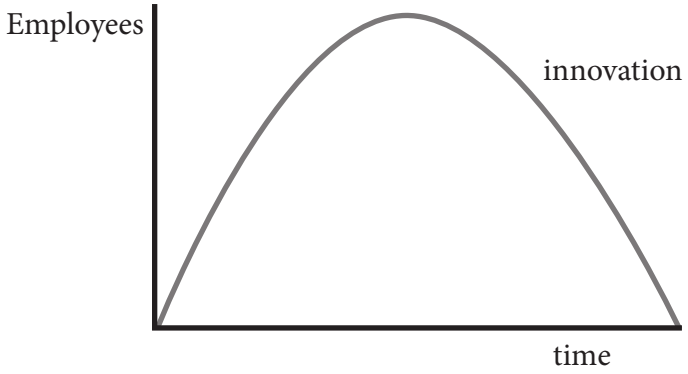
reported that, within firms, innovations only promote temporary advantages in the short-run, which appear to slowly diminish in the long-run because of knowledge diffusion across markets. Therefore, so as not to suffer a loss or be forced to exit the market, a firm should continuously innovate to develop new and better products or services.

FRAMEWORK

Neo-Schumpeterian hypothesis

The Neo-Schumpeterian hypothesis, based on the Schumpeterian hypothesis, suggests that there is a positive and quadratic relationship between firm size and innovative activity (refer to Figure 1).

Figure 1: Schumpeter on firm size and innovation



A one unit increase in the number of employees leads to higher levels of innovation. The latter, however, declines after a certain firm size is reached. Per Napoli (2008), this effect is expected because as the firm expands organizational conflicts or inefficiencies may occur.

Firm size and research and development

The Neo-Schumpeterian hypothesis suggests that there is a positive relationship between innovation and the number of employees. Levels of innovation, however, eventually decline after a certain level or number of employees is reached. Acs and Audretsch (1987) concluded that, in monopolistic markets, larger firms tend to innovate more; whereas small firms innovate better when positioned in a competitive market. Moreover, in line with Schumpeter's (1950) findings, Cohen and Klepper (1996) confirmed that large firms benefit more from innovation owing to advantages that stem from their size (i.e., knowledge and resources).

Profitability and research and development

The linear model of innovation suggests that research and development spark process innovation that aids in the advancement of product development. Per the model, innovation, which is founded on basic science, leads to the design, engineering, manufacturing, and marketing of new products – all of which accommodates the diffusion of innovation. Increase in sales, the final stage, is the result of the spread of the innovative activity.

Liabilities and debt and research and development

Liabilities and debt, what the firm owes its lenders, are usually used to finance firm activities and operations. Hence, the level of liabilities and debt could be indicative of a firm's ability to fund innovative activities. The Static Trade-off theory, then, posits that having liabilities and debts could be beneficial when they have not yet exceeded the firm's target financial leverage. On the other hand, the Pecking Order theory asserts that firms favor using internal financing for research and development – as oppose to relying on borrowed money–especially if they are risk averse (Ayaydin & Karaaslan, 2014).

METHODOLOGY

The researchers used a panel dataset comprised of 593firms from different manufacturing sub-sectors located in eight countries in East and Southeast Asian region for the years 2008-2013 (refer to Table 1).

Table 1: List of sample East Asian and Southeast Asian countries

Countries	*Number of Firms*
East Asia	
China	11
Hong Kong	6
Japan	515
Republic of Korea	27
Taiwan	25
South East Asia	
Indonesia	1
Philippines	2
India	5

The primary data, particularly the annual financial data of the firms included in the sample, was taken from Osiris. In the study, financial performance is measured in terms of: profits before tax, sales, cash flow, number of employees, total liabilities and debt (in thousands, current USD); whereas innovation is proxied by R&D expenditures.

RESULTS AND DISCUSSION

The first objective is to determine the effects of corporate financial performance on innovation (R&D expenditures). All three explanatory variables in the grand regression – namely, sales, cash flow, and profitability – were significant and consistent with the a priori expectations (refer to Table 2).

Table 2: Results of Grand Regression Model

Independent Variables	Coefficients	Standard Error	*p*-value P > | z |
Sales	.0099683	.0037768	0.008***
Cash Flow	.1382338	.0320846	0.000***
Profitability	.0788712	.0267826	0.003***
Constant	19813.24	8547.514	0.020*

*significant at $\alpha = 0.05$
** significant at $\alpha = 0.01$
*** significant at $\alpha = 0.005$

The second objective is to compare the financial performance of SMEs and large firms to their level of innovative activity. The results of the regressions revealed that the R&D determinants of SMEs and large firms differ. Lagged sales and the number of employees were significant for small- and medium-sized firms; while large-firm R&D expenditures responded to lagged profitability and total liabilities and debt (refer to Table 3).

Table 3: Results for SMEs

Independent Variables	Coefficients	Standard Error	*p*-value P > | z |
Sales	.0033513	.0015667	0.032**
Employee	10.87342	4.484807	0.015**
Constant	-93.3335	890.2661	0.917

* significant at $\alpha = 0.05$
** significant at $\alpha = 0.01$
*** significant at $\alpha = 0.005$

Table 4: Results of Large Firms

Independent Variables	Coefficients	Standard Error	*p*-value P > | z |
Profitability	.0673042	.0245451	0.006***
Liabilities and Debt	.022086	.0121224	0.069***
Constant	49421.12	16361.47	0.003*

* significant at $\alpha = 0.05$
** significant at $\alpha = 0.01$
*** significant at $\alpha = 0.005$

CONCLUSION

The overall focus of the study was to determine the effects of corporate financial performance on research and development expenditures. For SMEs, sales and the number of employees were positive and significant, indicating motivation for R&D; while large-firm R&D responded to profits before tax (profitability) and liabilities and debt. Hence, firms with higher profits tend to increase R&D financing.

Investments in R&D benefit the firm, industry, and society as a whole through the supply of new and/or higher-quality goods and services. As more countries focus on how to compete for global R&D, government institutions need to continually revise policies in order to remain relevant and attractive to R&D investors, especially in the Asian region where the R&D trend is shifting and rising at a rapid pace (Parsons, 2013). The researchers believe that among the policies that can help improve R&D activities are: (1) offering R&D tax incentives, which aid in establishing and promoting the sustainability of R&D activities. These incentives can encourage R&D efforts and, in turn, fuel business growth for innovating companies. Indeed, the literature argues that countries with R&D tax incentives are generally the preferred location for global R&D-activity expansions. Hence, companies involved in the process can effectively leverage their global R&D infrastructure, which can lead to the development of valuable intellectual properties (Deloitte, 2014); and (2) further strengthening the current intellectual property rights by granting longer patent durations to ensure that firms will fully enjoy the economic benefits (i.e., increases in sales and profitability) of their new discoveries. Both policies could lead to improved corporate financial performance and, thus, raise R&D expenditures.

SMEs are financially-constrained. These firms must utilize unique strategies to generate the needed R&D funding. One practical solution and recommendation, then, is to collaborate with other companies – through innovation networks – to effectively and efficiently conduct R&D activities. Working with other SMEs can be a key factor for success, particularly for firms that cannot finance major R&D projects. One advantage of innovation networks is that they generate investments. Furthermore, according to Hansen & Morten (2009) and Camarinha-Matos (2004), collaboration leads to better innovations, higher sales, and efficient business operations. Finally, and most significantly, the work of Audretsch and Vivarelli (1996) shows that SME-collaboration – as it raises SME R&D productivity –can result in SMEs out-performing large-scale companies.

Nonetheless, Wiens and Jackson (2015) highlighted the following problems in finding the golden approach to creating policies that promote innovative activities: (1) increased patent litigations of firms that are unaware of existing patents; (2) higher probabilities of incurring

monetary penalties for violating patent laws owing to ambiguous policies; and (3) the passive use of patents to guard against policy infringements instead of a means to produce new and better goods and services. Patents are, then, wasted.

In the end, the right policies that will successfully encourage and promote innovation must be rooted on a thorough analysis of the issues faced by each country (i.e., strengths and weaknesses). Similar to Japan and India, Asian countries should create policies that are specific to the needs and qualities of their constituents. Learning which economic issue can be addressed by innovation-related efforts is a crucial first step in identifying potentially effective innovation policies.

References:

Acs, Z. J., & Audretsch, D. B. (1987). Innovation, market structure, and firm size. *The Review of Economics and Statistics,* 69(4), 567–574. http://doi.org/10.2307/1935950

Audretsch, D., & Vivarelli, M. (1996). Firm size and R&D spillovers: Evidence from Italy. Small Business Economics, pp. 249–258.

Ayaydin, H., & Karaaslan, I. (2014). The effect of research and development investment on firms' financial performance: Evidence from manufacturing firms in Turkey. Retrieved on 15 March 2015, from http://www.beykon.org/dergi/2014/spring/h.ayaydin.pdf.

Bessler, W., & Bittelmeyer, C. (2008). Patents and the performance of technology firms: Evidence from initial public offerings in Germany. *Financial Markets and Portfolio Management* , 22 (4), pp. 323-356.

Camarinha-Matos, L. M. (2004). *Virtual enterprises and collaborative networks*. Boston: Springer.

Cohen, W., & Klepper, S. (1996).A reprise of size and R&D. *The Economic Journal*, 925-925.

Crescenzi, R. (n.d.). Papers in evolutionary economic geography. Retrieved on 15 March 2015, from http://econ.geo.uu.nl/peeg/peeg1408.pdf

Deloitte. (2014). 2014 Global survey of R&D tax incentives. Retrieved from http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-rd-survey-aug-2014.pdf

Hansen, M. T. (2009). Collaboration. How leaders avoid the traps, create unity, and reap big results. Watertown: Harvard Business Review Press.

Hazlitt, H. (1979). *Economics in one lesson*. New York: Three Rivers Press, chap. 7.

Hayek, F. (1960).*The constitution of liberty*. Chicago: University of Chicago Press, p. 63.

Mobbs, C. (2010). Why is innovation important? Innovation for growth. Retrieved on 15 March 2015 from http://www.innovationforgrowth.co.uk/whyisinnovationimportant.pdf

Napoli, R. (2008). Innovation in the financial sector: Persistence and Schumpeterian hypotheses. *Journal of Service Science and Management,* pp. 215-225.

Parsons, R. (2013). 2013 Asia-Pacific R&D incentives. Retrieved on 16 November 2015 from http://www.ey.com/Publication/vwLUAssets/2013APAC_RnD/$FILE/2011-Asia-Pacific-R&D-incentives.pdf

Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge: MA: Harvard University Press.

Schumpeter, J. A. (1950). *Capitalism, socialism, and democracy*. New York: Harper & Row.

Wiens, J. & Jackson, C. (2015). How intellectual property can help or hinder innovation. Retrieved on 26 October 2015 from http://www.kauffman.org/what-we-do/resources/entrepreneurship-policy-digest/how-intellectual-property-can-help-or-hinder-innovation

CONTACT INFORMATION

DLSU - Angelo King Institute for Economic and Business Studies (DLSU-AKI)
Room 223, St. La Salle Hall
2401 Taft Avenue
1004 Manila

Angelo King International Center
Corner of Arellano Avenue and Estrada Street
1004 Manila

+63-2-524-4611 loc. 287,
+63-2-524-5333, +63-2-5245347 (Fax)
http://aki.dlsu.edu.ph