

The Importance of Organizational Structure and Corporate Culture in Open Innovation Performance

Filip Ljubicic

School of Management, Shanghai University, 99 Shangda Road, Shanghai, 200444, China

Abstract

This study investigates the relationship between changes in organizational structure and company culture, and open innovation performance. Two hypotheses were developed based on the literature review. In order to test the hypotheses, the quantitative surveys were collected and analyzed using the data obtained from the questionnaire, answered by 52 companies located in China. Finally, the findings shown that both hypotheses were supported. These results reveal a significant positive relation between both, changes in company culture and changes in organizational structure and open innovation performance. This study has numerous implications for managers implementing an open innovation process.

Keywords: Open Innovation, Organizational Structure, Company Culture, Open Innovation Performance.

1. Introduction

The main effect that the globalization of economic activities and markets has had, is the acceleration of the innovation process, causing factors such as the global access to knowledge, technology fusion, and shorter information cycles to increase in importance exponentially for companies (Inauen and Schenker-Wicki, 2012, p.212). In early literature Schumpeter (1934) identified innovation as a critical aspect of economic change and vital to success in an increasingly competitive environment. In order to cope, succeed, and stay ahead in today's dynamic and fast changing business environment, companies must increase and improve their innovation performance and seek new channels and opportunities for commercialization (Inauen and Schenker-Wicki, 2012). Traditionally, research and development (R&D) and the innovation process could be described as a vertical integration model, where firms would use internal research and development to internally develop products and then the firm would distribute the product to the market (Chesbrough, 2006). Over the past decades, the traditional form of the innovation process has begun to change, as many firms now acquire a significant amount of their technologies from external sources. (Lichtenthaler, 2009) This new innovation process, coined by Chesbrough (2003) is known as an open innovation process or paradigm, and is the central theme of this research paper. There is significant evidence to suggest that open innovation is increasingly becoming a common practice of the innovation process in numerous industries and in numerous countries across the world, such as the United States (Chesbrough, 2003, 2006) and the European Union (van de Vrande et al, 2009) (Lichtenthaler, 2008)

Even though open innovation is a relatively new field of research, with the term being first defined by Chesbrough (2003), the body of literature has grown and expanded significantly in recent years. Despite the increase in academic interest in the topic, certain gaps in the literature remain. One of the main areas of research in the field is the challenge associated with open innovation and the best means possible to overcome them (Nakagaki et al, 2012) (Van de Vrande et al, 2009) (Du Chatenier et al, 2010). From the literature, the main key challenges in implementing and successfully conducting open innovation practices are centered on organizational structure and corporate culture (van de Vrande et al, 2009). Since the main challenges regarding open innovation appear to be organizational structure and corporate culture, it remains to be seen whether confronting those two challenges will lead to a higher performance of open innovation.

The paper examines the question whether changes in organizational structure and corporate culture whilst implementing open innovation leads to higher performance in other key performance indicators. In order to test the hypothesis of this paper an online survey was administered to over 50 enterprises in China, as "surveys are one way to dramatically expand the empirical evidence on open innovation" (West et al 2006, p.302). The hypotheses of this paper will be tested using SPSS and Somer's delta.

The research conducted will add value to both the literature and the practical implementation of open innovation. The paper provides evidence for the need for changes to organizational structure and corporate culture whilst implementing open innovation and incites further research in the field of organizational behavior in regards to open innovation. For managers the research illustrates the importance of their role in creating an open innovation culture and can lead to changes in the hiring and training process of employees in firms that practice open innovation.

2. Literature Review

2.1 Organizational Structure and Company Culture in Open Innovation

Absorptive capacity theory is the capability of a firm to on one hand recognize value of new information and technology, but also on the other hand to absorb the new technology and apply it to products, services, and

processes (Cohen and Levinthal, 1990). Although absorptive capacity is important for understanding open innovation, the debate regarding absorptive capacity is centered on the means of developing absorptive capacity. (Christensen, 2006). Christensen (2006) illustrates the question whether absorptive capacity should be internally developed or from outside sources such as hiring new employees, cooperating with external stakeholders or contracting for consulting services. The difference in knowledge and competency structures between firms is described using the term cognitive distance (Inauen and Schenker-Wicki, 2012). Every individual company has its own perception and an evaluation system that highlights its own values and is aligned to coincide with the companies' own competences (Inauen and Schenker-Wicki, 2012). The differences in organizational focus and organizational culture cause cognitive distances between various companies. Nooteboom (1992) illustrates the challenge in working with other companies; he describes an inverted-U shaped relationship between cognitive distance and innovation performance. Initially, an increase in cognitive distance causes a positive effect on learning due to the combining and coupling knowledge through interaction, but after a certain level has been reached, an increased cognitive distance can have the negative effect of hindering learning through interaction due to diminishing mutual understanding (Inauen and Schenker-Wicki, 2012).

The literature on open innovation has identified that the main challenges in implementing open innovation is the problems that arise relating to the organizational and cultural issues when companies start to interact and collaborate with external partners (van de Vrande et al, 2009. p.435). Lichtenthaler and Ernst (2006) also identified the critical role that employee attitudes and interorganizational trust play in designing an open innovation process. Nakagaki et al (2012) illustrated the difficulties and need for organizational and cultural change when implementing open innovation practices using the case study of Roche, a pharmaceutical company. The main two hurdles faced at Roche during the implementation of an open innovation strategy was the creation of a 'eureka' moment that would demonstrate to the senior management the value of open innovation and a change in the company mindset to an open innovation culture (Nakagaki et al, 2012). Nakagaki et al (2012) illustrated that corporate-level innovation requires support from the top management team. "the alignment of the beliefs and actions of a corporation's top leadership with a desired change is a key success factor in any large initiative" (p.34). The difficulty in achieving support from top management was best described as a circular trap, to get support from top management they need to show results, to get those results they needed the support of top management (Nakagaki et al, 2012). Nakagaki et al (2012,p.36) further highlighted an important aspect of implementing open innovation, that big wins are as rare in open innovation as they are in the closed innovation paradigm. Another example of the changes in corporate culture and organizational structure whilst implementing open innovation is the case study of Whirlpool (Muller and Hutchins, 2012). The case study of Whirlpool illustrates how even a successful innovator can embrace open innovation, through changes in its innovation process, known as Whirlpool Corp's 'Triple Diamond' innovation process. Whirlpool's innovation process is a delicate balance between open innovation and internal innovation and is built on awareness that the company needs both (Muller and Hutchins, 2012). Whirlpool uses 'tools' or a set of questions and discussion guides to raise questions that determine whether or not to use open innovation at each phase of the innovation process, idea generation, idea development, and commercialization (Muller and Hutchins, 2012). The changes in organizational structure and corporate culture have changed the context to competences within the organization, Whirlpool is now pursuing numerous new opportunities that would have previously been rejected and have expanded their business to adjacent spaces with the aid of external partners (Muller and Hutchins, 2012).

Another important aspect whilst implementing open innovation was the changing of the company culture, at Roche, the company culture encourages the reliance on internal resources, and implies a perception that looking outside for answers is an admission of failure (Nakagaki et al, 2012). An open innovation culture will only be achieved if individuals adopt an open innovation mindset; once senior management is convinced of the benefits of open innovation they must act to ensure that the rest of the company adopts the same mindset (Nakagaki et al, 2012). At Whirlpool, the innovation process is truly company wide; every employee of the company receives training in innovation and open innovation and how it works (Muller and Hutchins, 2012). The innovation infrastructure at Whirlpool consists of I-Mentors and I-Consultants that guide and mentor employees on innovation projects and innovation boards that screen, prioritize and fund innovation and open innovation projects at several levels (Muller and Hutchins, 2012,p.37). Finally, Nakagaki et al (2012) illustrate the need for the company culture to reshape the definition of success and to incentivize those employees who support and promote open innovation in their 'free' time along with their day-to-day tasks.

Another dimension of organizational structure that causes companies to struggle while implementing open innovation practices is that outside ideas fail to reach the people that are best equipped to exploit them (Whelan et al, 2011). Whelan et al (2011) highlighted the two types of innovation brokers, the idea scouts and the idea connectors, the utilizing of their talents by managers can result in major improvements in converting external knowledge into innovative outcomes (p.38). Whelan et al (2011) determined that a company needs both an idea scout and an idea connector; companies that rely only on an idea scout are not examining the open innovation process as a whole. The management of a company must be sure to identify the innovation brokers as

they tend to emerge informally and furthermore the idea scout and the idea connector must be linked (Whelan et al, 2011). Finally, the idea brokers should be given enough resources and more importantly enough time, in Whelan et al (2011) research one idea scout was allowed to devote 100% of their working week to scout potential ideas.

2.2 Performance Indicators

In the early work of Schumpeter (1934,1939) defined five types of innovation; new products, new production process, new sources of supply, the exploitation of new markets, and new ways of organizing business. The literature focuses on product and process innovations as key measurements of performance. Product innovations are the invention and commercialization of entirely new products or services, whereas, process innovation is changes in the production process through the acquiring of new technology or knowledge (Inauen and Schenker-Wicki, 2012). Furthermore, there are numerous indicators to measure the profit or return of newly introduced products or services, share of sales (Smith, 2006), return on sales (ROS) (Lichtenhaler, 2008), and other measures such as return on assets and return on equity have also been previously used (Lichtenhaler,2008). Finally, another key performance indicator used in the open innovation literature is the newness continuum, ranging from radical to incremental (Parida et al, 2012). Incremental innovations are those that build upon existing company competences and result in minor improvements to existing products or services (Inauen and Schenker-Wicki, 2012). Radical innovations are innovations that come about from fundamental technological changes and result in revolutionary or breakthrough products and services (Inauen and Schenker-Wicki, 2012).

Hypothesis 1: There is a significant relation between changes in organizational structure when implementing open innovation and open innovation performance.

Hypothesis 2: There is a significant relation between changes in company culture when implementing open innovation and open innovation performance.

3. Methodology

In this study, a quantitative strategy method is used. This method allows collecting a large amount of data, quantifying it and performing a statistical analysis. Furthermore, a quantitative approach is strongly connected to deductive testing of theories through hypotheses (Saunders et al., 2003). The primary data used in this study was collected through an online survey questionnaire. The online questionnaire was originally produced in English and then translated into Chinese. The target population of this research study was companies located in China. The respondents were selected using convenience-sampling method. A total of 227 questionnaires were distributed to the respondent and 51 questionnaires were completed and returned to be analyzed. Therefore, the response rate of the study is 22.46 %

The current analysis is the constructs for measuring the changes in the organizational structure, the changes in the company culture and the openness innovation performances. The answer are measured by perceptive five-point Likerts scales, ranging from 1 = "No" to 5 = "Very High". The respondents were asked to point out to which extent their company had. The reliability of scale was assessed by conducting a reliability statistics test. According to George and Mallery (2003), generally Alpha of 0.7 and above is considered acceptable. The result of the test indicated computed Cronbach's alpha values of 0.872, which indicates a high level of internal consistency for our scale with this specific sample. The researcher grouped all the indicators of open innovation performance by computing the median. This method is appropriate to analyze the data because all of the variables are measured on an ordinal scale and they have a monotonic relationship between the dependent variable and independent variable. In this study, the independent variables are the changes in the company culture and the changes in company structure. The dependent variable is the openness innovation performance. To test the hypotheses, Somer's delta in SPSS statistics, which is a nonparametric measure, was conducted by analyzing each independent variable with the dependent variable.

4. Findings

The quantitative surveys were collected and analyzed using the data obtained from the questionnaire, answered by 52 companies located in China. The companies in our study comprise of 31.4% Manufacturing, 33.3% Services and 33.3% others. Classified by market type, 47.1% of the respondents were domestic, 7.8% were foreign and 43.1% were both domestic and foreign. Furthermore, the Somer's delta analysis measures the strength and direction between an ordinal dependent variable and an ordinal independent variable. According to the first hypothesis, the researcher wanted to determine if there was an association between the changes in the organizational structure and the open innovation performance as in the following table:

Table1: Direction Measures between Open Innovation Performance and Changes in the organizational structure

	Value	Asymptotic Standardized Error	Approximate T	Approximate Significance
Ordinal by Somers' Symmetric	.463	.109	3.793	.000
Ordinal d Changes in the organizational structure. Dependent	.498	.114	3.793	.000
Open Innovation Performance Dependent	.433	.107	3.793	.000

Somer's delta was presented in the "Open Innovation Performance Dependent" row of the "Value" column, which is 0.433 in this study. This indicates that increased changes in the organizational structure are associated with an increased open innovation performance of the company. Furthermore, the "Approx.Sig." columns shows that the statistical significance value (i.e. p -value) is 0.000, which means $p < 0.05$. Therefore, the association between the ordinal dependent variable, "Open Innovation Performance Dependent", and ordinal independent variable, "Changes in the company structure", is statistically significant.

Considering the second hypothesis, the researcher wants to determine if there is an association between the changes in the company culture and the open innovation performance as shown in Table 2:

Table 2: Direction Measures between Open Innovation Performance and Changes in the organizational culture

	Value	Asymptotic Standardized Error	Approximate T	Approximate Significance
Ordinal by Somers' Symmetric	.435	.111	3.450	.001
Ordinal d Changes in the company culture. Dependent	.457	.114	3.450	.001
Open Innovation Performance Dependent	.414	.112	3.450	.001

According to the result in Table 2, Somer's delta is presented in the "Open Innovation Performance Dependent" row of the "Value" column, which is 0.414 in this study. This indicates that increased in changes in the company culture dependent is associated with increased open innovation performance of the company. Furthermore, the "Approx.Sig." columns shows that the statistical significance value (i.e. p -value) is 0.000, which means $p < 0.05$. Therefore, the relationship between the ordinal dependent variable, "Open Innovation Performance Dependent", and ordinal independent variable, "Changes in the company culture", is statistically significant.

5. Discussion

The results demonstrated a statistically significant relation between both, changes in organizational structure and company culture when implementing open innovation and open innovation performance. Implementing open innovation in any company is a complicated and delicate process that can lead to numerous novel opportunities but also to the loss of a company's competitive advantage. The results of this research show that when implementing open innovation, changes in organizational structure and company culture are very important factors important and to minimize the risk associated with open innovation they should be managed extremely carefully.

The debate regarding the absorptive capacity theory is centered on the means of developing absorptive capacity, in essence, internally developing it or developing from the outside such as hiring new employees (Christensen, 2006). When examining any collaborative knowledge creation process, such as open innovation, it is important to acknowledge the crucial role that individuals play (du Chatenier et al, 2010). The competencies that are necessary to achieve open innovation success differ from a closed innovation process (du Chatenier et al, 2010). The key competencies that were identified as being important in open innovation teams were brokering solutions and being socially competent (du Chatenier et al, 2010). Employees that excel at brokering solutions and social competence enhance open innovation success through numerous channels (generating new knowledge, working with low reciprocal commitment) but most importantly by building trust (du Chatenier et al, 2010). Management literature puts an emphasis on trust as the main coordination mechanism when dealing with uncertain collaborations that require creative cooperation (Adler, 2001). A case study on a successful new product development service supplier illustrated a key phase of their innovation process was the allocation of significant resources and time to an alignment and learning phase (Colombo et al, 2011). This phase is used to bridge the cognitive distance between companies and more importantly to build trust (Colombo et al, 2011). The

case studies showed that if the phase of alignment and learning wasn't properly undertaken the chances of the project being successful were severely undermined (Colombo et al, 2011).

Another important change in organization structure that leads to success is the creation of an employee network that causes open innovation success through the implementation of both an idea scout and idea connector (Whelan et al, 2011). The idea brokers can be both hired internally or from the outside, but the research has shown that they emerge informally and were a surprise to the management, thus the appointments must be carefully considered (Whelan et al, 2011). The appointment of idea brokers allows a company to consider the open innovation process in its entirety (Whelan et al, 2011). In essence, “when management invest in the idea scout and the idea connector, and in the relationships between them, it will be well on its way to achieving open innovation success” (Whelan et al, 2011, p. 44).

Changes in company culture when implementing an open innovation process are also correlated to performance. The key changes in company culture are the adoption of an open innovation mindset starting from the top management that will then in turn be bestowed upon the rest of the company (Nakagaki et al, 2012). Adopting an open innovation mindset or company culture from top management down is important for employees as in certain industries looking to the outside for help can be seen as an admission of defeat (Nakagaki et al, 2012). Companies implementing open innovation should duplicate a company culture and innovation process similar to that of Whirlpool (Muller and Hutchins, 2012). Whirlpool, utilizes open innovation as a tool of support to its existing innovation infrastructure, plans to engage in open innovation are carefully determined by a set of questions and discussion guides at every phase of the innovation process and the open innovation infrastructure is available company-wide (Muller and Hutchins, 2012). Finally, companies must ensure that employees who do work on open innovation projects are given enough resources, especially time, but also incentives that increase the motivation and lead to success (Nakagaki et al, 2012) (Whelan et al, 2011).

6. Conclusion

This paper has proved a significant relation between both, changes in company culture and changes in organizational structure and open innovation performance. The debate, whether absorptive capacity should be developed internally or externally, is best answered through a focus on the key competencies (social competence and brokering solutions) to build trust and the appointment of idea brokers. Internally developing absorptive capacity and changing the organizational structure is more difficult but should not be excluded. Furthermore, changes in company culture result in a blend of both an open and closed innovation process, with support and resources allocated from top management down to all the employees. The limitations of this paper are its focus solely on companies in China; research in additional countries could be useful. In the future, more specific research on which particular changes in both organizational structure and company culture when implementing open innovation have the best performance results.

References

- Adler, P, 2001. Market, hierarchy, and trust: The knowledge economy and the future of capitalism. *Organization Science*, 12(2), 215–234.
- Chesbrough, H, 2003, *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, MA.
- Chesbrough, H., 2003, “The era of open innovation”, *MIT Sloan Management Review*, Vol. 44 No. 3, pp. 35-41.
- Chesbrough, H, 2006, “New puzzles and new findings”, in Chesbrough, H.W., Vanhanverbeke, W. and West, J. (Eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford, pp. 15-33.
- Christensen, J, 2006. “Whither core competency for large corporations?”, in Chesbrough, H.W., Vanhanverbeke, W. and West, J. (Eds), *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford.
- Cohen, W. M., and Levinthal, D.A, 1990. “Absorptive Capacity: A New Perspective on Learning and Innovation,” *Administrative Science Quarterly* 35(1), 128–152.
- Colombo, G, Dell’Era, C and Frattini, F, 2011. “New Product Development (NPD) Service Suppliers in Open Innovation Practices: Processes and Organization for Knowledge Exchange and Integration.” *International Journal of Innovation Management*, vol. 15, no. 1, pp. 165-204.
- du Chatenier, E, Versteegen, J. A. A. M., Biemans, H. J. A., Mulder, M and Omta, O. S. W. F, 2010. “Identification of competencies for professionals in open innovation teams.” *R&D Management*, vol. 40, no. 3, pp. 271-280.
- George, D., & Mallery, P, 2003. *SPSS for Windows step by step: A simple guide and reference*. 11.0 update (4th ed.). Boston: Allyn & Bacon
- Inauen, M and Schenker-Wicki, A, 2011. "The impact of outside-in open innovation on innovation performance", *European Journal of Innovation Management*, Vol. 14 Iss 4 pp. 496 - 520
- Inauen, M and Schenker-Wicki, A, 2012. "Fostering radical innovations with open innovation" *European Journal*

- of Innovation Management*, Vol. 15 Iss 2 pp. 212-231
- Lichtenthaler, U, and Ernst, H, 2006. Attitudes to externally organizing knowledge management; tasks, a review, reconsideration and extension of the NIH syndrome. *R&D Management*, Vol. 36 pp.367-386.
- Lichtenthaler, U, 2008. Integrated Roadmaps for Open Innovation. *Research-Technology Management* 51(3), pp. 45-49.
- Lichtenthaler, U, 2009. Outbound open innovation and its effect on firm performance:examining environmental influences. *R&D management*, Vol. 39 Iss 4 pp. 317-330
- Muller, A and Hutchins, N, 2012. "Case: Open innovation helps Whirlpool Corporation discover new market opportunities." *Strategy & Leadership*, vol. 40, no. 4, pp. 36-42.
- Nakagaki, P, Aber, J and Fetterhoff,T, 2012. "The Challenges in Implementing Open Innovation in a Global Innovation-Driven Corporation." *Research-Technology Management*, vol. 55, no. 4, pp. 32-38.
- Nooteboom, B. 1992. "Towards a dynamic theory of transactions", *Journal of Evolutionary Economics*, Vol. 2 No. 4, pp. 281-99.
- Saunders, M., Lewis, P., & Thornhill, A, 2003. *Research method for business students*, 3rd ed. New York: Prentice Hall.
- Schumpeter, J,1934. *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.
- Schumpeter, J, 1939. *A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*, McGraw-Hill, New York, NY, 2 vols.
- Smith, K. 2006. "Measuring innovation", in Fagerberg, J., Mowery, D.C. and Nelson, R.R. (Eds), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 148-77.
- Van De Vrande, V., J. P. J. De Jong, W. Vanhaverbeke, and M. De Rochemont (2009). "Open Innovation in SMEs: Trends, Motives and Management Challenges," *Technovation* 29(6-7), 423-437.
- West, J, Vanhaverbeke, J and Chesbrough, H, 2006. "Open Innovation: A Research Agenda", in *Open innovation: Researching a new paradigm*. Chesbrough, H., Vanhaverbeke, W., and J. West, Eds. Oxford: Oxford University Press, pp. 285-307.
- Whelan, E, Parise, S, de Valk, J and Aalbers, R, 2011. "Creating Employee Networks That Deliver Open Innovation." *MIT Sloan Management Review*, vol. 53, no. 1, pp. 37-44