THE EFFECT OF TECHNOLOGICAL AND COMMERCIAL VIABILITY ON MICROSOFT TAIWAN INNOVATION COMPETENCY

Cheng-Ping Shih [1]
Ya-Chung Hung [2]

Abstract
Innovation competence has become one of the most important issue in high tech industry in globalized economy. Therefore, this study focuses on IPOT innovation model in Microsoft Taiwan.by using PLS method. Empirical results indicate that the commercial viability have higher impact than Technological viability on innovation competence in Microsoft Taiwan. Also, according to results stated above, Technological innovation is more important than project innovation and organization innovation. And all four factors have 1% significant. The following results shows that under commercial viability, human related factor shows more significantly related than market related factor, and under technological viability, organizational related factor has higher related than project related factor. Therefore, the ultimate innovational goal in Microsoft Taiwan industry is to gain more effort on human related factor than the other three factors. The study find the successful factors on a company's' innovation competency from IPOT model that can build an econometrics self-successful model. It show that innovation model can indeed help organization self-evaluate whether it is advantageous to adopt innovation.

Key words: Innovation competency and Technical innovation.

1. Introduction

Innovation is addressed as the importance that outperforms the previous preparation. Also it is a concept central to economic growth and can be a source of sustained competitive advantage to firms (Schumpeter, 1934; Tushman et al., 1997). Its primary purpose is to introduce change in the organization to create new opportunities or to exploit the existing ones (Druck, 1985). To lead or endure with innovations, managers need to essence comprehensively on the innovation system, which requires deep understanding of the complexity of innovation. However, there have been a few researchers that have been conducted an integrate process oriented model to knowledge management. Innovation is the key to maintain it. Innovations are increasingly brought to the market by networks of firms, selected according to their comparative advantages, and operating in a synchronized method.

1.1 Propose of this study

By looking at a more complete picture, propose of this research seeks to improve the last year study. The study last year examined the four crucial successful factors, organization-related factor, project-related factor, human-related factor, and market-related factor of the van der Panne et. al. model (2003) by using OLS. However, the limitation of OLS regression, we are only able to gather information separately to analyze isolated relationship. Therefore, the ultimate goal in this study aims at improving Shih's model by using Partial Least Squares (PLS). The method of PLS is to appear more suitable than using OLS in the IPOT model. The advantage of PLS is described that First, it can deal with numerous dependent variable and independent variable Second, it overcomes the problem of muticollinearity.Third, high

[1] National Taiwan Normal University
[2] National Taiwan Normal University, kellybebe1006@gmail.com

forecasting talent in potential variable goes into response variable Forth, it handles both reflective indicator and formative indicator, finally it suits for small sample

2. Literature reviews

2.1 Innovation

Thompson (1965) defines innovation as the generation, acceptance, and implementation of new ideas, processes, products, or services. On the other hand Amabile et al. (1996) define innovation as the successful implementation of creative ideas within an organization. According to Rogers (1995), it is an idea, practice, or material artifact perceived as new by the relevant unit of adoption.

Innovation is a concept central to economic growth and can be a source of sustained competitive advantage to firms (Schumpeter, 1934; Tushman et al., 1997). The primary purpose of innovation is to introduce change in the organization to create new opportunities or exploit the existing ones (Druck, 1985). Innovation is generally considered to be one of the key drivers of corporate success (Cardozo et al., 1993). Prajogo and Ahmed (2006) points out that the strong relationship between stimulus and innovation competency suggests that organizations that excel in creating an environment and developing behaviors and practices supportive to innovation are also likely to excel in building capacity and competency to innovate. Some researchers have defined innovation capability as the exploration to the unknown and introduce the new by breaking current social and cultural obstacles and the fixed pattern of things (Santomero & Trester, 1988).

Understanding how to manage innovation successfully is crucially important in a time when innovation is an almost obligatory survival ("Innovate or Die" (Drucker., 1999). The innovation process identifies the complex nature of innovation and emphasizes the need to view innovation within the context of the organization. If firms wish to improve innovation performance, they need to develop factors that stimulate innovation. (Shih & Tzen 2009). Prajogo and Ahmed (2006) argued that innovation competency includes technological and human factors.

Manufacturing, marketing, and services also have an opportunity to innovate in performing their value-adding activities. Shih et..al. (2009). In short, any part of a firm's value chain can be the source of innovation (Afuah, 2003). The focus on "change" is, however, not on directions of change but on principles of work organization, human resource management and technical innovation which are associated with combining organizational flexibility and innovative capability, i.e. intra- and inter-organizational response mechanisms that evidence economies of scope. (Shih & Tzen 2009)

In order to be successful, one company has to build an appropriate mechanism to integrate learning and knowledge to create value for the company (Cullen & Parboteeah, 2007).On the one hand, companies need to maintain the stability to accomplish daily tasks; on the other hand, companies also need to develop new ideas and new products to be competitive in the long run. The management involves developing the creative potential of the organization (Trott, 2005). Innovation competence is the skills and knowledge required to effectively generate new skills and knowledge (Romijn & Albaladejo, 2002). In Table 2.1 there are different literatures of innovation competency.

As a desire for innovation many companies are trying different methods to keep themselves in the global market, those methods include process innovation, organizational innovation and technological innovation (Shih & Tzen 2009).

2.2 Technical innovation

Technical innovations use new technological or market knowledge to offer new products or services to customers (Afuah, 2003).Technical innovation is about improved products, services, or processes or completely new ones.

2.3 Successful Factors

Skills in market research are generally considered a success factor (1) organization related; (2) project related; (3) market related factors, and (4) product related; Loewe & Dominiquini (2006).

3. Questions of the Study

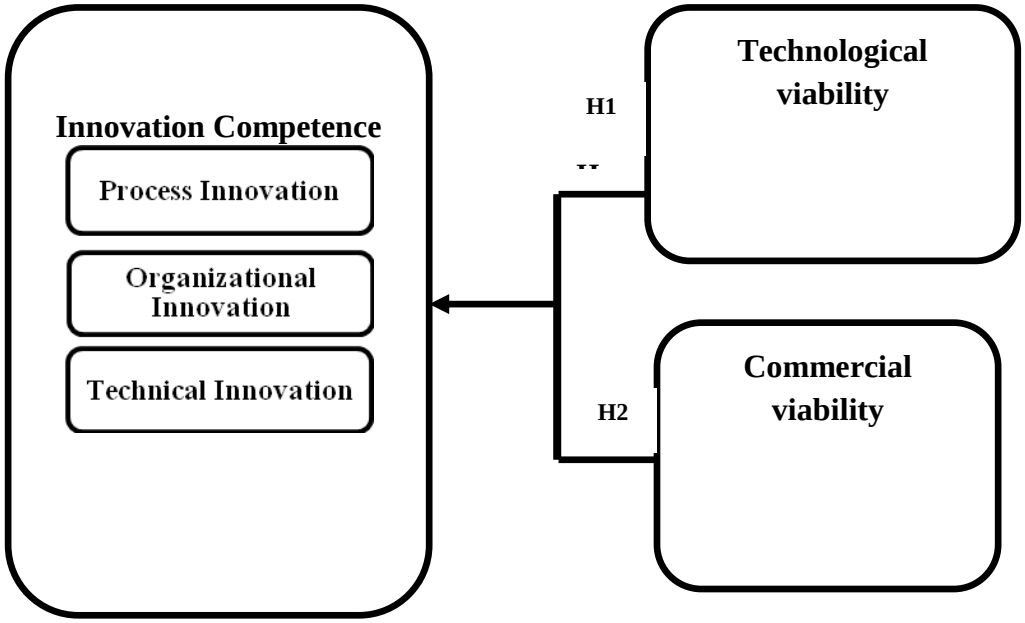
This research concerns the innovation of the company by using IPOT model, it aims to examine both high technical and traditional company, though , due to the word limitation, this paper only focus on the Microsoft Taiwan by the IPOT model which focuses on the Innovation in Process, Organizational and Technology, the high technical company, The purpose of this research is to know if those factors in the four dimensions (Microsoft Taiwan) have an important influence on technological innovation competency and how the IPOT model by Shih & Tseng (2009) takes an important role. The questions of the study are the following:

How do organizations related factors influence technological innovation?
How do project related factors influence technological innovation?
How do market related factors influence technological l innovation?
How do human related factors influence technological l innovation?

3.1Research Framework

Figure 1 shows the theoretical framework. There are five independent variables, including organization-related factors, project-related factors, market-related factors and human-related factors. Under the limitation of the pages, this paper only reports the results for technical innovation.

Figure 1: Study Framework Innovation Competence Model



3.2 Equation Model and Hypothesis

From the above literature review and the structured research framework, five hypotheses can be listed:

Hypothesis 1a: Technological viability of Organization related factors have no influence on technical innovation.

Hypothesis 1b: Technological viability of Project related factors have no influence on technical innovation.

Hypothesis 2a: Commercial viability of Market related factors have no influence on technical innovation.

Hypothesis 2b: Commercial viability of Human related factors have no influence on technical innovation

3.3 Data and Samples

In order to understand the effect of the model on technological industry Microsoft Taiwan was selected. Microsoft Taiwan is one of the most successful companies in Taiwan. The research population sample comprises a group of employees from Microsoft Taiwan Company. A nonrandom sample technique has been implemented. Out of 300 questionnaires distributed 260 valid questionnaires were returned, a return rate of 86.6%.

3.4 Instrument

In order to test the research hypothesis, a previous literature-based questionnaire was created in which the four factor dimension of Microsoft Taiwan. and process innovation from IPOT was implemented. The questions are close ended and are composed of six parts. Part one talk about the basic information of employees like gender, age, years of working for the company, etc. Parts two to five talk about organizational (8 items), project management (8 items), human capital (8 items) and market (5 items). The final part talks about the enterprise performance construct (6 items). Each question of the questioner is in the form of a statement and the response are design to be answer on a 5-Point Likert-type scale, ranging from 1= strongly disagree to 5= strongly agree. The questionnaires were distributed personally to each employee of the different departments of Microsoft Taiwan

The data will be analyzed utilizing two models: Model 1 consists of a regression analysis and Model 2 will use the average of each group of questions. Average is used to study the overall effect of different factors have on innovation.

3.5. Study Method-Partial least squares

The data analysis method used in this paper is Partial Least Squares (PLS). PLS is used to analyze simultaneously the interrelationships among all the constructs. It is a powerful tool in social and behavioral sciences where theories are formulated in terms of hypothetical construct, which are theoretical and cannot be observed or measured directly. Additionally, in order to evaluate the statistical significance of the loadings and the path coefficients (standardized betas), a jackknife analysis was performed. By applying the jackknife formula, PLS estimates the parameters for each sample and compute the "pseudovalues". Two paths have shown significance at the p-value < 0.10.. Besides, PLS estimation does not require assumptions of normality or independence of observations. Moreover, it works well with small samples and is better suited for exploratory work. These are also the reasons that make PLS a more suitable analyzing method for this study.

Finally, the "rule of thumb" for sample size requirements suggests that it will be equal to the larger of the following (Cabrita & Bontis, 2008): 1. 10 times the scale with the largest number of formative indicators (scales with reflective indicators can be ignored) or 2. 10 times the largest number of antecedent constructs leading to an endogenous construct. In our study we applied the second requirement as all indicators are reflective. The final full test with interaction effects would have 3 constructs. Therefore, a minimum of 30 (3 x 10) was required. Our sample size (260 samples) met the criterion.

4. RESULTS

4.1 Testing the Measurement Model

Validity and Reliability

This paper uses Cronbach's alpha in PLS approach to assess the measurement model (outer model). From Table1, all of the Cronbach's alpha values of the three constructs exceeded 0.83 Individual item reliabilities were evaluated by examining the loadings of the measures with their corresponding construct. All loadings were greater than 0.7842. Convergent validity was assessed using the internal consistency measure, developed by Fornell and Larcker (1981). All

values for the four constructs exceeded 0.7, as recommended by Nunnally (1978).
Loadings of 0.5 or greater maybe acceptable if there exists additional indicators for describing the latent construct (Chin, 1998). Therefore, items with loadings of 0.5 or greater are retained. There are other authors (Birkinshaw, Morrison, & Hulland, 1995) who have also followed this criterion in their exploratory studies. Table 1 shows the results of PLS loadings on all the items.

Table 1 Measurement model results

Constructs	**Number of items**	**Cronbach's Alpha**	**Internal Consistency**	**R^2 (%)**
Innovation Competence	6	0.8606	0.1924	0.5114
technical viability	13	0.8550	0.0000	0.0000
commercial viability	14	0.8360	0.0000	0.0000
Loadings				
Innovation Competence	Y1(0.7794), Y2(0.7689), Y3(0.7996), Y4(0.8453), Y5(0.7824), Y6(0.6251),			
technical viability	O1(0.3179), O2(0.2436), O3(0.5970), O4(0.4629), O5(0.6161), O6(0.6592), O7(0.6688),O8(0.5641) P1(0.6677), P2(0.6063), P3 (0.6115), P4(0.6927),P5(0.5725), P6(0.6086), P7(0.5783),P8(0.4866)			
commercial viability	H1(0.4744), H2(0.5997), H3(0.5154), H4(0.4993),H5(0.5429), H6(0.6268),H7(0.5979),H8(0.3399), M1(0.7273),M2(0.6871),M3(0.5885)M4(0.4627)			

Source: This paper

4.2 Empirical Results

The data analysis method used in this paper is Partial Least Squares (PLS). PLS is used to analyze simultaneously the interrelationships among all the constructs. Additionally, in order to evaluate the statistical significance of the loadings and the path coefficients (standardized betas), a jackknife analysis was performed. By applying the jackknife formula, PLS estimates the parameters for each sample and compute the "pseudovalues". Two paths have shown significance at the p-value < 0.10. From Table 1, the results showed that the explanatory power (R^2) for the model is 51 %.

Table 2 describe the results by using PLS, as the results address that IT industry shows positive direction and significant in IPOT model.

Table 2. PLS Path Analysis Results (Standardized Beta Coefficients and Adjusted T-values

Path	Hypotheses	β-path	Adj. t-value	Sig.	Support	Direction
T→I	H1	0.379	1.678	*	V	+
C→I	H2	0.381	2.139	**	V	+

* p < 0.10. **p <0.05. *** p <0.001

Table 3 Measurement model result

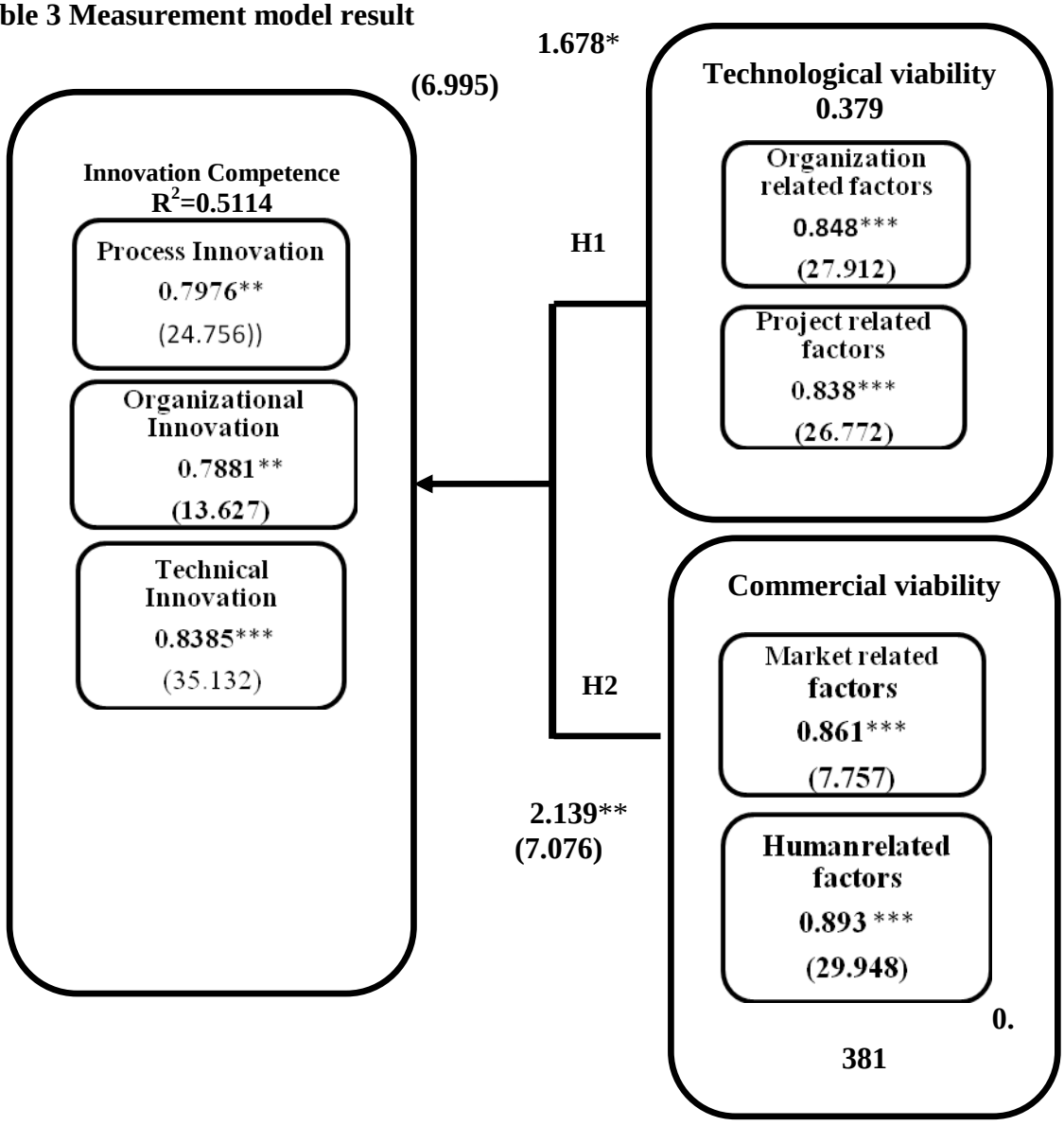


Table3 demonstrates the results for the structural model. The results pinpoint that the three constructs that forms technological variable and commercial variable really affect the innovation competence, and the result shows both variables have positive influence so that reject the research hypothesis. Also, commercial variable is the most important construct in the context of the model given its substantive beta value (0.381).

According to the Smart PLS, from the technological variable perspective the result shows that organization related factor has a positive parameter (0.848) and t-ratio (1.678), which is significant at 1%. Human related factor has also a positive parameter (0.893) and t-ratio (2.139) which is significant at 1%.

Table 4 is shown the enter method, a significant model emerged (F4,98=24.79, p < 0.0000. Adjusted R square = 0.329 Significant variables are as below:

Table 4. PLS Path Analysis Results (Standardized Beta Coefficients and Adjusted T-values

Path	T-values	Sig.	Support	Direction
MR→PI	0.379	***	V	+
OR→PI	0.381	***	V	+

Table5 describes the enter method, a significant model emerged (F4,98=22.45, p < 0.0000. Adjusted R square = 0.307 Significant variables are shown below:

Table 5. PLS Path Analysis Results (Standardized Beta Coefficients and Adjusted T-values

Path	T-values	Sig.	Support	Direction
MR→OI	0.457	***	V	+
OR→OI	0.266	**	V	+

Table 6 points the enter method, a significant model emerged (F4,98=12.75, p < 0.0000. Adjusted R square = 0.267 Significant variables are shown below:

Table 6. PLS Path Analysis Results (Standardized Beta Coefficients and Adjusted T-values

Path	T-values	Sig.	Support	Direction
PR→TI	0.257	**	V	+
OR→TI	0.267	**	V	+
MR→TI	0.199	**	V	+

More results proves that IPOT model is the key of innovation on Microsoft Taiwan industry, As Table 4 , Table 5 and Table 6 shows the four IPOT factors organizational, project, market and human related factors could improve the competence in the industry, especially the organizational related factor which is influence most and successfully in the industry. (Table 4 5 6)

Discussions

The ultimate goal in this paper is aim at improving innovation issue in the high tech industry, therefore, this research examines IPOT model by using PLS in both traditional industry and IT industry. Due to word limitation, we only focus on IT industry in this paper. However, comparing with traditional industry, commercial viability (2.139) has higher related than technological viability (1.678) in Microsoft Taiwan industry.

The empirical findings of this research also shows that under commercial viability human related factor (0.893) shows more significantly related than market related factor (0.861), and under technological viability, organizational related factor (0.848) has higher related than project related factor (0.838). Therefore, the ultimate innovational goal in Microsoft Taiwan industry is to gain more effort on human related factor than the other three factors.

Also, results indicate that the technological viability and commercial viability of technical industry Microsoft Taiwan Company have both positive influence on Innovation Competence However, depends on β-path, Commercial viability(0.381) shows a comparable significant construct that contributes to Microsoft Taiwan

The IPOT model identifies innovation competence is influenced by: process, organizational and technical factors while each of these factors is composed of four success factors: organizational, project, market and human related factors. This research will study if this model fits the IT industry. In an attempt to improve upon the IPOT model, a fifth dimension: demographics will be added and tested. Employees from different departments were used. The data was analyzed by running a multiple linear regression analysis using backward elimination. Results from this research support organization related, project related, market related and human related factors are significantly correlated to innovation competence while demographics related has no effect on process innovation. The data was then analyzed using averages, this new method of analyzing data showed that only 4 factors: organizational, project, market and human related factors are significantly related to innovation competence.
The study find the successful factors on a company's' innovation competency from IPOT model that can build an econometrics self-successful model. It show that self-successful model can indeed help organization self-evaluate whether it is advantageous to adopt innovation.

References

Afuah, A. (2003). *Innovation management: Strategies, implementation, and profits*, and ed. New York: Oxford University Press.

Business Review, Cambridge, MA: Harvard Business School Press.

Cheng-Ping Shih, Jocelynn Gutierrez (2011), Measuring Technical Innovation Competency of Casa Pella Company in Nicaragua, Human Resource Development in Asia: Capitalizing Human Expertise for Greater Innovation & Creativity, 10th International Conference of the Academy of HRD (Asia Chapter), Kuala Lumpur, Malaysia , December 3 – 6, 2011.

Drucker, P. F. (1985). *"The discipline of innovation," In innovation,* edited by Harvard

Kerle, Dr R. Creativity In Organizations - How can creativity become a prime contributor to the strategic objective of the organization (2011)

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

Rogers, E.M. *Diffusion of innovations*. 4th ed. New York: Free Press, 1995.

Romijn, H. & Albaladejo M. (2002). *Determinants of innovation capability in small electronics and software firms in southeast England*. Research Policy, 31, 1053-1067

Shih, C. P. & Tseng, D. L. (2009). *An Econometrics Approach to Evaluate the Successful Factors on Innovation Competency on Microsoft Taiwan-Innovation in Organization*. The 2009 International Conference on Human Resource Development, Graduate Institute of International Human Resource Development, National Taiwan Normal University

Trott, P. (2005). *Innovation Management and New Product Development*, 3rd ed. Australia: FT Prentice Hall.

Van der Panne, G., van Beers, C. & Kleinknecht, A. (2003). *Success and failure of innovation: a literature review*. International Journal of Innovation Management, 7(3), 1-30.