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Innovative Activities and KPI Impact on the KOSDAQ IT Firm Value - Accounting Perspective

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Abstract

Through the changes in firm management activities, value creation of firm drives due to the movement in from tangible assets to intangible assets. Thus, research and interest about an invisible power is very important as the reason of firm growth or value, in a knowledge-based society. Although innovative activities in firms are dynamic power of firm's value growth, there is a positive analytical issue whether the market expects wrong expectations for the short term or innovative activities are not linked to firm's value growth. The purpose of this research is based on analysis of obtaining a patent, including an influence of innovative activities on firm's value and on long-term performance in long-term basis.

Keywords: Firm Value, Innovative Activity, KPI

1. Introduction

In current society the importance of intangibility is very crucial. For IT companies like KOSDAQ, especially investment for "Innovations" and intangibility is important. Figure 1 shows modern society is intangibility of firm value drivers. This paper presents analysis if there is a real influence of innovative activities in terms of performance such as acquiring patent rights, on increasing business value. Accordingly, empirical evidence is shown whether the innovative activities in IT companies like KOSDAQ, was a deciding factor or not. There is a serious information asymmetry exists in KOSDAQ firms. Recently, even though KOSDAQ firms acquire patents, develop new product, there is no connection with stock price increase. The reason, may be innovative activities, such as obtaining a patent is not able to connect to the increase of firm's value? Previous researches mainly based on the case study method to analyze the existence of the short-term rate of return. However, the performance of innovative activities affects in the long-term rather than short term. An increase in firm's value is expected through connection between non-financial performance including financial performance and an external performance including internal one. Global brand consulting firm, Inter brand, evaluates brands on their product and financial performances to create its annual brand value assessment report "Best Global Brands (Figure 1)"

The Top 10 Global Brands and their respective brand values are as follows. Table 1 Apple's brand value grew by 28%, as compared to the previous year, and was ahead of Coca-Cola, which was previously ranked No. 1 for 14 years. IT firms also stand out strong: Google, which holds the second place, IBM, Microsoft and Intel also belong to the Top 10 list. Toyota is the only car brand to make it to the Top 10.

Korean firms have shown substantial progress as well. Samsung's brand value increased by 20% compared to the previous year, which inched it up a spot from the 9th position last year to the 8th position this year.

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Figure 1. Best global brands 2013.

(Source: Interbrand. 2013).

Table 1. Best global top 10 brands 2013

Best Global Brands & Brand Value	
1	APPLE ($98.316 billion)
2	Google ($93.291 billion)
3	Coca-Cola ($79.213 billion)
4	IBM ($78.808 billion)
5	Microsoft ($59.546 billion)
6	General Electric ($46.947 billion)
7	McDonalds ($41.992 billion)
8	Samsung ($39.610 billion)
9	Intel ($37.257 billion)
10	Toyota ($35.346 billion)

(Source: Interbrand. 2013)

2. Literature Review

Schumpeter[4] defined innovation as "a key factor which a company uses in an attempt to get through a discontinuous process of creative destruction." On the other hand, Rogers[3] defined innovation as something an individual or an organization "recognizes as new ideas and execution techniques". So far, innovation has been defined by many scholars, and innovative activities have been recognized as an important factor which directly impacts a firm's survival and prosperity. However, the analysis of the direct effect that innovation has on business performance and value is not an easy task.

Research by Baek, Seung-ik[1] reveals that innovation involves revolutionary activities such as: 1) patent acquisition, 2) investment in research and development, and related facilities, 3) development of new products and services, 4) divestiture (spin-off), and 5) five activities of technology introduction. Based on these activities, reaction of stock market is defined by markets, business sectors after disclosure of innovation activities.

Analysis shows the effect of disclosure on innovative activities is more significant in the KOSDAQ market. Especially, in IT industry in the sector of information and communication equipment the innovation activities disclosure shows more positive impact on firm's value. The preceding research findings about the effect of these innovative activities can interpret that the information of innovation activities is useful on the stock market and affects investors' decisions to reduce the risk of capital markets. However, direct evidence for the impact analysis cannot be seen with an innovation, business performance and firm value. As the event study does not fully do an exogenous macro-control such as the Sub prime Mortgage Crisis, an analytical bias can occur. Thus, this study analyzes the impacts of getting patent and innovative activities on firm value in the long-term perspective.

3. Research Hypotheses and Methods

Hypothesis 1: The innovative activities in the KOSDAQ IT firms will positively affect the firm value.

1-1 IT firms that disclosure the innovative activities for the current year will increase the firm value for the next term.

1-2 IT firms that try different innovative activities for the current year will increase the firm value for the next term.

1-3 IT firms that try to continue innovating activities in the current and next year will increase the value of the firm for the future term.

The Logic: The intangibility is more important in the KOSPI market than KOSDAQ market, same as more in IT firms than non-IT firms. According to previous studies, when innovative activities are in function the relative value relevance is higher, thus by creating an excess earning power the innovation activities become stronger. Continuous performance of innovative activities is expected to enhance stronger the firm value.

Hypothesis 2: The correlation between innovation and KPI will positively (+) affect the firm value.

The Logic: Innovative activities enhance financial and non-financial results, internal and external improvements are accompanied together in IT firms. In addition, innovative activities perform more actively in the case of IT firms with an excellent KPI. Thus, the correlation between innovation and KPI is expected to strengthen the firm value for the next terms. Research Models are as follows. Figure 2.

Interaction between innovation and KPI is considerably analyzed by analyzing model.

The given KPI is selected by considering balanced measurements of internal and external, financial and non-financial performance, based on the BSC point of view for financial performance, customer performance, employee performance and growth.

Financial result equals to profitability (ROA = operating profit / average total assets), Customer Performance equals to Customer Satisfaction Index (Korea Management Association Consulting: CSI), Employee performance equals to productivity per employee (value-added), Growth equals to Market To Book ratio, Enterprise value, EVA, MVA are used as a long-term value of the firm, based on the information of Valuation measures provided by South Korea Investors Service KIS-Value II.

Research Methodology of this research performs a multi-regression analysis. In order to control an economic factors that affect firm value, the deficit (NL), liquidity (CASH), financial risk (RISK), firm size (SIZE), year (YEAR), industry (IND) are controlled.

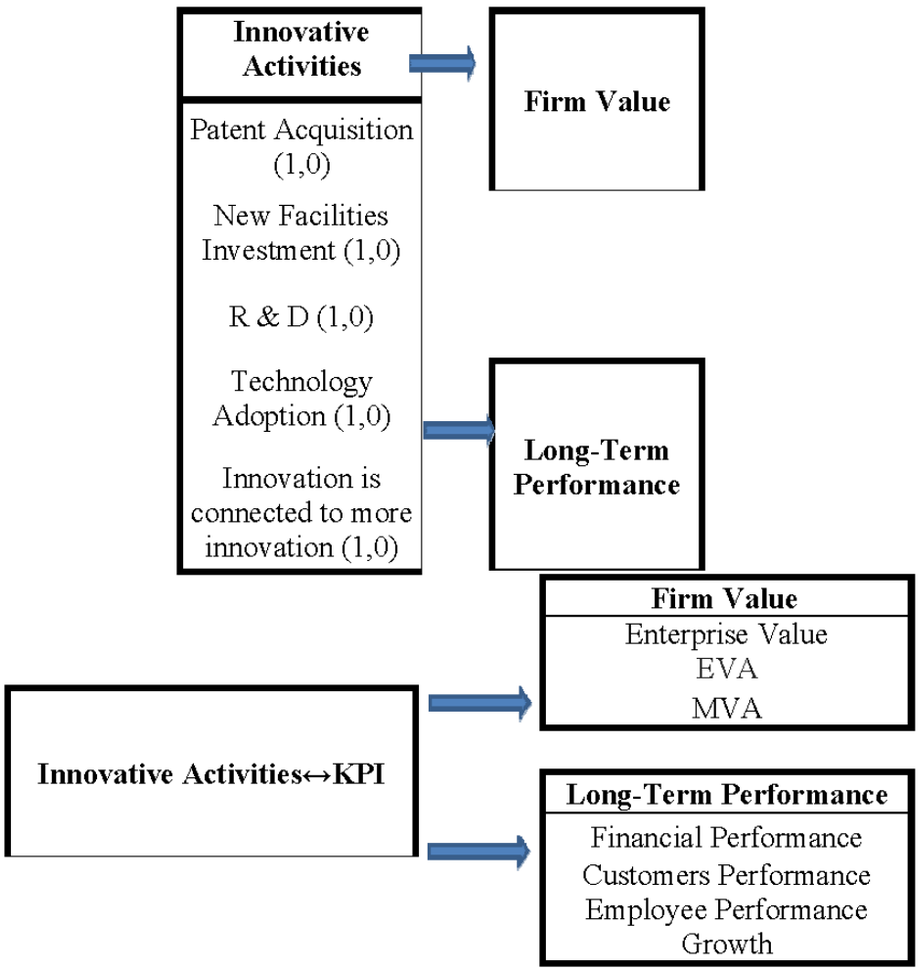

Figure 2. Research model.

4. Data, Sample Selection and Variable Measurement

Table 2 shows Data and Sample Selection. Distribution of Samples is follows in Table 3.

Decision of disclosure of innovative activities is collected based on information (regular, voluntary, and other disclosures) by electronic disclosure system (DART). Financial and stock price data are collected through

Table 2. Data, sample selection

Continued 2009–2013 years 392 IT firms listed on the KOSDAQ	**392**
If you are not a 12 firms month-end	(6)
If you are not a capital deficit	(11)
If you are not unqualified opinion	(10)
If the analysis is not utilized	(13)
In the final Sample of 352 firms (five years, 1,760 firm - year data)	**352**

Table 3. Distribution of samples

Panel A: Distribution of innovation disclosure per annum

Innovative Activities (Variable)	2009	2010	2011	2012	2013	Disclosure Innovation Firm
Patent Acquisition (NINT)	82 17.6%	91 19.6%	96 20.6%	102 21.9%	93 20.0%	464 100%
New Facilities Investment (NINV)	25 11.1%	48 21.3%	50 22.2%	53 23.5%	49 21.7%	225 100%
R & D (NRND)	66 21.6%	52 17.0%	63 20.6%	65 21.3%	59 19.3%	305 100%
Technology Adoption (NTEC)	11 29.7%	6 16.2%	4 10.8%	6 16.2%	10 27.0%	37 100%
Two or more Overlapping (NSEV)	31 15.8%	33 16.8%	44 22.4%	42 21.4%	46 23.7%	196 100%
Innovation is connected to more innovation (NADD)	12 9.5%	26 20.6%	30 23.8%	26 20.6%	32 25.4%	126 100%

Panel B: Distribution of firms by innovation disclosure & non-innovation disclosure

Innovative Activities (Variable)	Disclosure Innovation Firm	Non-Disclosure Innovation Firm	Total Sample
Patent Acquisition (NINT)	464 26.36%	1,296 73.64%	1,760 100.00%
New Facilities Investment (NINV)	225 12.78%	1,535 87.22%	1,760 100.00%
R & D (NRND)	305 17.33%	1,455 82.67%	1,760 100.00%
Technology Adoption (NTEC)	37 2.10%	1,723 97.90%	1,760 100.00%
Two or more Overlapping (NSEV)	196 11.14%	1,564 88.86%	1,760 100.00%
Innovation is connected to more innovation (NADD)	126 7.16%	1,634 92.84%	1,760 100.00%

KIS-Value II, Customer Satisfaction Index was provided by the Korea Management Association.

5. Research Results

Externally introduced innovations such as technology (NTEC) rather than internal innovation, such as patents obtained (NINT) has a significant positive (+) influence on the firm value. Innovation is also obtained by patents for other innovative activities, and is more linked to the continuous innovation to enhance firm value. Descriptive Statistics are as follows in Table 5.

Table 6 shows the Customer Satisfaction (CSI) has a significant positive impact on firm value, and the correlation between innovation and CSI strengthens further the value of company. Analysis in terms of NINV, NRND, NTEC including Patent Disclosure (NINV) did not show significant differences. On the other hand NINV, NRIND, NTEC showed positive coefficient, however it was defined as a statistical metaphor.

Table 4. Operational definition of variables

Innovative Activities	DART	Variable	Operational Definition of Variables
Patent Acquisition	Voluntary Disclosure	NINT	Once you have obtained a patent 1, otherwise 0
New Facilities Investment	Voluntary Disclosure	NINV	Investment, including investment in new facilities, such as the expansion you have 1, 0 otherwise
R & D	Other Disclosures	NRND	Research and development, including the development of new products and services Once you invest in 1, otherwise 0
Technology Adoption	Voluntary Disclosure	NTEC	In fact, if the technology transfer and transfer agreements 1, otherwise 0
Two or more Overlapping	-	NSEV	Both innovation activities in the current year if at least duplicate 1, otherwise 0
Innovation is connected to more innovation	-	NADD	In addition to the current year's innovative activities have been added next to one another innovative activities, 0 otherwise

Table 5. Descriptive statistics (N=1,760)

	Mean	Median	STD	MIN	MAX
LNEV	25.03	24.93	0.99	20.14	29.25
LNEVA	21.77	21.87	1.42	15.18	25.81
LNMVA	24.25	24.31	1.47	17.41	28.91
NINT	0.26	0.00	0.48	0.00	1.00
NINV	0.13	0.00	0.49	0.00	1.00
NRND	0.17	0.00	0.49	0.00	1.00
NTEC	0.02	0.00	0.42	0.00	1.00
NSEC	0.11	0.00	0.45	0.00	1.00
NADD	0.07	0.00	0.35	0.00	1.00
ROA	0.02	0.03	0.10	−0.86	0.58
CSI	32.05	32.00	5.16	10.00	62.33
ES	27.28	22.44	21.29	0.00	209.67
MTB	1.68	1.13	3.11	0.11	106.97
NL	0.82	1.00	0.42	0.00	1.00
CASH	0.05	0.05	0.09	−0.40	0.47
RISK	0.99	1.00	0.42	−0.42	2.46
LEV	0.38	0.38	0.19	0.00	0.97
SIZE	25.21	25.16	0.82	22.88	28.83
IND_VEN	1.00	1.00	0.00	1.00	1.00

Table 6. Multiple regression analysis

Hypothesis 1: KOSDAQ IT companies in innovative activities, firm value will rise if you do next?

Dependent Variable	LN EV		LN EVA		LN MVA	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Constant	0.19	0.20	−1.22	−0.32	−2.18	−0.87
NINT	0.09	1.82*	0.15	2.09**	0.09	1.86*
NINV	0.02	0.51	0.04	0.25	0.12	0.88
NRND	0.07	1.00	0.10	0.39	0.04	0.21
NTEC	0.08	1.80*	0.39	1.26	0.10	0.44
NSEC	−0.09	−1.78*	0.06	1.08	1.01	2.08***
NADD	0.10	2.20**	1.12	2.07**	1.20	2.98***
NL	−0.08	−0.32	−4.18	−3.32***	−0.93	−1.47
CASH	0.03	0.12	3.56	3.77***	0.42	0.63
RISK	−0.19	−3.83***	−0.17	−0.91	−0.31	−2.39**
LEV	−0.43	−3.43***	−0.42	−0.88	−1.92	−5.77***
SIZE	0.95	24.52***	0.84	5.43***	1.02	10.05***
YEAR	included		included		included	
IND	included		included		included	
R2	0.75		0.36		0.48	
F	89.51***		8.69***		23.32***	

Hypothesis 2: Will an interconnection between Innovative Activities (patents acquired, many times innovation, continuous innovation), and the next KPI enhance further the value of the firm?

Dependent Variable	LN EV		LN EVA		LN MVA	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Constant	−0.31	−0.31	−2.36	−0.60	−3.28	−1.26
NINT*ROA	0.00	0.01	1.02	0.49	0.83	0.84
NINT*CSI	0.07	1.82*	0.04	1.79*	0.06	1.84*
NINT*ES	0.00	0.88	0.00	1.00	0.00	0.46
NSEC*ROA	0.43	0.80	4.71	1.84*	1.29	0.96
NSEV*CSI	0.03	2.62**	0.02	2.58**	0.10	3.09***
NSEV*ES	0.00	1.07	0.01	1.51	0.00	0.19
NADD*ROA	0.185	0.364	2.586	0.99	0.49	0.39
NADD*CSI	1.18	2.05	1.04	1.78*	1.23	2.26**
NADD*ES	0.00	0.73	0.01	0.75	0.00	0.84
NINT	0.04	0.46	0.40	1.25	0.12	0.54
NSEV	0.61	1.79*	1.82	1.84*	1.25	1.86*
NADD	0.11	1.88*	0.01	0.03	0.25	1.07
ROA	0.09	0.27	3.62	2.13**	1.42	1.80*
CSI	0.06	2.11**	0.05	1.78*	0.06	1.81*
ES	0.06	1.84*	0.00	0.71	0.05	1.80*
NL	−0.08	−0.32	−4.18	−3.32***	−0.93	−1.47
MTB	0.35	21.77***	0.23	3.46***	0.55	13.22***
CASH	0.02	0.09	3.51	3.70***	0.36	0.54
RISK	−0.18	−3.76***	−0.20	−1.067	−0.31	−2.36***
LEV	−0.45	−3.57***	0.34	0.71	−1.96	−5.83***
SIZE	0.95	24.48***	0.84	5.40***	1.02	10.07***
YEAR	included		included		included	
IND	included		included		included	
R2	0.782		0.435		0.542	
F	74.566***		7.269***		19.344***	

6. Conclusion

In this study, the innovative activities in the KOSDAQ IT firms positively affected the firm value. The correlation between innovation and KPI also positively affected the firm value. Continuous performance of innovative activities enhanced stronger the firm value that could be identified. The analysis of the results of this study are discussed and related to Innovative Activity & KPI impacting big implications.

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