A Global Perspective on Green Sustainability, Corporate Reputation, and Technological Strength for Firm Performance Across Countries

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Abstract

This study is an attempt to explore the nature and characteristics of strategic impact of green strategy by environmental capital, corporate reputation, and technology strengths on the firm's performance across countries. The main question addressed in this paper relates to how corporate sustainability, corporate reputation, technology strength, and capabilities influence the firm's economic performance with respect to diverse dimensions of performance measures including sustained growth through the leading firms across countries in the United States, Canada, Europe, and Asia-Pacific countries. Particularly, this study attempts to empirically explore the directions and magnitudes of the operational links between new emerging strategic core competencies (e.g., sustainability green strategy by environmental focus for more sustainable path, corporate reputation by corporate social responsibility and image enhancement, and technology strengths to develop a new product and market) and the firm's economic performance with respect to diverse dimensions of performance such as accounting (ROE and EOA) - and market-based performance (Market value and Tobin's q). Considering all possible limitations that might exist with regard to selected samples and methods, this study demonstrates that environmental sustainability, corporate reputation, technological capabilities and competencies through R&D intensity and patent are most likely to be significantly associated with most market-based performance measures, but the strategic significance of other variables such as capital intensity, leverage, and administrative cost efficiency on performance tends to be different depending on which performance measure is used across different countries with diverse economic and business contexts.

Keywords : Green Sustainability, Corporate Reputation, Technological Strength, Economic Performance

JEL Classifications : F01, L23, L24, M14, M15, Q56.

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Ⅰ. Introduction

The identification of drivers of competitive advantages and market power is therefore of great importance to those firms facing erosion of their market share and profitability that is essential to survive. A considerable amount of research in the business and economic fields has not only empirically examined the strategic links between corporate reputation, and technological strength and capabilities based on R&D spending and patent citations, but also emphasized their relative significance to a distinctive strategy in determining the firm'seconomic performance. In fact, corporate reputation and technology development has been one of the most critical strategic factors to maintain sustained growth in today's competitive economic world marketplace across different countries (Aw et al.,2007; Tomiura, 2007; Ural & Acaraver, 2006). Corporate spending for technology development and strength remains the driving force behind innovation with respect to the ability build-up to develop a new product and/or market when the market fails and the economy falls. Recently, corporate sustainability through environmental and societal focus has also been known as another key strategic factor to continually improve the firm's market performance to strengthen the competitive power in today's business world based on new technology innovation (Lee et al., 2011).

While there are still discernible inter-relationships between corporate reputation, sustainability performance, increased technological strengths, and firm economic performance independently, very few studies have undertaken them collectively, especially from the international perspective. The significance of a greening strategy, corporate reputation, technological strength and capabilities may have a different impact on firm performance subject to which performance measures are being used across countries (Hall & Lee, 2008; Lee & Habte, 2004). Theexact nature of their relationships among these key strategic determinants with respect to various dimensions of performance measures may also be different by other intervening factors like firm size as well as different type of industry and country context (Lee & Blevins, 1990; Lejarraga & Martinez-Ros, 2008; Tomiura, 2007). Therefore, the previous studies on this pattern of relationships could be misleading at best and completely erroneous at worst.

The consideration of sustainability and technology strength for improving performance is relatively controversial because of the validity and applicability of the controversial findings previously posited by uni-dimensional measures of performance mainly with respect to financial profit based accounting performance. While a number of studies have confirmed that sound corporate sustainability and technological capabilities are financially profitable for the firms who are

viewed as having a favorable corporate reputation (Artz et al., 2010; Fombrun & Shanley, 1990; Lee & Pati, 2012), the significance and impact of technology and sustainability as it relates to corporate sustainable growth and financial performance is still inconclusive. Thus, it can be argued that most previous findings may not entirely rule out the real competencies of selected strategic factors under investigation as major significant determinants of the firm's economic performance across countries with different economic and business environments. To accommodate such controversial issues, further study may need to investigate a firm's strategic determinants and also need to employ various aspects of a firm's dynamic economic performance measures as a benchmarking.

This study will attempt to empirically examine the significance of the impact of corporate sustainability (CS)based on environmental green strategy, reputation, and technology on various indices of performance by utilizing accounting- and market-based performance models across countries. Further, this study will also attempt: (1) to explore the existence of a diverse set of linkages between a selected set of distinctive strategic variables and various indices of performance measures, (2) to explore the direction and magnitudes of their relationships, and further (3) to determine the relative importance of selected key strategic determinants, both individually and jointly, for improving the firm's economic performance while controlling the firm's business and operations strategic variables in the leading firms across three major world economic groups

Ⅱ. Theoretical Background of the Study

2.1 Green Sustainability

Corporate commitment to environmental issues for sustainability is increasingly signified by progressive and proactive leading firms at the forefront of industry. In fact, the driving focus on environmental awareness for sustainability has been one of the most emerging challenges throughout the leading firms across countries in the world. But sustainability may need to focus on a multitude of business and managerial awareness including social, economic, and environmental dimensions (Nguyen & Slater, 2010). Although corporate sustainability is not limited to just the realm of environmental awareness, the value of sustainability can be found from the company's financialgains and market growth through environmental green strategy not only for corporate social responsibility but also for value added products or services for customers in the market(Haanes et al., 2011; Lee et al., 2011). The strategic links between environmental greening efforts and its prospective returned performance are still inconclusive and ambivalent particularly depending on which performance are being undertaken in the study.

Although most past studies attempted the effect of sustainability on performance individually based on a single dimension of performance, the result of their findings showed a significant and strong relationship between corporate sustainability performance (CSP) and financial performance (Choi & Choe, 2010; Jo & Harjoto, 2011). In another study of the relationship between environmental green strategy and financial performance, Konar and Cohen (2001) found that a firm with a better environmental performance relative to tangible and intangible assets has a significant and positive effect on the firm's market value which may be one of the favorable predictors of the firm's expected future financial profitability in the market. Despite that there still exist some arguments on the inconclusive links between corporate sustainability performance and financial performance, overall findings are likely to support one of key strategic rationales for acquiring corporate sustainable capabilities and development through environmental greening is the substantive contribution to the firm's economic performance (Waddock & Graves, 1997; Lee et al., 2011). Accordingly, we would like to propose the following hypotheses:

H1: Corporate Sustainability is significantly and positively associated with a firm's economic performance across countries.

2.2. Corporate Reputation:

Corporate reputation as a result of social and environmental performance as well as technological strengths and capabilities for new product development is playing an increasingly important role in terms of the propensity of business to build and sustain competitive advantages. It is a general notion that the majority of practitioners consider corporate image and reputation as an intangible asset that is scarce, valuable, sustainable, and difficult for a competitor to imitate (Schwaiger, 2004). Corporate reputation has long been regarded as one of the most critical, strategic and enduring assets that a corporation possesses (Bemasek, 2010; Hall & Lee, 2008). A favorable corporate reputation is critical to sustaining a company's competitive power in the market because of the potential power to promote added value creation and difficulty for other firms to replicate (Roberts & Dowling, 2002)thereby creating an effective barrier to entry against competition. A company's reputation is playing and an increasingly important role in terms of the propensity of business to build and sustain a competitive edge in the market. For example, Apple and Microsoft have shown significant market performance based on their reputations that are created by exceptional value creation for their products.

A number of past studies argued that reputations are an intangible or invisible asset that a firm may cultivate or utilize to influence its ability to capture future rents (Fombrun & Shanley, 1990; Hall & Lee, 2011). As argued by Fombrun and Shanley (1990), a firm's reputation may play an important role in determining future organizational performance by limiting its competitors'market access, and/or by generating greater access to capital, better attraction of employment, high profile employees, and reliable commitment of social responsibility. The perceived effect of a good corporate reputation on economic performance will be viewed as more attractive to customers and investors and as a result generate a competitive price power in the market (Cravens et al., 2003; Jarmon, 2009). If a consumer believes that a company has produced better quality goods in the past then they will believe that all new products will also be of a similar quality. This will then increase the likelihood of the consumer buying the company's products (Shapiro, 1983) and also promote a firm's

social and economic potentials by external constituents such as customers, suppliers, and society, etc. (Hall & Lee, 2011). Having a positive reputation can lead to several intangible or invisible assets that a firm may attribute to an organization, thereby improving economic success of the company through a better financial performance (Hall & Mairesse, 1995; Lee & Hall, 2008; Hall & Lee, 2011). Therefore, we also would like to propose the following hypothesis.

H2: Corporate reputation is significantly and positively associated with a firm's economic performance across countries.

2.3. R&D Intensity for Technological Strength

Technological innovation through R&D spending is at the core of business strategy, creating for firms an effective barrier against competition through a steeper learning curve for other firms with in the competitive market. Most conventional research literature suggest that firms that invest a large portion of their sales in R&D tend to experience more growth and profit than those that do not (Lee & Habte-Giorgis, 2004; Ito & Pucik, 1993; Morbey and Reithner, 1990). Several studies have empirically investigated the relationship between R&D investment and performance and found that irrespective of industry and size, company growth increases along with R&D increases (Franko, 1989; Hoskisson & Turk, 1990). It appears that R&D investment usually enables firms to maintain international competitive leadership through product development, operational efficiency, and cost reduction (Ito and Pucik, 1993; Zhao and Zou, 2002). Thus, the traditional notion of the role of R&D in individual firms has also played a major role in the firm's ability to attain or sustain profitability.

Although there have been not found discernible relationships between increased R&D spending and profitability (Morbey & Reithner, 1990; Hartmann et al., 2006), technological innovation obtained through previous investments in R&D provide a crucial incentive to improve the quality of products and/or services. Although research and development can help to determine a firm's commitment to its future endeavors, it is not clear whether a concrete relationship exists between the level of R&D investment and the return on the R&D investment. R&D projects are difficult to manage because there are not usually clear goals for researchers to focus on and accomplish, so many times the results of these investments are inconclusive and open-ended. However, firms that have been profitable in the past have shown a strong commitment to R&D signaling that there is a positive relationship between levels of R&D investment and return on R&D investment (Asthana & Zhang, 2006). As a result, R&D activity would likely contribute to the success of firms pursuing an innovative strategy. Thus, we propose the following hypothesis:

H3: Technological strength & Capabilities by R&D Intensity is significantly and positively associated with a firm's economic performance across countries.

2.4. Patent for Technological Strength

Technology innovation is thought to provide organizations with a means of creating a sustainable competitive advantage that is imperative in today's turbulent environment. Although there is no unique assessment of technological strength performance, one of the most commonly used criteria is patents, particularly in its citations for technical productivity. As one of the traditional studies on corporate technological strength, Narin and Noma (1987) demonstrated that concentration and patent citation are likely to be linked to major increase in profit as well as market growth in sales. In fact, a higher performance in growth and profit is probably significantly relying on technological strength. Particularly, technological capabilities and strengths created by R&D and patents can give high-tech firms more competitive advantages over their rivals by their significant impact on productivity and growth as well as financial performance (Chari et al., 2008; Shan & Song, 1997; Tsai, 2004).

Hall and Trajtenberg (2005) asserted the strategic significance of patent citations on the market-based performance in Tobin's q. by empirically demonstrating that the usefulness of patent citations as technological strength significantly affects market value. Besides the impact of patents on market performance, international patents can also be an indication of research capabilities on the firm's financial performance with respect to profits on total assets through accounting-based measures (Mahlich, 2010). In spite of some negative findings on the impact of patents on both ROA and sales growth (Artz et al., 2010), As such, a majority of past studies supported the advantages of patents as a technology strength and capabilities not only for a wealth of detailed information but also for comprehensive coverage of technology innovation for a new product and market development that may be critical determinants for the competitive advantage. Therefore, we proposed the following hypothesis with regard to technological strengths and capability through the numbers and citations of patent:

H4: Technological strength by Patent is significantly and positively associated with a firm's economic performance across countries.

Ⅲ. Empirical Methods

3.1 Samples and Data Collection

In line with the main theme of this study, the initial sample was taken from the Global 500 Green Rankings 2011 by Newsweek. Finance related firms (SIC 6000-6999) were initially eliminated for their generalizability and reliability of the results with respect to the effect of R&D and technology strength on performance. The initial sample was additionally confirmed through the technology strength related data represented by the patents (Patent Scoreboard 2011 by KIPRIS: Korea Intellectual Property Rights Information Service and The USPTO: United States Patent and Trademark Office), corporate reputation (World's Most Admired Companies by Fortune), and R&D intensity(The 2011 Top Global R&D Scoreboard by the UK's Department of Trade and Industry). After applying the above decision criteria, 190 firms (95 for the United States and Canada, 59 for European countries, and 36 for Asia-pacific countries) were finally

chosen on the basis of comprehensive data availability and tested for this study All other data including key controlling variables employed were taken from Research Insight-Global Vantage

3.2. Measurement of Variables

3.2.1. Firm Performance:

In order to gain more accurate and generalized results, and to minimize possible weaknesses associated with the use of any single performance, this study considered the composite indices of performance measures stemming from accounting-based performance (ROA and ROE) and market-based performance (Market Value and Tobin's Q). More specifically, they are operationalized in the following manner:

EBIT based ROA = (Earnings before Interest & Tax) / (Total assets)
EBIT based ROE = (Earnings before Interest & Tax) / (Common shareholders' Equity)
Market Value = Ln [(Year end closing stock price) * (Common shares outstanding)]
Tobin's Q = (Market value of shareholder's equity + Liquidating value of the firm's outstanding preferred stock + Book value of total debts) / (Book value of total assets)

3.2.2. Strategic Variables:

Continuing the main theme of this paper, sustainability represented by environmental green strategy and focus for sustainability, corporate reputation, technology strengths represented by patents and R&D intensity were employed as three key strategic variables for this study.

(1) **Green Sustainability** is composed of environmental impact score based on data compiled by Trucost that is a comprehensive, quantitative, and standardized measurement of the overall environmental impact of a company's global operations. (2) **Corporate Reputation** is measured using Fortune's "World's Most Admired Companies." Fortune, using nine criteria, solicited the opinions of experts, executives, members of boards of directors, and corporate analysts in assessing corporate reputation. This average reputation score across the nine criteria was used as a proxy for overall corporate reputation.

(3) **Technology Strengths** represented **by R&D Intensity** (= R&D Expenditure / Sales Revenue) and **Citation of Patents** (=Citations received per U.S. Patents).

3.2.3. Control Variables:

The control variables incorporated in this study employ five strategic factors, namely firm size, capital intensity, debt leverage, and selling & administrative cost efficiency. (1) **Firm Size** is measured by the natural log value of total assets, (2) **Capital Intensity** is measured by the ratio of the net amount of plant & equipment to the total assets, (3) **Debt Leverage** is measured by the ration of total debts to shareholders' equity, and (4) **Selling & Administrative Cost Efficiency** is measured by the ratio of the selling & administrative expenses to the total sales

<Table 1> Descriptive Statistics of Major Variables by Country Groups

Major Variables	U.S. & Canada		European Countires		Asia Pacific & Other	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Environmenatal Impact Score	54.74	12.99	56.25	13.45	52.37	14.37
Corporate Reputation Index	6.53	1.30	5.97	0.74	5.63	0.63
R&D Intensity	4.54	4.54	4.39	4.69	3.86	3.73
Citations of Patent	243.71	598.32	208.00	69.47	188.45	709.00
Accounting-based Performance						
EBIT based ROA	0.14	0.07	0.08	0.09	0.06	0.04
EBIT based ROE	0.25	0.15	0.14	0.16	0.11	0.04
Market-based Performance						
Market Value(Ln)	11.43	6.25	10.23	13.26	10.12	7.86
Tobin's Q	1.79	1.00	1.07	0.56	0.75	0.24

Note:
1. **Environmental Impact Score** is a comprehensive, quantitative and standardized measurement of the overall environmental impact of a company's global operations
2. **Citations of Patent**(Citations received per Patent) is a measure of innovation value and knowledge flows

IV. Empirical Analysis and Discussion

4.1. Descriptive Statistics and Correlation Analysis

The mean and standard deviations of major strategic variables in addition to various performance measures across countries are displayed in Table 1. For the firm's performance measures, the U.S. and Canadian firms uniformly show higher means for all accounting- and market-based performance than two other counties based on selected samples in this study. This indicates that overall performances of mainly the U.S. firms are superior to those of the other two countries regardless of different measures of firm performance during that period. In addition, all other key strategic control variables show mixed results across different country groups (even in different industry contexts). The average green strategy variables in European countries (56.75 in environmental impact score) tend to focus more on environmental issues than those in other country groups (54.74 and 52.37 in the U.S. and Canada and Asia-Pacific countries, respectively). Furthermore, the U.S. and Canadian firms (mainly the U.S. firms), on average, tend to be superior inmost technological indicators in addition to more spending in R&D based on sales revenue and signify more reputation in contrast to other country groups. It is also reflected in other patent based technology indicators in which mainly the U.S. firms still remain well ahead of other country groups on the overall indicators in technology strengths with respect to the patents across countries. As results, the U.S. and Canadian firms are more likely to be sustainable through more emphasis on technology development by R&D and patents but to a lesser extent by emphasizing environmental focus (Gobble, 2010; Jeffers, 2010).

Although it is different in the sign of correlation coefficient, the intercorrelations between key strategic variables are likely to be significantly correlated with firm performance with respect to different performance measures across countries (see Table 2). Although the variance inflation factor (V.I.F.) is not presented because of the table

<Table 2> Descriptive Statistics and Correlations[a]

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Environmental Impact											
2. Corporate Reputation	.15 *										
3. R&D Intensity	.61 ***	.14 *									
4. Citations of Patent	.27 ***	.16 *	.25 ***								
5. EBIT based ROA	.01	.35 ***	.13 *	.12 *							
6. EBIT based ROE	.08	.31 ***	.19 **	.04	.47 ***						
7. Market Value(In)	.13 *	.34 ***	.14 *	.15 *	.24 ***	-.02					
8. Tobin's Q	.15 *	.37 ***	.20 **	.34 ***	.70 ***	.12 *	.32 ***				
9. Frim Sized: Ln Sale	.08	.24 ***	.18 **	.31 ***	.21 **	.14 *	.60 ***	.23 ***			
10. Selling&Admin. Efficiency	.11 +	.13 +	.18 *	-.04	-.23 ***	-.07	-.32 ***	-.30 ***	-.06		
11. Capital Intensity	.13 *	.03	.16 *	-.15 *	-.10 +	-.02	.27 ***	.16 *	-.06	.40 ***	
12. Debt Leverage	-.07	-.02	-.20 **	-.12 *	-.16 **	-.01	.02	-.18 **	.21 **	-.11 +	.12 *
[a] N = 190. Due to space availability, dummy variables are not shown											
[b] +P < 0.01; *P < 0.05; **P < 0.01; ***P < 0.001											

space limit, we performed collinearity diagnostics by examining the bivariate correlations and variance inflation factors and found that the problem of multi collinearity does not appear to exist (i.e., V.I.F.s are between 1.16 and 3.97). As we employed the exclude cases list wise method in dealing with the missing values for variables in our analysis, environmental strategy, reputation, and technological strengths represented by patents and R&D intensity are uniformly and significantly correlated with market-based performance measures, but not significant in accounting-based performance across countries.

The strategic impact of major environmental focuses by an environmental impact of a company's global operations, corporate reputation for social responsibility and image, and technological strengths based on patents and R&D seem to be varied across countries, subject to which performance measures are employed. However, they are uniformly and positively correlated with market-based performance including sustained growth rate. Among controlling variables, firm size tend to be significantly and positively correlated with most performance measures regardless of different indices of performance across countries as expected. Capital intensity and selling & administrative cost efficiency are significantly correlated with firm performance, particularly with respect to market-based performance only. Debt leverage is not likely to be uniformly correlated with performance with respect to different indices of performance measures across countries.

4.2. Hierarchical Regression Analysis for Strategic Determinants

Using hierarchical multiple regression analysis, the empirical models shown previously were estimated separately with six indices of performance (accounting-based and market-based performance. This analysis will be used to explore the significant impact of environmental greening, corporate reputation, and technological strength on various performance measures across different countries. From the tables 3 (A & B) for accounting- and market-based performance, all regression models were highly significant ($p < .001$), indicating that the multiple regression models were useful in exploring the major determinants of firm performance across different countries. All models for market-based performance are more useful for exploring the simultaneous effect of both environmental green strategy and patent on the firm performance than that for accounting-based performance (i.e., adjusted R^2 has significantly increased in the market-based performance), indicating theexistence of green strategy and technology strength can be pursued to improve the explanatory power for market-based performance. Therefore, this result provides more confidence in contending that even when other business strategy factors are held constant, the firm's driving force toward environmental greening and technology strength by patent is more likely to be conducive to improving the firm's performance regardless of different indices of performance measures across countries.

As presented in Table 3(A & B), corporate reputation and R&D intensity are significant strategic determinants ($p<0.05$) of the firm's performance (except for EBIT/ROE). In particular, corporate reputation is highly significant and it is one of the major distinctive determinants for all market-based performance measures across countries. Firms with better reputation are more likely to produce a better accounting profit than R&D intensity. The finding of this study appears to be enough to contend that investment in R&D may reflect a company's willingness to forgo market performance as well as sustainable growth in an effort to improve future returns and performance across countries (Hall & Lee, 2008; Kafouros, 2005). Furthermore, corporate reputation as one of major characteristics for social responsibility is most likely to be used as one of the most robust determinants for the firm's economic performance regardless of different dimensions of performance measures. It is consistent with other studies in which firms with relatively good reputations are better able to sustain superior profits outcome when it is interacted with R&D (Fombrun & Shanley, 1990; Ofek & Sarvary, 2003; Inglis et al., 2006) across countries with different business environments. As a result, our proposed hypotheses (H2 & H4) are fully supported.

Contrary to corporate reputation and R&D intensity, technology strength represented by the patent is not uniformly conducive to the firm performance.

<Table 3(A)> Results of Hierarchical Multiple Regression Analysis: Accounting-Based Performance[a]

	EBIT based ROA						EBIT based ROE					
Independent Variables	Step 1		Step 2		Step 3		Step 1		Step 2		Step 3	
(Constant)	.160	(.06) **	.168	(.06) **	.211	(.07) **	.590	(.15) ***	.618	(.16) ***	.626	(.17) ***
Dummy: U.S. vs. Non-U.S.	.027	(.01) *	.028	(.01) *	.023	(.01) +	.006	(.03)	.005	(.03)	.003	(.03)
Firm Size	-.013	(.01) *	-.013	(.01) *	-.012	(.01) *	-.055	(.01) ***	-.058	(.01) ***	-.057	(.01) ***
Administrative Efficiency	-.107	(.05) *	-.101	(.05) *	-.106	(.05) *	-.084	(.12)	-.061	(1.2)	-.053	(.13)
Capital Intensity	-.025	(.01) **	-.025	(.01) **	-.023	(.01) *	-.016	(.02)	-.015	(.02)	-.013	(.02)
Debt Leverage	-.030	(.04)	-.31	(.04)	-.032	(.04)	-.013	(.09)	-.036	(.09)	-.042	(.09)
R&D Intensity	-.002	(.00) *	.003	(.00) *	.003	(.00) *	.006	(.00) *	.006	(.00)	.006	(.00)
Corporate Reputation	.022	(.00) ***	.20	(.01) ***	.022	(.01) ***	.038	(.01) ***	.038	(.01)	.039	(.01) **
Citations of Patent			.021	(.03)	.015	(.03)			-.064	(.07)	-.052	(.07)
Environmental Impact					.000	(00)					-.001	(00)
Model R^2	0.2876		0.2905		0.2908		0.2566		0.2601		0.2684	
Adjusted R^2	0.2174		0.2213		0.2304		0.2258		0.2316		0.2346	
? in R^2			0.0019		0.0003				0.0035		0.0083	+
F-Ratio	5.0423	***	5.7892		5.7853		4.15637	***	4.2075	***	4.3125	***
F-Ratio for ? in R^2			0.5295		1.0707				1.0997		0.1126	
[a.] N = 190. Unstandardized regression coefficients, with standard errors in parentheses, are shown												
[b.] +P < 0.01; *P < 0.05; **P < 0.01; ***P < 0.001												

<Table 3(B)> Results of Hierarchical Multiple Regression Analysis: Market-Based Performance

	Market Value						Tobin's Q					
Independent Variables	Step 1		Step 2		Step 3		Step 1		Step 2		Step 3	
(Constant)	1.779	(.84) *	1.852	(.86) *	2.045	(.94) *	1.046	(.61) +	1.375	(.61) *	2.242	(.62) ***
Dummy: U.S. vs. Non-U.S.	.185	(.22)	.186	(.22)	.151	(.23)	.516	(.16) **	.516	(.16) **	.452	(.16) **
Firm Size	.789	(.07) ***	.817	(.07) ***	.835	(.07) ***	-.068	(.05)	-.079	(.05)	-.048	(.05)
Administrative Efficiency	-2.85	(.68) ***	-2.87	(.69) ***	-1.82	(.70) ***	-1.86	(.50) ***	-1.87	(.49) ***	-2.07	(.47) ***
Capital Intensity	.279	(.12) *	.286	(.12) *	.304	(.13) *	-.297	(.09) ***	-.268	(.09) **	-.234	(.08) **
Debt Leverage	-.503	(.48)	-.478	(.48)	-.463	(.48)	-.231	(.35)	-.125	(.34)	-.114	(.32)
R&D Intensity	.036	(.02) *	.118	(.02) *	.068	(.03) *	.041	(.01) ***	.027	(.01) *	.048	(.01) ***
Corporate Reputation	.289	(.07) ***	.283	(.07) ***	.277	(.07) ***	.164	(.05) ***	.139	(.05) **	.129	(.05) **
Citations of Patent			.147	(.38)	.156	(.40)			.784	(.27) **	.819	(.27) **
Environmental Impact					.021	(.01) *					.189	(.01) *
Adjusted R^2	0.3105		0.3158		0.3235		0.3247		0.3451		0.3986	
? in R^2			0.0007		0.0126	*			0.0166	*	0.0516	***
F-Ratio	14.4006	***	10.6946	***	10.138	***	11.3113	***	10.5584	***	11.6935	***
F-Ratio for ? in R^2			0.0951		1.7559				4.3636	*	9.6065	
[a.] N = 190. Unstandardized regression coefficients, with standard errors in parentheses, are shown												
[b.] +P < 0.01; *P < 0.05; **P < 0.01; ***P < 0.001												

Thus, H3 is partially supported. Technology strength is not likely to be used as a major determinant for most measure of accounting performance but it is statistically significant explanatory factors (at P<0.05) for market value. In fact, it supports the traditional notion that the significant impact of firm performance on technology development by patent can be used to improve performance (Artz et al., 2010; Chari et al., 2008). Our findings appear
to support another previous finding in which the technology strength is significant in a market-based performance, particularly with respect to Tobin's Q (Miller, 2006). Using environmental impact score as proxy measures of corporate sustainability is statistically significant determinants of market-based performance. As such, this study does notsupport H1 fully but it does with respect to market-based performance. Although there are limited studies on the impact of environmental green score on performance, the finding of this study lends support to the notion that firms can sustain and maintain the market competition (Holtzman, 2008; Lee & Pati, 2012).

Furthermore, firm size is significantly associated with most performance measures. It continue to support the traditional notion that firm size can be viewed as one of the most validated determinants of

firm performance in terms of technology development endeavor (Wolff & Pett, 2000) as well as sustainability performance (Lee et al., 2011). Next, capital intensity is also a significant predictor of the firm performance irrespective of different dimensions of performance measures except EBIT/ROE. The effect of capital intensity on the firm's performance may stem from the argument that companies may require more capital investments to sustain competitive earnings and growth in the global market (Lee & Blevins, 1990; Ohmae, 1990). In addition, selling & administrative cost efficiency is significantly associated with all market-based performance but it is statistically significant in EBIT/ROA. As one of the most commonly used business-level strategy variables (Beard & Dess, 1981; Gunner et al., 2007), debt leverage does not show any significant sign of determinants for the firm's performance across countries.

Ⅴ. Major Findings and Conclusions

Although there may still exist some inconclusive empirical results in its significance of determination and direction, the results of the study indicate that corporate reputation for corporate social responsibility, and technological strength influenced by R&D intensity and patents, corporate sustainability through environmental green strategy, and firm size can be viewed as the major competitive determinants for improving the firm's economic performance particularly with respect to market-based performance across counties with different business and economic environments. The results for the positive and significant effects of such major strategic competencies suggest that the firms with a higher and stronger technological capabilities and greening sustainability performance are more conducive to their sustainable strength in financial profit and market growth across countries. The results also suggest a need for technology innovation to sustain competitive edge and social responsibility for greening products and services. Although there are not many empirical studies on the integrated impact of greening, reputations, and technology on the firm's performance, the findings of this study demonstrate that leading firms are likely to maintain stronger sustainable market performance through greater focus on environmental issues, more emphasis on social responsibility and image enhancement by reputation, greater R&D investments, more patenting and stronger technological capabilities. This result may also support a firm's synergistic effects of distinctive strategic factors resulting in a competitive edge in the global market.

In addition, other business and functional strategic factors such as firm size, capital intensity, and selling & administrative cost efficiency in promoting technology development and greening as well as reputation are also more likely to be significant strategic determinants for market-based performance. In fact, larger firms with a higher capital investment for technology improvement may have a greater opportunity to gain new knowledge and capabilities that may accelerate their progress toward environmental greening improvements as well as company reputation in the global market. As such, the synergy forged from knowledge and capabilities can be the foundation of a significant competitive advantage in a fast changing world market. A firm's integrated synergistic capabilities can be strengthened by renewing dynamic capabilities (Artz et al., 2010; Chari et al., 2008; Teece et al., 1997) and strategic competencies to achieve consistency with the changing business environment, through the technology innovation, social responsibility, and the administrative business awareness of creating environmental capital in response to the customers and market.

Ⅵ. Limitations and Implications

One limitation is that the results reported may have been biased by both selected samples and variables because of limited key data availability and the operationalization of the variables with insufficient time span used in the study. Moreover, the present study only looked at an aggregated country setting such as combined U.S. and Canada, Europe, and Asia-Pacific countries over a single-year period. More extensive longitudinal database, if available in the future, may uncover other important findings with regard to the effects of greening strategy and technological strengths on the firm's diverse economic performance including sustained growth rate as a new performance indicator of long-term sustainability from the global perspective.

The major findings of this paper will be of great importance because it not only identifies the key strategic elements that lead to success in diverse economic contexts, but it also is useful to managers in determining the level of commitment to a competitive strategy in a given economic context across countries. This study will also contribute to new strategic implications of environmental green strategy for corporate sustainability performance and its integrated synergy effect of technological strength and firm's reputations for social image and responsibility for the firm's financial and market sustainability in business and economic research, particularly across the leading countries. Most leading global firms in not only the U.S., Canada, and Europe, but also in the Asia-Pacific region have focused on the environmental green strategy and technology innovation toward sustainable growth and competitiveness. More importantly, the major findings of this study will postulate some insightful paradigms of key strategic determinants in economic performance and sustainable growth for those industries and firms that are undergoing competition in the strategic and economic global market.

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