영문요약

THE GRAND UNIFIED THEORY OF THE FIRM AND CORPORATE STRATEGY: MEASURES TO BUILD CORPORATE COMPETITIVENESS

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Introduction

A good understanding of the nature of the firm is essential in developing corporate strategies and building corporate competitiveness. Several theories have emerged on the nature of the firm: The neoclassical theory of the firm, the principal agency theory, the transaction cost theory, the property rights theory, the resource-based theory and the evolutionary theory. Each of these theories identifies some elements that contribute to the success of the firm, but no single theory is comprehensive enough to include all elements for the success of the firm.

Economists are beginning to realize the need for unifying these theories. Bolton and Scharfstein (1988) indicate what we lack and what we need is a more unified theory of the firm

based on the insights of Coase (transaction cost theory, 1937) and Bearl and Means (agency theory, 1932). We propose to unify all of the theories mentioned above. We refer this new theory, the grand unified theory of the firm. We borrowed the term, grand unified theory from physics (Feynman, 1965; Yun, 1984, Weinberg, 1992; Green, 1999). Physicists studied the forces determining high energy separately until Feynman proposed to unify them. Physicists call the theory grand unified theory or final theory. The final theory in physics is not fully confirmed and they are still working on the theory and experimental evidence.

The grand unified theory of the firm can offer a comprehensive view of the firm and may provide better insights on corporate strategies. The neoclassical theory offers insights on corporate mergers because it defines the economies and diseconomies of scale and scope. Benefits and costs of hierarchies and markets (transaction cost theory), ownership structure of assets (property rights approach), separation of ownership and control (agent theory), development of resources and capabilities (resource-based theory), or an environmental change and firm's adaptation to the change (evolutionary theory of the firm) can explain the relative cost and profit positions of the firm.

The environmental changes experienced by Korean firms and corporate transformation after facing the environmental changes present a unique opportunity for scholars to study

factors contributing to success and failure of the firm. As Porter (1991) indicates the reason why firms succeed or fail is the central question in strategy and any effort to understand success must rest on an underlying theory of the firm and an associated theory of strategy.

We developed a comprehensive theory of the firm and associated strategy. In discussion of firm success, we must define a clear definition of what success means. For purposes of our study, we follow the Porter's (1991) definition of success: Firm success is manifested in attaining a competitive position or series of competitive positions that lead to superior and sustainable financial performance (p.96). Financial performance can be measured with profitability of the firm. Profit is defined as follows:

Profit = Total Revenue !Total Cost
or Profit = (Price ! Average Cost) x Quantity

In our study we will examine the nature of the Korean economic crisis and apply the grand unified theory of the firm to our empirical examination of success and failure of Korean firms. Like the grand unified theory in modern day physics, the grand unified theory of the firm may define the universal model for corporate strategy in Korean firms.

The Grand Unified Theory of the Firm

Each of the theories mentioned above identifies some elements that define the nature of the firm. However, no single theory is comprehensive enough to include all elements in defining the success of the firm. As Bolton and Scharfstein (1998) also indicate what we lack and what we need is a more unified theory of the firm based on the insights of Coase and Berle and Means. We need to link together all theories that explain the success of the firm because each theory contributes some relevant elements for defining the success of the firm.

We may call this the grand unified theory of the firm. We have borrowed the term grand unified theory from physics (Feynman, 1965; Yun, 1984; Weinberg, 1992; Green, 1999). Physicists studied the forces determining the nature of the universe separately until Feynman purported to identify the force linking the strong and electroweak forces of atoms. Feynman (1965) indicated that all matter is the same.

"The matter of which the stars are made known to be the same as the matter on the earth. The character of the light that is emitted by those stars gives a kind of fingerprint by which we can tell that there are the same kinds of atoms there as on the earth. The same kinds of atoms appear to be in living creatures as in non-living creatures; frogs are made of the same group as rocks, only in different arrangements. So that makes our problem simpler; we have nothing but atoms,

all the same, everywhere (Feynman, 1965, p.150)."

In physics, the superstring theory has emerged as a single theory that, in principle, is capable of describing all phenomena of the universe (Green, 1999).

We may find a similar analogy in economics. Factors of production in the firm are the same in different organizations/ labor, land and raw materials, capital and entrepreneurship, but organizations produce a variety of goods and services by arranging input factors differently. We have nothing but production factors, all the same in every organization. The various theories purport to explain the nature of the organization and each theory offers differing vantage points of the organization. The grand unified theory of the firm is a framework for stitching these theories into a seamless whole, as the superstring theory in physics.

The firm in the neoclassical theory produces a large variety of outputs using various combinations of inputs. The firm maximizes the profit by accomplishing technical efficiency of inputs, and every economic agent has perfect information. Information is distributed symmetrically. The boundaries of the firm can be defined by the economies and diseconomies of the scale and scope. In principal-agency theory information is asymmetric and moral hazard and adverse selection problems may lead to less than optimal outcomes in the firm. Costs of mitigating these problems can be very high. The transaction cost theory introduced by Coase (1937) offers explanations and

identifies the nature and sources of transaction cost in different circumstances. Williamson (1985) identifies three transaction characteristics that are critical to adoption of governance structure: frequency, uncertainty and asset specificity. Each of those characteristics is claimed to be positively related to hierarchical organization. The design of efficient governance structure is aimed at matching these characteristics with governance structure: hierarchy, varying degree of hybrid and market. Grossman and Hart (1986) and Hart and Moore (1990) advocated a fourth approach, the modern property rights approach to the nature of the firm. A major strength of their property rights approach is that they clearly identify the costs and benefits of integration without relying on the presence of an impersonal market. A firm is a set of assets under common ownership according to their theory. Nelson and Winter (1982) explore the evolutionary and dynamic aspects of the firm. The firms are complex, adaptive systems and this theory focuses on the organization's core competency, structure and strategy. Firms are able to survive and prosper if they change in response to changing input and output markets, and technologies. Firms must find new productive and valuable outlets for their core competency (the things they do well). Determining factors of the success of the firm are the firm's learning about its costs and abilities relative to other firms.

The differences among these theories can be viewed from many different perspectives. However, Acs and Gerlowski

(1996) summarize them into three areas: unit of analysis, availability of information and the operational environment assumed. Acs and Gerlowski point out that the unit of analysis in the neoclassical theory, the principal agent theory, the transaction cost theory and the evolutionary theory of the firm is exchange, the firm in relation to itself, the individual transaction between parties and the firm and its productive processes, respectively. The unit of analysis is the property rights theory is ownership of assets.

The availability of information assumed differs among theories. The neoclassical theory assumes that the economic agent has perfect information. The principal-agent theory introduces asymmetric information into the analysis and asymmetric information leads to the moral hazard and adverse selection problems which result in less than optimal outcomes of the organization. The transaction cost theory assumes that economic agents act with the bounded rationality (intendedly rational, only limitedly so, Simon, 1961, p.XXIV) and opportunism (self-interest seeking with guile, Williamson, 1985, p.47). The transaction cost theory is concerned with the hold up problems of incomplete contracts. The property rights theory recognizes the problems associated with the ownership of assets and post contractual investment in plants and assets. The evolutionary theory of the firm regards firms as complex adaptive systems. Information regarding market and technology changes is important to organizational changes which are

critical for the firms to survive.

A summary of the definition of each theory of the firm, the unit of analysis, assumptions on information and behavior and the principle that each theory is offering for profit maximizing and a stitching link of all theories is presented in <Figure 1>.

<Figure 1> A Summary of the Theory of the Firm

Theory of the Firm	Definition of the Firm	Unit of Analysis	Assumptions on Information	Action Principles of Profit Maximizing and Link
neoclassical theory	a device for resource allocation	-exchange -technical efficiency	-perfect information -symmetric information -rational behavior	-set the ratio or factor price over marginal -production cost minimizing
agency theory	a nexus of contract	-the relationship between agent and principal -work incentives	-imperfect information -asymmetric information -bounded rationality	-design of contract to deal with risks sharing, work incentives -economize agency cost
property rights theory	a team of resource owners	-assignment of property right and ownership of the firm	-imperfect information -asymmetric information -bounded rationality -pursuit of self-interest	-incentive compatible assignment of property rights -economize property right costs

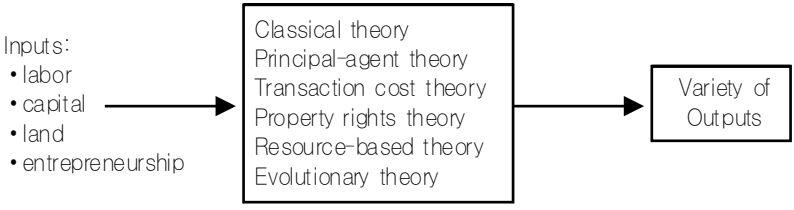
<Figure 1>

transaction cost theory	a collection of transaction	-transaction/contract -holdup costs problem -make or buy	-imperfect information -information asymmetry -bounded rationality -opportunistic behavior	-aligning governance structure with transaction characteristics -economize transaction costs
resource-based theory	a collection of resources and capabilities	-resources -continue to create excess profit	-imperfect information -bounded rationality	-develop strategic assets -economize resource development cost
evolutionary theory	-a collection of routines -complex adaptive system	-routine -product and process innovation	bounded rationality	-adapt to changes in selection environment -economize innovation cost and adaption cost

The grand unified theory of the firm recognizes issues raised by the above theories and purports to identify a link among theories as physicists try to identify linking factors among elements of defining the nature of the universe. A firm is the essential basic unit of the economy. When we study the firm from a comprehensive viewpoint, we should have a better understanding of the nature of the firm and the economy. The firm involves all aspects of the extant theories: the scale and

scope of the economy, technical efficiency, agency efficiency, transaction cost economization, ownership structure and assignment, procurement, development and maintenance of corporate resources and adaptation to changing input and output markets.

<Figure 2> The Grand Unified Theory (GUT) of the Firm



In <Figure 2>, we can see that the grand unified theory of the firm includes all elements of the extant theories of the firm. Candidates of linking factors can be profits, sales, market share, growth or economizing. Behavioral assumptions can be optimization or satisfying and there are interactions among theories in optimizing profits. The grand unified theory (GUT) of the firm lays ground for comprehensive corporate strategy.

Corporate Strategy

There has been an increasing trend integrating the theory of the firm and corporate strategy (Rumelt, 1984; Shapiro, 1989; Spulber, 1993, 1994; Spence, 1979; Porter, 1980, 1991; Wernfelt,

1984; Reve 1990; Williamson, 1991; Nelson and Winter, 1982; Nelson, 1991; Rubin, 1973; Teece, 1985, 1987). Porter (1991) indicates that the earlier strategy literature offers a theory that sought to explain part of phenomena, but which left out important elements that precluded the offering of credible guidance for individual companies. He then asserts that the earlier effort to formulate a theory of strategy raises profound challenges for research because the complexity, situation specificity, and changing nature of the firm and its environment strain conventional approaches to theory building and hypothesis testing. He attempts to suggest what we know and what we need to know to develop a theory of firm performance linked to managerial choice, initial conditions and environmental choice. His answer to the question why some management makes the right choices in selecting products, industries, and activity configurations are luck and local environment. He, however, points out that an important role for the local environment in competitive success does not eliminate the role of strategy nor the need for competitive analysis. Industry structure, positioning, activities, resources, and commitment remain important.

From the above review of the strategy literature, we can see linkages between the theory of the firm and corporate strategy. Lately, more scholars attempt to integrate economic theories with management strategy. Spulber's survey paper on economic analysis and management strategy (1993) evaluates

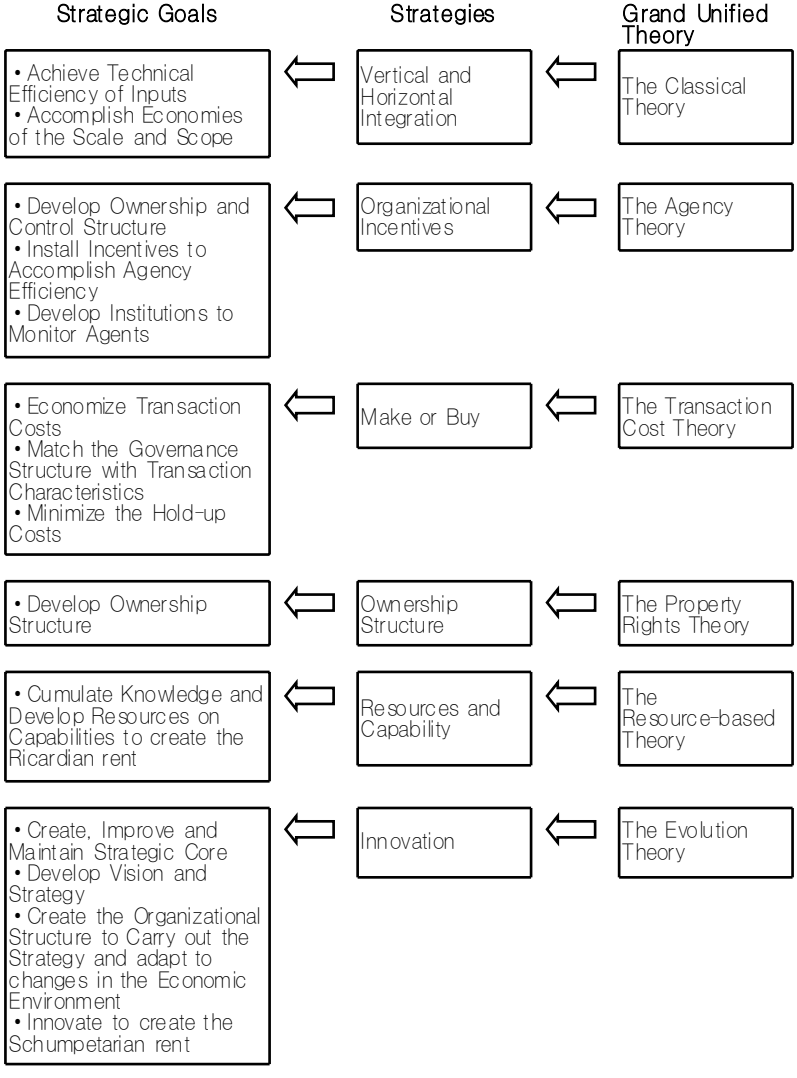
economic theories on the basis of their potential application to problems of management decision making. Management strategy involves decisions in production inputs, production processes and product markets. Decision levels are routines, tactics and strategies.

Wernerfelt (1984) explicitly explores the usefulness of analyzing firms from the resource side (input side) and use a resource-based view of the firm to highlight the new strategic options. Reve (1990) argues that a theory of the firm capturing the questions of strategic management can be developed drawing on transaction cost economics. Reve applies ideas of transaction cost economics to develop an integrated model of strategic management.

Integration of the Grand Unified Theory of the Firm and Strategy

Factors determining success or failure can be analyzed from costs of production and sales of the product. Therefore, any effort to understand success must rest on underlying theory of the firm and an associated theory of strategy as Porter (1991) indicated in the dynamic theory of strategy. The grand unified theory of the firm (GUTOF) offers frameworks for the corporate strategy.

<Figure 3> Integrated Model of the Strategy Based on the Grand Unified Theory of the Firm



The firm that economizes transaction costs achieves technical and agency efficiency, accomplishes the economies of scale and scope; creates, improves and maintains a strategic core, can amass more resources and expand the boundaries of its organization, according to "this unified theory of the firm." The operational or strategic aspects of the grand unified theory of the firm are presented in <Figure 3>.

Hypotheses

Hypotheses are formulated based on the grand unified theory of the firm, market structure and organizational characteristics of the firm.

H1: The market share of the firm (X1) enhances corporate performances.

H2: There is a positive relationship between the size of the firm (X2) and corporate performances.

H3: The tangible asset intensity (X14), machinery and equipment per employee (X5) and debt to equity ratio (X4) of the firm affect the performances of the firm.

H4: The bonus, stock option and sales commission intensity of the firm (X6) positively affect the performances of the firm.

H5: The share (X7) and participation (X8) of major stock holders in a firm play an important role in the

performances of the firm.

H6: There is a positive relationship between the purchase intensity (X9) of intermediate parts and the performances of the firm.

H7: The difference (X10) between productivity per employee and labor cost per employee positively affect the performance of the firm.

H8: The educational and training expenditure intensity (X11) of the firm has a positive effect on the performances of the firm.

H9: The R&D expenditure intensity (X12) has a positive effect on the performances of the firm.

H10: The marketing expenditure intensity (X13) of the firm affect the performances of the firm.

H11: The sales growth rate (X15) of the firm has a positive effect on the performances of the firm.

H12: The age of the firm (X3) affects the performances of the firm.

H13: There is a difference in performances of chaebol and non-chaebol firms (X16).

Model and Data

To test hypotheses we used multiple regression models. The model in our study is specified as follows:

$$Y = \forall + \exists X + ,$$

where Y: performance of the firm measured by return on invested capital (ROIC), return on asset (ROA) and return on equity (ROE).

X: a vector of corporate strategic variables, industry structure and organizational characteristics of the firm:

Detailed strategic variables are as follows:

X1 = market share
X2 = ln (number of employees)
X3 = age of the firm
X4 = debt/equity ratio
X5 = machine and equipment per employee
X6 = bonus, option and sales commission intensity
X7 = share of large shareholders
X8 = management participation of large shareholders
X9 = parts purchase intensity
X10= productivity per employee labor cost per employee
X11= education and training expenditure intensity
X12= R&D expenditure intensity
X13= marketing expenditure intensity
X14= tangible asset intensity
X15= sales growth rate
X16= 30 large chaebol (Yes=1, No=1)

Intensity variables in the model are measured by the ratio of each expenditure over sales. Data used in the model are

<Figure 4> Summary of Hypotheses Derived from the Strategic Model, and an Integration of the Grand Unified Theory of the Firm and Corporation Strategy

Industry Structure-Conduct (Strategy) Performance (SCP) Model			
market share	market structure	X1	H1
Strategy-Structure-Performance (SSP) Model			
Theories of the firm	Strategies	Strategic Variables	Hypotheses
neoclassical theory	efficient combination of resources	X2,X4,X5,X15	H2, H3
agency theory	Improve incentive compatibility	X6	H4
property rights theory	proper assignments of property rights	X7, X8	H5
transaction cost theory	make or buy	X9	H6
resource-based theory	create and appropriate Ricardian rent	X10	H7
evolutionary theory	innovate and create Schumpeterian rent	X11, X12, X13	H8,H9,H10,H11
Organizational Characteristics			
age of the firm		X3	H12
30 large chaebols	develop a proper organizational structure	X16	H13

obtained from the Korea Information Service (KIS) and the Korea Economic Research Institute (KERI). They are cross-section data and consist of detailed accounting data for the firms listed in Korean stock exchange. We used data for manufacturing firms. We also conducted a survey and 203 firms responded to our survey questionnaire.

Hypotheses are derived from the industry conduct (strategy) performance model, the grand unified theory of the firm and the organizational characteristics of the firm. An integrative summary of theories of the firm and corporate strategies are presented in <Figure 4>.

Empirical Results

Empirical results of the regression model are shown in <Table 1> and findings of the study are summarized in <Table 2>.

<Table 1> Empirical results

	ROIC (Y1)	ROA (Y2)	ROE (Y3)
Independent Variables (X)	Regression coefficient (P-value)	Regression Coefficient (P-value)	Regression Coefficient (P-value)
constant	-27.7573 (0.00)	-18.2309 (0.00)	-22.1981 (0.00)
market share	0.0103 (0.68)	0.0080 (0.66)	0.0115 (0.53)
ln (employee)	1.6799 (0.00)	1.1612 (0.00)	1.2576 (0.00)
debt/equity ratio	-0.2385 (0.00)	-0.2449 (0.00)	-0.1815 (0.00)
machine and equipment per employee	-0.4646 (0.03)	-0.5142 (0.00)	-0.3987 (0.00)
tangible asset intensity	-0.00879 (0.28)	-0.0169 (0.00)	-0.0158 (0.01)
bonus, option intensity	0.00897 (0.79)	0.00126 (0.96)	0.00024 (0.99)
parts purchase intensity	0.0387 (0.12)	0.0362 (0.05)	0.0231 (0.21)
(productivitylabor cost)/ per employee	3.8321 (0.00)	3.1928 (0.00)	3.3066 (0.00)
education and training intensity	-3.5089 (0.34)	-0.2766 (0.92)	-0.0259 (0.99)
R&D intensity	-0.5429 (0.12)	-0.4355 (0.09)	-0.4473 (0.08)
advertising, sales commission and A/S intensity	-0.0519 (0.64)	-0.0099 (0.90)	-0.0170 (0.83)
sales growth rate	-0.0000272 (0.96)	0.000934 (0.85)	-0.0000148 (0.97)
age of the firm	-0.1142 (0.00)	-0.1635 (0.00)	-0.1429 (0.00)
30 chaebol	-6.9362 (0.00)	-4.8073 (0.01)	-5.2072 (0.00)
n	1773	1773	1773
R^2	0.17	0.29	0.20
Adj R^2	0.16	0.28	0.19
F	25.68	50.14	31.10

<Table 2> Findings of the regression model

Strategic Model Based on Industrial Organization (IO)			
market share	H1	the market share variable has a positive relationship with corporate performances, but not statistically significant.	
Strategic Model Based on The Grand Unified Theory of the Firm			
Theories of the Firm	Strategic Variables	Hypotheses	Results of Regression Model
neoclassical theory	economy of scale and scope	H2	a positive relationship between corporate performances and the economy of scale.
	technical efficiency	H3	an inverse relationship between corporate performances and technical efficiency variables: debt equity ratio, tangible asset intensity and machine and equipment per employee.
agency theory	agency cost economizing	H4	a positive relationship between corporate performances and agency cost variable, but not statistically significant.
property rights theory	assignment of property rights	H5	not on 〈Table 1〉, but we found that there is a positive relationship between corporate performances and shares of large stockholders, and an inverse relationship between corporate performances and large shareholders' participation in management. Both variables are not statistically significant.

transaction cost theory	make or buy	H6	a positive relationship between corporate performances and parts purchase intensity.
resource based theory	creating Ricardian rent	H7	differences in productivity and labor cost per employee have a positive relationship with corporate performances and consistently significant.
		H8	an inverse relationship between corporate perform- ances and advertising, sales commission and after service intensity.
evolutionary theory	creating Schumpeterian rent	H9	an inverse relationship between corporate perform- ances and R&D intensity.
		H10	an inverse relationship between corporate perform- ances and advertising, sales commission and after service intensity.
		H11	a mixed relationship bet- ween corporate perform- ances and sales growth rate, but not statistically significant.
Organizational Characteristics			
Theories of the Firm	Strategic Variables	Hypotheses	Results of Regression Model
age of the firm		H12	an inverse relationship between corporate performance and the age of the firm
30 large chaebol	organizational structure	H13	a statistically significant difference in corporate performances between the large chaebol firms and other firms.

Conclusion

The empirical results in general support the grand unified theory of the firm. Korean firms can improve their performances and competitiveness by applying the grand unified theory of the firm to their cost and benefit drivers. In other words they can reduce costs by accomplishing technical efficiency and the economy of the scale, economizing agency and transaction costs, and obtaining, developing and maintaining strategic resources (assets). They can improve benefit drivers by innovating production processes and products. We also found that the survey results show that successful business practices in Korean firms follow the framework of the grand unified theory of the firm. Therefore, we can conclude that the grand unified theory of the firm offers a good framework for improvement in business practices, corporate performances and competitiveness.