

## ORGANIZATIONAL EFFECTIVENESS IN THE IT INDUSTRY: THE CASE OF SOUTH KOREA\*

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*This paper proposes to increase theoretical and empirical understanding of organizational environments in the rapidly developing country by offering a more rigorous framework of developmental strategy, linking organizational structure to its effectiveness, and presenting an empirical test of the proposed linkages. The present study builds on an organization-contextual perspective in order to focus on how variation in the organizational characteristics of the IT industry in Korea produces advantages for its effectiveness. While organizational effectiveness is specified by financial robustness, a stratified random sample of 120 Korean IT firms is estimated by several regression models. Although the key predictor variables differ depending on the effectiveness outcome measure considered, variables are chosen on the basis of their potential for offering theoretical insights, and each variable represents one of several organizational properties of a firm. The results confirm that the size variable is still in the conventional wisdom, but the previous mechanisms in Korea such as conglomeration with chaebol groups, export-oriented strategy, and family-controlled factors no longer work in the IT industry. This change is further suggested by the importance of information network systems and IT investment, as well as unusual income and firm's age in affecting organizational effectiveness. The potential implications of these findings and suggestions for future study are discussed.*

*Key Words: Organizational Effectiveness, IT Industry, Developmental Strategy, Korean Firms*

### INTRODUCTION

This study explores the effects of structural relations in economic organizations on the effectiveness of firms in a developing country, using multivariate regression analysis. The objective is to analyze the relationships between organizational structure (e.g., size, age, industry) and financial structure (e.g., performance measures and profitability). This study is not concerned with individual level variables (e.g., interaction patterns, role conflict) or psychological variables (e.g., motivation, individual stress),

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although these are also important aspects of organizations. The view of organizations in the present study is strongly influenced by the works of Kimberly (1976) and Scott (1992). Their work argues that organizations are characterized by contextual relationships among interdependent attributes, as a turn toward institutional explanations and an interest in properties of supra-individual units of analysis that cannot be reduced to aggregations or direct consequences of individuals' motives.

The main theme is to broaden understanding of differences in effectiveness between large monopolistic firms and small competitive firms by assessing the influence of organizational characteristics. These characteristics are operationalized through: 1) financial position, as reflected in its accounting records; and 2) the results of organizational operations. In the first section of the paper, a critical review of previous studies is presented, while the second section presents models of the determinants of effectiveness, based on a structural perspective. These models explain how differences in some organizational characteristics lead to differences in firm effectiveness, and they are tested by analyzing Korean IT firms.

A critical review of the literature on organizational effectiveness shows that some previous studies simply assert that effectiveness is improved or decreased by some degree, without adequately detailing the source of data or identifying the cause of the effectiveness change (Bettis, 1981; Weiner and Mahoney, 1981). They have made little progress in estimating socioeconomic effects. One reason for this lack of progress is that much research in this area has been done by social scientists who are more interested in individual and psychological factors than with economic outcomes of work (Ronan and Prein, 1973). Another reason is that many individuals analyzing organizational structure have been more concerned with process than with outcomes (Adams and Sherwood, 1979; Armandi and Mills, 1982). In contrast to these studies, this thesis focuses on assessing one type of economic indicator as a function of organizational characteristics.

Recently, the discussion of long waves of technological development indicates that the periodic rise in prominence of certain industrial sectors has been a characteristic of innovative technology (Suh, 2003). It means that the rise of new industries and integration of technology and science by firms does not occur in a steady, constant manner. Entire industries, created or transformed as a result of key innovations, have allowed capitalism to maintain its vitality and creative destruction as new sectors became the seedbeds of each upswing of innovation-based growth. For example, from textiles and iron to automobiles and electronics, families of interrelated information technology industries have played significant roles in economic

growth in their particular areas.

The imperatives of technological change constantly affect business firms and determine the conditions of their organizational effectiveness. The growing use of information technology is causing a shift from the hierarchical command and control organization to the flexible and networking organization. The technological development of information systems may present firm's managers with an extended range of organizational and strategic options, in turn impacting their effectiveness. Even in the new environment, small businesses function as a single unit, using low-cost computing to gain competitive advantage over larger companies. Whether a firm keeps up or falls behind, the technological frontier largely defines its fortunes, the prospects for its employees and, in turn, economic development outcomes. Technology, along with informatization, is the principal source of structural change and effective growth or decline.

Korea may be an appropriate case study for investigating economic performance as a function of the firm's organizational characteristics in Newly Industrializing Countries (NICs). The experience of the East Asian NICs, including Korea, is one of the most successful cases of economic growth, which is often used to support or refute the explanatory mechanisms from the major theoretical paradigms (e.g., modernization vs. dependency theory). Nevertheless, the literature review suggests that central to Korea's success has been its outward-looking development policy based on export-promoted industrialization under state guidance (Amsden, 1989; Wade, 1990). This policy, however, generates a discrepancy between export-oriented industries and domestic industries in the country.

In particular, there is a significant difference between the big chaebol groups, conglomerates of a number of industrial firms and businesses, and small or medium corporations. In order to maximize capital accumulation so as to increase international competitiveness under conditions of few resources, the state gives priority to large scale conglomerates by financially repressing small or medium firms. Thus, membership in large chaebol groups may be an important factor in organizational effectiveness, net of other structural characteristics in the country.

Korea has been able to achieve rapid growth over the past 30 years due to a variety of leading industries that have advanced the growth of the economy during various stages of technological development. However, as the global economy has been mired in a slow-down since 2000, the major export items of Korea recorded a growth of 2.9% in 2003 (Korea National Statistics, 2003). In particular, memory semiconductors, auto, steel and other main industries which had been leading in creating national wealth over the last

few years are now faced with difficulties caused by the rapid growth of Chinese counterparts and the oversupply of products around the world.

This recent development, both at home and abroad, raises questions as to the fundamental competitiveness of Korean industries. The Korean economy is expected to face limited growth if it fails to overcome the low value-added production structure. In addition, Korea is required to forecast new component industries and identify new industries to drive future economic growth. Therefore, it is important to evaluate the status of the Korean information and technology industry and to explore the organizational effectiveness that will lead to future economic development.

## RESEARCH BACKGROUND

### *Theoretical Background*

Numerous researchers have described and analyzed the nature of structure and its influence on effectiveness in organizations (Bluedorn, 1980; Child, 1972; Hunter et al., 1982; Kanter and Derick, 1981; Lynch, 1971; Scott, 1992). Their studies have been guided by the structural perspective (Kimberly, 1976). This perspective is concerned with the following questions: 1) What are the relationships among structural characteristics of organizations? 2) What determines variability in the structural characteristics of organizations? 3) What are the consequences of structural variance for variability in organizational outcomes? It would be fruitless to examine effectiveness without considering the various structural characteristics that might be related to forms of effectiveness.

The growing body of comparative organizational studies is guided by a conceptual scheme that facilitates comparability among organizations with respect to effectiveness, and that guides the empirical steps of operationalization and quantification (Armandi and Mills, 1982; Glisson and Martin, 1980). Since organizational effectiveness is one of the most complex issues in the study of organizations, many difficulties arise when we attempt to define it. Criteria of effectiveness are always controversial, and as varied as the theoretical models used to describe organizations. Generally, effectiveness has been defined as "the degree to which an organization achieves its goals" (Price, 1997: 402), and as "a desired state of affairs which the organization attempts to realize" (Etzioni, 1964: 6).

The three main theoretical perspectives on organizational effectiveness are: 1) the goal approach, 2) the system approach, and 3) the multiple-level approach. Considerable differences exist among theoretical (and empirical)

approaches. As noted in an earlier definition, effectiveness is the degree to which the organization accomplishes its specific objectives. This is the central point of the goal approach (Hannan and Freeman, 1977). The system approach defines organizational effectiveness in terms of an organization's bargaining position, as reflected in the ability of the organization, either in absolute or relative terms, to exploit its environment in acquiring scarce and valued resources (Yuchtman and Seashore, 1967). Another perspective on organizational effectiveness focuses on constituent definitions of effectiveness, and proposes that the criterion of organizational effectiveness should include measures relevant to employees and to management (Pfeffer and Salancik, 1978).

Without a rigorous theoretical perspective that adequately treats the concept of organizational effectiveness, research efforts would, for the most part, proceed unsystematically, failing to consider the empirical realities of organizational effectiveness. The present study adopts the goal approach, since it seems to safeguard the analysis against subjective biases. Focusing on business firms, this study will consider several important contexts of organizational environment in Korea.

It can be argued that the structure of an organization is closely related to its context, and much of the variation in organizations might be explained by structural or contextual factors. Under a rational choice model, since organizations are viewed as instruments for the attainment of goals, the criteria emphasized focus on the number or quality of outputs and the economies realized in transforming inputs into outputs. General criteria include measures of total output and of profitability or efficiency ratios, which may be viewed as the excess of returns over expenditures (Scott, 1992). Furthermore, organizations themselves can be interpreted in terms of their contributions to more general social systems. Starting from this theoretical framework, this study explores how differences in the effectiveness of Korean business firms are related to their characteristics.

It is not clear that a single model can be formulated with effectiveness defined as financial viability. However, it is both convenient and useful to construct a model for a single idea, such as financial viability. Conceptualization is always arbitrary to a certain degree. Effectiveness can be defined in a variety of ways, and there is no one best way to define the term. Some definitions, nevertheless, may be more useful than others, depending on theoretical insights. Similarly, the indicators to be used in assessing organizational effectiveness must also be chosen from among several possible types, and data gathered from several possible sampling frames.

In this study, organizational effectiveness is conceptualized as the extent to which an organization is financially viable. The reasons for conceptualization of effectiveness as profitability in terms of financial viability are as follows. First, financial viability is relatively easy to measure. Acquisitions of land or equipment are relatively easy to measure, while the quality of labor or managerial knowledge is not as easy to measure. Second, financial viability appears to be strongly and positively correlated with traditional views of effectiveness (Lindsey, 1981). This is central to the goal approach. Third, financial viability allows one to formulate a theoretical model of the determinants of effectiveness, since outcome indicators focus on specific characteristics of objects on which the organization has performed some operation. Fourth, the cause-effect relations can be handled by the use of relative rather than absolute performance standards, so that the performance of an organization is compared against others carrying on similar work.

### *Structural Variables*

The concept of size is highly relevant to the study of organizations (Blau, 1988; Glisson and Martin, 1980). Size can be conceptualized in several ways, namely, physical capacity of an organization (e.g., number of beds in hospitals), financial characteristics (e.g., assets), amount of input or output (e.g., sales), and human resources (e.g., number of employees). Generally, these four categories are strongly interrelated (Evers et al., 1976). The size of an organization is conceptualized in this study as asset volume and as human resources, measured by the number of employees. Since the purpose of the multivariate analysis is to better understand a wide variety of business firms, the use of financial performance as the basis for the analysis of organizational effectiveness allows more organizations to be included. For example, when the work process requires expensive equipment or automation, the number of employees or organizational members is not very meaningful in investigating organizational effectiveness.

Of the various explanatory variables, size is perhaps the most likely one to be associated with other organizational characteristics. Conceptual and empirical examination of economies of scale has sought an optimum firm-size, one that results in the lowest cost per unit of production. In addressing the size-effectiveness relationship, some researchers find a negative relationship (Bettis, 1981), while others, a positive one (Aldrich, 1979). Despite their contrasting findings, each study holds that size may influence organizational effectiveness. Because of the diverse perspectives, however, research on the size-effectiveness relationship in organizations has reported contradicto-

ry findings.

The relationship of borrowed funds to effectiveness is also important (Hawkins, 1977). Debt is more risky for a company than equity, for debt requires fixed interest payments on specific dates and eventual repayment. Unusual business operations are another potential influence on organizational effectiveness. In Korea, there are many cases of capital gains from selling real estate by firms. It is easy to find firms that own an undeveloped industrial site, waiting for the land price to rise. As a financial term, 'unusual income' includes such infrequent events as the disposal of fixed assets, including land and buildings. By considering these characteristics, this study explores how this unusual factor influences organizational effectiveness.

As the effectiveness of an organization changes over time, the age of the organization is controlled in this study. According to Carroll (1983), two internal characteristics, age and size, appear to affect organizational mortality rates, regardless of environmental conditions. He finds that organizational death rates decrease with age, and that organizational dissolution rates are also consistently higher for smaller organizations than for larger ones. This suggests that both factors are important to organizational effectiveness in terms of the organization's survival. As informatization has proceeded recently, the introduction of information systems via IT development has contributed to reducing the transaction costs dramatically by decreasing the uncertainty of management and by increasing the usefulness of information (e.g., costs of business operation and flexibility of labor market).

### *Contextual Variables*

The difference between export and non-export firms is examined here. In Korea, the expansion of exports was strongly dependent upon the country's comparative advantages in relatively cheap and highly skilled labor in the world market. Small domestic markets, relatively abundant labor, and relatively scarce land and capital made export-oriented industrialization a most efficient means of achieving rapid growth.

Organizational effectiveness is both a cause and a consequence of the evolution of the dynamics of technical progress and accumulation of capital resources. Some empirical studies suggest that organizations with high degrees of IT investment are more effective than those without IT investment (Brynjolfsson and Hitt, 1993). It is, therefore, necessary to control for IT potential in assessing organizational effectiveness.

An interesting observation is that large chaebol groups operate under a

system of highly centralized family control through holding companies in Korea. It has been suggested that around 21 percent of executive positions in the large chaebol groups can be accounted for by family ties with the firm's owners (Shin and Chin, 1989). Chaebol groups have allowed their members to avoid rapid structural change (e.g., market instability, risks) and maintain strong solidarity based on family ties. This phenomenon usually can be found in both large-sized and small- and medium-sized firms in Korea.

This study attempts to advance the analysis of organizational effectiveness in several ways. First, as a theoretical approach for comparative research, the study builds on the structural perspective, in order to focus on how variation in the organizational characteristics of economic organizations generates variation in economic performance. Each variable in the analysis represents one of the characteristic properties of a business organization. Second, the study approaches an important question in the study of Korean economic firms by considering variables that previous research ignored. Previous studies did not include such variables as export-orientation, family control, industry category, and conglomeration within large chaebol groups, which represent unique characteristics to the economy. Third, as a case study, the present analysis explores the financial aspects of the Korean business firms using quantitative measures of organizational characteristics, focusing on their influences on effectiveness. Thus, the study may shed light on the factors influencing firm effectiveness in NICs. Fourth, to control for organizational differences between business firms affiliated with conglomerates, and small and medium non-affiliated firms, a dummy variable for affiliation is specified. This dummy variable is used to test the hypothesis that chaebol groups are more effective than non-affiliated firms, due to the former's large share of the market and to advantages of state support. Fifth, a different set of data and variables are used. Data in the present analysis are taken from a highly reliable source of Korean data, which is large, broad, and up-to-date.

## MODEL AND METHOD

### *Models*

This study develops a model of organizational effectiveness based on multi-dimensional aspects of organizations, and tests several hypotheses concerning effectiveness. The models suggest that effectiveness is related to a variety of organizational characteristics.



Finding a measure of organizational effectiveness is somewhat problematic, since, as discussed earlier, the concept is difficult to operationalize, and no measure is universally accepted (Scott, 1992). The main hypothesis of the analysis is that variation in the structural characteristics of firms affects variation in organizational effectiveness, that is, organizational success in the Korean economy. The study analyzes, as dependent variables, the most widely used measure of profitability for organizational effectiveness, returns on sales (ROS). The variable for returns on sales is defined as the won value of net income divided by the won value of sales. This measure is used to take into account cost control, indicating the percentage relationships of net income to sales.

Net income includes all of the costs of doing business and reflects the total operating of a firm. Business is primarily conducted for the purpose of earning income. Thus, net income is one of the most significant figures produced by the accounting processes, for it measures the degree to which the firm attains its objective. The present analysis uses comparable data from financial statements. Since financial statements essentially report the results of a firm's management activities, they can be viewed as the principal source for evaluating management's performance.

As an explanatory variable, theoretical arguments call for inclusion of firm-size. Size is measured in terms of total assets volume. Another measure of size is the number of employees. To capture the effect of debt on organizational effectiveness, debt utilization ratios are used. Debt ratios include the ratio of debt to total assets and the ratio of debt to equity as a measure of a firm's ability to meet its short-term obligation.

Other selected variables are suggested by the literature review. The number of years in business, up to 2003, is used as the measure of a firm's age. Measures of being conglomerated with large chaebol groups, of being an export firm, as well as being a family controlled firm are included as dummy variables. Unusual income is utilized as a measure of a firm's speculation activities. While the information network system is employed for the effect of IT in a given firm, the investment for IT is used for the potential of firms by informatization.

In sum, three separate regression models for organizational effectiveness can be set up as follows:

Model 1:

$$\begin{aligned} \text{ROS (Returns on Sales)} = & b_0 + b_1 (\text{ASSETS}) + b_2 (\text{DEBT-TO-EQUITY}) + b_3 \\ & (\text{UNUSUAL INCOME}) \\ & + b_4 (\text{FIRM'S AGE}) + b_5 (\text{CONGLO}) \end{aligned}$$

$$+ b6 (\text{EXPORT}) + b7 (\text{FAMILY}) \\ + b8 (\text{INFONET}) + b9 (\text{ITINVEST}) + e$$

Note:

a. Model 2: b1 (EMPLOYEES)

b. Model 3: b1 (EMPLOYEES); b2 (DEBT-TO-ASSETS)

All variables are as defined in Table 1, and  $e$  is the error term. Note that while Model 1 utilizes total assets, Models 2 and 3 use only employees as a size variable, in order to avoid multicollinearity.<sup>1</sup> Accordingly, in Model 1, debt divided by equity is employed as a debt utilization ratio, since the debt-to-assets ratio is a component of the size variable, net income divided by total assets.

**TABLE 1. OPERATIONAL FORM AND MEASUREMENT OF THE VARIABLES**

Variables	Meanings	Measurement
ROS	Organizational Effectiveness	Net Income/ Sales (multiplied by 100)
ASSETS EMPLOYEES	Size	Total Assets Number of Employees
DEBT-TO-ASSETS DEBT-TO-EQUITY	Debt Ratios	Total Debt/ Total Assets Total Debt/ Total Equity
UNUSUAL INCOME	Speculation	Total Unusual Income
FIRM'S AGE	Years in Business	Number of Years in Business up to 2003
CONGLO	Affiliation with Chaebol Groups	1 = in Chaebol
EXPORT	Export Firms	1 = in export
FAMILY	Family-Controlled	1 = family controlled
INFONET	Information Network System	1 = system introduced
ITINVEST	Amount of Investment For IT Sector	Total IT Investment

<sup>1</sup> For the detection and treatment of possible multicollinearity, this study uses the method of the variance inflation factor (VIF). The VIF values for independent variables identified in each model are quite small (e.g., less than 2.0), indicating little multicollinearity.

### *Hypotheses*

With the above framework, several hypotheses are examined:

H1) The size of firms will be positively associated with organizational effectiveness.

H2) Debt ratios will be negatively associated with effectiveness, since these ratios refer to the firm's ability to meet its obligations.

H3) Unusual income will be positively related to effectiveness.

H4) The age of firms will be positively associated with organizational effectiveness.

H5) Being conglomerated with chaebol groups will increase the degree of organizational effectiveness.

H6) Export firms will have greater effectiveness than will non-export firms.

H7) Family control will have a positive impact on organizational effectiveness.

H8) The information network system will be more effective in firms that use the system than in firms that do not use the system.

H9) The amount of investment will be positively related to effectiveness.

### *Data and Analytical Strategy*

The data source is a highly reliable Korean publication, *Firm Information*, by Korea Economic News (Hankyung), which provides significant information on all Korean business firms. The data to be analyzed in this study include general organizational characteristics such as assets, capital, debt, based on financial statements (e.g., balance sheet, income statement), industry and age of firm as of 2003. To approximately capture the export factor, the study uses data on the classification of companies as export and non-export companies. For classifying family-controlled firms, the study utilizes the same data set on the number of family relations in high-level positions, for example, a board director of a firm based on a direct family line such as a father-son or brother-brother relationship.

The basic analytical strategy is to utilize multivariate regression techniques for estimating the model of organizational effectiveness. The study employs a sample of 120 Korean business firms, selected by stratified random sampling of the population across each industry. Based on the classification of the IT industry by the Bank of Korea (1995), five industry categories are used for the disproportional classification of firms by industry

such as digital manufacturing (5.1%), electronic equipment (1.81%), semiconductor (2.08%), communication service (1.41%), and software and contents (1.09%). Data on the collateral family lines such as brother-in-law and son-in-law are not available, since most companies are reluctant to have their confidential sources open to the public. If these data became available, future study of family linkages in organizations would greatly advance. Ordinary least squares estimate (OLS) is the method of quantitative analysis.

## RESULTS

The means and standard deviations of each variable are presented in Table 2.

The mean of each dummy variable (CONGLO, EXPORT, FAMILY, INFONET) represents the percentage distribution of firms across these categories. For example, about 9 percent of the firms are conglomerated with large chaebol groups. The Pearson correlation matrix for the bivariate relationships of each variable in the model is presented in Table 3.

The correlations in Table 3 show that the relationships between the size variables (e.g., assets and number of employees) are very strong, as noted earlier, whereas all other correlations are moderate to weak. The relationships between unusual income and the size variables are relatively strong, because assets and unusual income go hand in hand as financial aspects of business organizations.

The unstandardized regression coefficients for the equations described

TABLE 2. SUMMARY STATISTICS (MEAN AND STANDARD DEVIATION OF EACH VARIABLE IN THE MODEL)

Variable	Mean	Standard Deviation	Unit
ROS	-1.639	6.824	(%)
ASSETS	39316.0	138420.6	million won
EMPLOYEES	125.04	432.2	# of employees
DEBT-TO-ASSETS	8.94	3.163	ratio
DEBT-TO-EQUITY	6.23	9.258	ratio
UNUSUAL INCOME	12.41	182.16	Million won
FIRM'S AGE	8.52	6.25	year
CONGLO	.092	-	(%)
EXPORT	.835	-	(%)
FAMILY	2.386	-	(%)
INFONET	.4175	-	(%)
ITINVEST	152.44	639.45	million won

**TABLE 3. MATRIX OF ZERO-ORDER CORRELATION COEFFICIENTS BETWEEN VARIABLES**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) ROS	-													
(2) ROA	.56	-												
(3) ROE	.54	.88	-											
(4) ASSE	.02	-.03	-.03	-										
(5) EMPL	.02	-.01	-.01	.72	-									
(6) DEBA	-.01	-.01	.02	.04	.04	-								
(7) DEBE	-.10	-.04	.04	-.03	-.04	.36	-							
(8) UNUS	-.17	-.25	-.14	.46	.12	-.15	.25	-						
(9) AGE	-.18	-.08	-.02	.38	.29	.01	-.04	.24	-					
(10) CON	.23	-.02	-.01	.35	.32	.01	-.03	.35	.27	-				
(11) EXPO	-.01	-.01	.02	-.04	-.02	.02	-.01	-.02	.03	-.11	-			
(12) FAM	-.02	-.01	-.02	.02	.11	.02	-.02	.06	-.02	.04	-.12	-		
(13) NET	.05	.01	.05	.04	-.19	-.06	-.05	.08	-.01	.00	-.12	-.14	-	
(14) IT	.07	.13	.07	.23	.21	.10	.10	.16	.13	.02	-.01	-.25	.21	-

Notes:

- (1) returns on sales
- (2) returns on assets
- (3) returns on equity
- (4) assets
- (5) employees
- (6) debt-to-assets
- (7) debt-to-equity
- (8) unusual income
- (9) firm's age
- (10) conglomeration with chaebol groups
- (11) export firms
- (12) family-controlled firms
- (13) information network system
- (14) IT investment

above are shown in Table 4. The findings are, by and large, consistent across the separate models. Overall, a statistically significant amount of the variance in the dependent variable, organizational effectiveness, can be explained by the models (about 30 percent across the models).

In Model 1 where ROS (Returns on Sales) is the dependent variable, the coefficient for ASSETS is statistically significant at the .01 level in a one-tailed test, and its sign is in the expected direction (positive) when the

**TABLE 4.** REGRESSION COEFFICIENTS FOR ORGANIZATIONAL EFFECTIVENESS MODEL (STANDARD ERRORS IN PARENTHESES)

Variable	Model 1	Model 2	Model 3
Intercept	-.989 (-.0842)	-.824 (.0623)	-.835 (.0739)
ASSETS	.00012*** (.00004)		
EMPLOYEES		.00039*** (.00013)	.00064*** (.00021)
DEBT-TO-ASSETS			-.0632 (-1.454)
DEBT-TO-EQUITY	-.0278 (-.454)	-.0316 (-.588)	
UNUSUAL INCOME	-.0163* (.0108)	-.0179* (.0112)	-.0145* (.0102)
FIRM'S AGE	-.0155* (-.011)	-.0392** (-.018)	-.0291** (-.013)
CONGLO	.0347 (.722)	.0322 (.721)	.0310 (.713)
EXPORT	.0165 (.337)	.0189 (.339)	.0212 (.342)
FAMILY	.0021 (.061)	.0014 (.062)	.0017 (.063)
INFONET	5.227*** (1.80)	5.017** (2.40)	6.363** (3.12)
ITINVEST	-.226* (-.151)	-.244* (-.153)	-.215* (-.151)
R <sup>2</sup> <sub>adj</sub>	.2874	.2932	.3145
F	3.245	3.306	3.826
P	.0005	.0005	.0004
N	120	120	120

*Notes:*

\* Significant at the .10 level

\*\* Significant at the .05 level

\*\*\* Significant at the .01 level

effects of other variables are controlled. This result is in line with the hypothesis that assets will be positively associated with organizational effectiveness. It is estimated that an increase of 10 thousand million won in assets is related to a .0012 increase in the ratio of net income to sales, net of other variables. Such an effect is comparable to 70 percent of the mean of the dependent variable, returns on sales. Transforming this finding into an elasticity reveals that returns on sales increase .90 percent for a 1 percent

increase in assets. In Models 2 and 3, where the dependent variable is ROS (Returns on Sales), but the number of employees (EMPLOYEES) is the measure of size, the overall findings are consistent with the results of Model 1, since the correlation between ASSETS and EMPLOYEES is very strong, as shown in Table 3.<sup>2</sup>

The coefficient for UNUSUAL INCOME is negative and statistically significant, but marginally so at the .10 level in a one-tailed. The sign of the coefficient for this variable is not in the hypothesized direction (positive). Likewise, the coefficient for FIRM'S AGE has a negative sign and is statistically significant at the .05 level in a one-tailed test, if the effects of other variables are controlled. The result shows that the sign of the coefficient for unusual income is not in agreement with the proposed positive one.

As predicted, the coefficient for debt ratios shows a negative sign but is not statistically significant when the effects of other variables are held constant. Also, the coefficient for conglomeration with large chaebol groups (CONGLO) has a positive sign but is not statistically significant, net of the effects of other variables. When other variables are controlled, the coefficient for export firms (EXPORT) is not statistically significant, and its sign is in agreement with the hypothesis that export firms will have greater effectiveness than will non-export firms.

The result for the family-controlled variable (FAMILY) shows the hypothesized positive direction, but is not statistically significant. As predicted, the coefficient effect of introduction of an information network system (INFONET) has a strong positive sign, and is statistically significant at the .01 and .05 levels in a one-tailed test, when the effects of other variables are held constant. Controlling for other variables, the coefficient for IT investment (ITINVEST) is statistically, but marginally significant at the .10 level in a one-tailed test. This result is not in the direction of the hypothesized positive sign. In short, if all other factors are held constant, ASSETS, UNUSUAL INCOME, FIRM'S AGE, INFONET, and ITINVEST do significantly affect organizational effectiveness, as measured by net income divided by total sales. Furthermore, these results are in the same pool across the models.

To ascertain whether these results are robust with respect to sample compositions, an outlier influential case analysis also shows the same results, except the size variable of ASSETS, which is not statistically significant in the test. Based on the  $DFBETAS_{ij}$  statistics, there are major differences

<sup>2</sup> Where ROA (Returns on Assets) and ROE (Returns on Equity) are the dependent variables, the results are by and large consistent with the results of Model 1 (Table 4), except that the conglomeration variable (CONGLO) is not significant.

between the firms identified as outliers and the other firms.<sup>3</sup> Outlier firms have greater total assets, more employees, and a higher ratio of debt to equity. This suggests that these firms rely mainly on debt or loans rather than shareholder's equity. The results of the reanalysis with all outliers omitted indicate that while the removal of 22 influential cases changes the size variable, overall results are strongly consistent with the original analysis. Thus, the findings for these variables appear to be strongly robust with respect to the composition of the sample.

## CONCLUSION AND IMPLICATION

This paper has attempted to address several hypotheses about the relationship between organizational effectiveness and selected organizational characteristics of Korean business companies. One of the major hypotheses of the study was whether large business firms would be more effective organizations than small and medium firms in the IT industry. This prediction was confirmed by the positive and statistically significant effects of the size measures (ASSETS and EMPLOYEES) on returns on sales and returns on assets. Therefore, Weiner and Mahoney's (1981) argument that the size variable has a positive effect on organizational effectiveness appears to be correct, reflecting the on-going benefits of economies of scale in the IT industry as the conventional wisdom of financial viability. This result, in part, rejects the tacit consent that small and medium firms are more appropriate and effective in the newly developed information economy. In line with this, it is widely believed that the characteristics of IT are different with respect to hardware and software. It can be argued that large firms are more appropriate in manufacturing IT hardware, while small and medium firms are more effective in developing IT software. Thus, new industries may arise which are best accommodated by combinations of large and small firms, in conjunction with other organizational characteristics and environments.

The analysis also showed that organizational effectiveness is not directly related to the particularity of Korean firms such as conglomeration with large chaebol groups, export-oriented strategy, and family-controlled firms. Although these peculiar characteristics in Korean firms are in the hypothesized direction (positive), the effects are not statistically significant in the

<sup>3</sup> The diagnostic procedure is considered the systematic and informative measure of the potential influence of a particular observation on the robustness of regression estimates (Bollen and Jackman, 1985). The suggested cutoff criterion for identifying unusual cases in this analysis is .1825, based on the  $DFBETAS_{ij}$  statistics (Belsey and Welsch, 1980). However, the omission of outlier cases makes the model censored or truncated.



test. Therefore, the mechanism of Korean business firms needs to readjust to the new environment for organizational effectiveness. This finding implies that independence and specialization, rather than affiliation with large chaebol groups, are more important factors that facilitate organizational effectiveness.

The successful industrialization of Korea has been characterized by its high speed of economic growth during a relatively short period, when one of the underlying sources for Korea's success is an export-oriented strategy which the state strongly supported. In particular, it is a rapid growth in aggregate concentration in the Korean economy by the ownership of a few, large family-running firms, whose efficiency is rooted in the macroeconomic framework of Korean industrialization taken as a whole. According to Woo (1999: 18-19), chaebol groups, combined with an open utilization on state controlled loans, were essential to Korea's economic success in gaining market share. This means, in part, that the state's financial policy favors export and large established firms with a subsidized rate, and this has been the major cause of the growth of business in Korea since the 1970s. Allocation of credit by the state is one of the key functions of finance, and it is widely believed to affect organizational effectiveness. Nevertheless, this study shows that the effect of conglomeration does not yet appear to impact effectiveness.

The importance of export orientation in explaining organizational effectiveness is not suggested by the positive, but insignificant effect of the dummy variable for export oriented firms. Since the launching of an export-oriented development strategy, the state supported the development of export-oriented sectors over that of the import substitution and non-tradable goods sectors. However, the result suggests that even with state support for export firms, the effect still suffers from a time-lag for organizational effectiveness. Likewise, the family factor appears to be weak, with its statistical insignificance. Thus, the IT industry in Korea does not have organizational effectiveness through the effect of family-controlled firms as in the case of industrialization, in which family ties can provide organizational stability to increase effectiveness.

The significant negative impact of unusual income on organizational effectiveness was not in agreement with the hypothesized positive effect. This finding is somewhat surprising, despite its statistical significance. When firms are concerned with irregular capital gains, it can be expected that firms cannot efficiently use their state backed loans to expand business, and they are excluded from further support. If it is not the case with critical momentum where the viability of the organization is threatened, this calcu-

lus of effectiveness reflects the peculiar pattern of state intervention in Korea, in order to develop industrial effectiveness. To the extent that the strength of a firm is rooted in the non-business real estate holdings from rapidly rising prices rather than productivity, the unusual income of a firm does not necessarily ensure organizational effectiveness. Further investigation of the business-state relationship may be required to explain this negative effect, since the state instituted a series of measures to prohibit real estate speculation.

The firm's age appears to affect organizational effectiveness negatively. This finding is not in agreement with Carroll's (1983) finding that organizational survival and dissolution rates are important to effectiveness in the old industry. In contrast, the IT industry, with a relatively short history, reflects a rapid and innovative wave of IT, in which a firm's age does not guarantee organizational effectiveness positively.

Two important factors in the IT industry, the introduction of information network systems and the degree of investment for IT, are statistically significant in the present study. However, it is quite interesting to see the opposite direction of the effects between the two variables. As predicted, the introduction of information network systems has a positive effect on organizational effectiveness, since the costs of business activity such as transaction costs can be reduced by the use of network systems among business firms. In addition, business relationships can be consolidated by the effective use of information network systems, which suggests that a firm's capacity to compete in the market can be advanced.

The negative effect of IT investment is open for interpretation. First, returns on sales can be decreased if over-investment is conducted in a given situation. Second, IT investment needs some room for organizational effectiveness via learning effects, since investment itself does not guarantee organizational effectiveness automatically due to the time-lag. Third, as a matter of measurement, the amount of IT investment does not reflect the qualitative change of capital in which the usefulness and diversity of IT can be varied. In point of fact, the result begs the important issue of the productivity paradox, which means incongruousness of IT investment and effectiveness (Sichel, 1997). The outlier analysis showed somewhat similar results with the original analysis when the characteristics of the omitted cases (N=22), which were mainly big firms, are considered. In point of fact, the size variables did not significantly affect organizational effectiveness, as in the original analysis.

Several limitations of the study must be acknowledged. ROS (Returns on Sales), ROA (Returns on Assets), and ROE (Returns on Equity) — profitabil-

ity ratios — were used as organizational effectiveness measures because public data for other effectiveness measures were not available for most of the firms in the sample. Different results may have been obtained with other organizational effectiveness measures. It is also necessary to take into account other explanatory variables, such as specialization of activities, standardization of procedure, formalization of documentation, centralization of authority, and division of labor. This point also begs another important issue permitting causal inference. For example, some qualification can be proposed for causal arguments regarding the relations of size to effectiveness that run in the reverse direction: effectiveness may cause organizations to grow in size.

Notwithstanding these limitations, the present study may contribute to a preliminary understanding of the relationship between organizational effectiveness and the structural characteristics of economic firms in Korea. One meaningful implication of the analysis is that studies of organizational effectiveness in Korea should consider the new milieu, where previous mechanisms such as conglomeration with chaebol groups, export-oriented strategy, and family-controlled factors no longer work in the IT industry. This implication is further suggested by the importance of information network systems and IT investment, as well as unusual income and firm's age in affecting organizational effectiveness. However, no linear model or simple one-way causality leads from the IT industry to total industries, since the barriers to the development of industries in Korea vary. Although the growth may aim to reach the level of advanced countries, when it comes to the trade of technology, which is a quality indicator, a number of high-technologies are still dependent on advanced countries.

Studies of economic development assume that, within the developing world, entrepreneurial organizations have made major contributions to the economic growth of their nations (Lindsey, 1981; Suh, 1998). Furthermore, IT development tends to present economic firms with an extended range of organizational and strategic options, including specialized work teams, expert systems, and the redefinition of both corporate objectives and their contributions to the nation. Accordingly, increasing attention has focused on removing obstacles that retard or restrain economic growth via firm's behavior and environment in a developing country, which is an important area for the study of organizations. Although this study is to underscore the point that the case of Korean firms is not like what one finds in other regions, it suggests that the important aspects of economic organizations of developing economies can be assessed by examining the effect of organizational characteristics on output, as indicated by effectiveness, since organi-

zational effectiveness is a basic determinant of economic growth.

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