Verification of the Influences of Intellectual Capital upon Organizational Performance of Taiwan-listed Info-Electronics Companies with Capital Structure as the Moderator

Chung-Ming Chang, Department of Logistic Management, Takming University of Science and Technology, Taiwan
Yu-Je Lee, Department of Marketing Management, Takming University of Science and Technology, Taiwan

ABSTRACT

This study aims to verify the influences of intellectual capital (IC) upon the organizational performance of Taiwan-listed info-electronics companies, with capital structure being the moderator. While financial section chiefs or employees of higher levels at such companies were interviewed, the statistical data of companies including Return on Equity (ROE) and Earnings per Share (EPS) were obtained from Taiwan Economic Journal (TEJ) database. Data extracted from the population through convenience sampling was used to verify the goodness-of-fit effects regarding the overall model, structural model and measurement model by means of Structural Equation Modelling (SEM). Findings from this study indicate a significantly interactive influence of IC and capital structure upon the organizational performance of Taiwan-listed info-electronics companies.

Keywords: Intellectual capital, Capital structure, Organizational performance

INTRODUCTION

As the high-tech firms thriving in recent years have ushered in an era of knowledge-oriented economy, the competitive advantage of many companies come from intangible assets, including intellectual capital (IC). Among others, a publicly traded info-electronics firm with accumulated IC enjoys a widening positive difference between its surging market value and the initial book value. That is, IC accumulation IC enables businesses to improve Enterprise Value (EV), achieve sustainable growth, and enhance the potential of sustainable corporate development (Cheng-en Ko, 1999).

Having been the focus of attention in Taiwanese high-tech sector, Taiwan-listed info-electronics firms have proven successful mostly because they have the world’s most comprehensive model of vertical integration among upper-, middle- and lower-stream firms. Not only did that integration model drive the country toward an “economic miracle”, it has tremendous economic significance and brought local companies extraordinary performances that won substantial recognition from investors worldwide. Compared to their counterparts in the traditional sector, info-electronics firms are known for their short product life-cycle as well as technology- and capital-intensiveness. The relatively short product life-cycle scenario forces info-electronics firms to keep developing products while adopting advanced manufacturing technologies, so as to bolster organizational performance and EV (Zhi-wei Pan, 2002).

Currently the companies traded on Taiwan Stock Exchange, including the Over-the-Counter market, are mostly owned by families with equity concentrated in one or more families. With members of those families occupying a large part of the board of directors and top management, the internal-equity structure of companies (i.e., the percentage of shares held by directors/auditors/managers) is brought close to the percentage of shares held by company administrators. As for the influence of Debt-to-Equity Ratio (D/E Ratio) and internal-equity structure, both of which are components of corporate capital structure, on a company’s operating performance (Cheng-wei Ni, 2011), companies may issue shares or raise debts to meet the demand for funding. While the issuance of shares leads to an increased number of external shareholders that further complicates the agency problem between managers and shareholders, financing through raising debts drives up the corporate credit risk as well as the agency cost of both shareholders and creditors. Therefore it is imperative that companies reach a point of balance among all types of costs, which is a determinant of corporate
capital structure. Because whether or not a healthy capital structure and IC accumulation help speed up a company’s efforts to improve organizational performance is a topic worth further scrutiny, this study focuses on Taiwanese info-electronics companies and verifies the goodness-of-fit effect of a research model based on literature review. In other words, this study is conducted for specific purposes as stated below:

1. To verify and examine if IC affects the organizational performance of Taiwanese info-electronics companies in a positive and significant way;
2. To verify and examine if capital structure affects the organizational performance of Taiwanese info-electronics companies in a positive and significant way;
3. To verify and examine if IC and capital structure exert a significantly interactive influence on the organizational performance of Taiwanese info-electronics companies.

LITERATURE REVIEW

The purpose of this section is to explore the association between previous research studies and the focus of this present study, and infer hypotheses from literature review to build a new research framework. Theories and relevant studies underlying this study are stated as follows:

**Intellectual Capital (IC)**


According to Stewart (1997), IC is a concept that involves human capital, structural capital and customer capital. He defines human capital as the sum of innovations, employees’ mindsets, seniority, turnover rate, experiences, and learning capacities; structural capital as the existing knowledge collected using a highly efficient method and tested, organized, integrated, with the irrelevant part sifted out before distribution; customer capital as the relationships a given organization forges with all parties it deals with, including customer satisfaction, retention rate, and loyalty.

The components of IC, as Sveiby (1998) noted, are individual competence, internal structure and external structure, with the individual competence being an employee’s ability to take actions under various situations, which involves explicit knowledge, skills, experiences, value-related judgments, and social network; internal structure being the sum of patents possessed, concepts, patterns, computer/management systems; external structure being the relations with customers and suppliers, which involves the brand, reputation and trademarks.

Johnson (1999) defines intellect, or wisdom, as the combination of human capital, structural capital and relationship capital, where human capital means the idea capital (i.e., the human resources for knowledge-based tasks and employees’ talent/attitude) combined with leadership capital (i.e., the qualities befitting an expert/manager); structural capital means the innovation capital (i.e., patents, trademarks, copyrights and knowledge database) combined with process capital (i.e., work procedures and trade secrets); relationship capital means the sum of relationships with customers, suppliers and members of network communities.

Knight (1999) said IC is made of human capital, structural capital, external capital and financial performance. He defines human capital as the sum of employee turnover rate, employee satisfaction, the quantity of new products/ideas, and the recommended quantity of delivery/reception; structural capital as the turnover rate of operating capital, the ratio of salespersons to general/administrative staff, and the launch time of a new product; external capital as the sum of customer persistency, customer satisfaction, the most lucrative customer list, the indicators of suppliers’ product quality/reliability; while financial performance means the Economic Value Added (EVA) combined with 90-day accounts receivable and the value added by each employee.

Chen Mei-chun (2001) said not only is intangible IC an important reference indicator for EV evaluation; it also comprises human capital, structural capital and relationship capital. Chen defines IC as “all the skills, knowledge,
information, experiences, problem-solving ability and wisdom displayed by a company as a whole and incorporated into the human, structural and relationship capitals”. Human capital, as Chen argued, is “the knowledge, skills and experiences of a company’s entire staff and management”; the structural capital, “the overall system and procedures used by a company to solve problems and create values”; and the relationship capital, “the initiation, maintenance and development of an organization’s external relationships, including relationships with customers, suppliers and business partners”.

In a simple definition, Edvinsson (2003) said IC would become what supports any company in the future as well as an indicator of whether that company will be operated effectively. It is impossible for a company to gain momentum for reforms unless it invests in intangible assets (Shu-hsiao Tsen and Hsian-ling Hu, 2010). Edvinsson & Malone (1997) defined IC as the sum of human, structural, and customer capitals. They went on to say that human capital is the personal competencies, knowledge, technologies, and experiences of the entire staff and management of a company, including the creativity and innovation capacities of the corporate organization. The structural capital, as they noted, is a supportive framework that gives physical form and power to human capital, as well as an organized capacity that includes the tangible system intended for communications or the storage of intellectual materials. As for customer capital, they refer to the sum of customer satisfaction, durability, price sensitivity, and the financial soundness of long-term clients.

To sum up, this present study adopted the conceptual definition of IC proposed by Chen Mei-chun (2001): “all the skills, knowledge, information, experiences, problem-solving abilities and wisdom/intellect displayed by a company as a whole and incorporated into human, structural and relationship capitals”. The operational definition of each IC component is briefly described below:

A. Human capital: The knowledge, skills and experiences of a company’s entire staff and management;
B. Structural capital: The overall system and procedures used by a company for problem solving creating values;
C. Relationship capital: The initiation, maintenance and development of an organization’s external relationships, including the relationships with customers, suppliers and business partners.

Capital Structure

According to Xin-zheng Yang (1993), corporate capital structure is significantly affected by the capital-intensiveness, profitability and size of a company, and also by the percentage of shares held by directors/auditors.

Capital structure, which is the financing source intended for long-term debts and shareholders’ equity that appear on the right side of a balance sheet, mostly helps determine the optimal portfolio of funding sources (Ru-jian Lai, 1993). When addressing corporate capital structure or financial policies, most of the previous studies adopted such variables as the D/E ratio, current ratio, and the ratio of short-term debts to total debts. (Chen-yi Liu, 2002; Ai-zhi Lu, 2005; Lin-ju Cheng. 2008)

Citing the fact that D/E ratio implies two totally different effects (i.e., the tax-shield effect and cost of expected financial crises) as part of the influence of a company’s financial leverage on operating performance, Ai-zhi Lu (2005) said the D/E ratio analyzed in a regression equation reflects how it affects EV. Meanwhile, Lin-ju Cheng (2008) believes a high multicollinearity occurs in studies that adopt both short- and long-term D/E ratio as variables.

Lin-ju Cheng (2008) noted the term “capital structure” refers to a company’s long-term loans. A typical company builds long-term current assets with long-term debts and considers the capital market a source of long-term funding. By changing the capital structure, such a company attempts to enhance its overall ratings while improving the price per share and EV.

Based on a summary of the above-mentioned literature, the conceptual definition of capital structure in this study is “long-term debts combined with the financing source for shareholders’ equity”; the “ratio of long-term debts to overall debts” and the “D/E ratio” both serve as the two evaluation indicators of capital structure.
Organizational Performance

According to Bonoma & Clark (1988), a company’s financial health is often gauged using profitability, sales growth, market share and cash flow as indicators.

Vorhies & Morgan (2005) proposed performance-measuring indicators in three categories for companies to determine if its organizational marketing capacity contributes to competitiveness. To effectively measure how competitive its marketing practices are, the company is supposed to base the three indicator categories on comparisons against arch rivals. The nature and components of the three indicator categories are detailed as follows:

(1) Customer satisfaction: Indicators in this category measure various capabilities that enhance customer satisfaction, such as the capability to satisfy customers, to convey values to customers, to meet customers’ needs, and to retain valuable customers.

(2) Market effectiveness: Indicators in this category mostly measure how a company is able to attain such market-relevant goals as the growth in market share, sales volume, total number of new customers, and sales generated from the existing customer base.

(3) Projected or actual profitability: Indicators in this category mostly measure a company’s profitability over the past 12 months as well as projected profits for the next year. Such indicators include the profitability of each business unit, return on investment (ROI), return on sales, and the capability to meet financial targets. In his study, Clark (2000) cited sales growth, profitability and market share as the most frequently used measurement indicators among businesses.

According to Atkinson et al. (1997), the latest trend in performance assessment systems is “joint improvement of the existing financial indicators (e.g., the economic value added)” as well as non-financial indicators that enable a corporate organization to review its past performances (e.g., customer satisfaction, employee satisfaction and product defect rate).

Tatikonda (1998) argued that, amid ongoing changes in the corporate environment, a performance management system with the sole focus on short-term financial targets is a waste of the already limited corporate resources. Consequently, what a company really needs would be a dynamic performance-evaluating system, or a vision stretching beyond the usual emphasis on financial performance.

An overwhelming amount of studies have been conducted on the measurement dimensions of organizational performance, and most of them listed financial performance among the measurement indicators because, after all, the benefits of organizational performance will show in the financial results. Given the convenient information delivery and rapid-changing markets nowadays, businesses must not rely on financial performance as the sole factor of survival and competitiveness. That underscores the inadequacy of measuring organizational performance with a single financial-performance indicator (Ya-hui Ling and Ling Hong, 2010).

Moreover, Ya-hui Ling and Ling Hong (2010) said the term “organizational performance” refers to the sum of accomplishments of all businesses units and departments involved with a given organizational goal, set either in phases or on the overall extent.

Kaplan & Norton (1996) noted emphatically that, instead of excessively relying on financial approaches for meeting strategic targets, businesses should resort to both financial and non-financial approaches. It is therefore imperative that a company’s financial performance be measured in financial as well as non-financial dimensions, the latter including the customer perspective, internal process perspective, and learning and growth perspective.

To sum up the aforementioned arguments, this present study adopts the conceptual definition of organizational performance proposed by Ya-hui Ling and Ling Hong (2010), and measure corporate performance in the financial and non-financial perspectives stated by Kaplan & Norton from a Balanced Score Card (BSC) point of view. Among others, the financial dimension of organization performance is gauged using ROE and EPS as indicators, with the non-financial dimension gauged in three perspectives: the customer perspective, internal process perspective, and learning and growth perspective.
Influence of IC on Organizational Performance

Mei-chun Chen (2001) believes that IC affects organizational performance in a significantly positive manner.

In a study of 211 Taiwan-listed companies (including OTC-listed ones), Chaur-shiuh Young (2006) found the tremendous contribution of IC to an organization in terms of value creation and competitiveness. Such a contribution is enhanced through interactions among human, structural and customer capitals, he added.

In their study Rudez and Mihalic (2007) said it is imperative that hotel businesses enhance IC development to stay competitive. They mentioned the potential of bolstering an organization’s financial performance with the interactions between human capital and Information Technology (IT). IC has a considerable influence on the organizational performance of firms in IT, Biotech, high-tech, or emerging industries (Chang, Chen & Lai, 2008). Service providers such as international tourist hotels, in particular, offer tangible products and intangible services (including employees’ knowledge and the organization’s managerial procedures) that constitute organizational IC.


Yan-ming Chen (2008) argued in his study that IC and organizational performance are related in a significantly positive way.

Using the approach of case study, Tzu-ling Peng (2009) delved into the relationship between Knowledge Management (KM)-stimulating factors and KM to examine how an organization accumulates IC through KM, and how it improves performances by accumulating IC.

According to Ching-fang Chang (2009), IC affects organizational performance in a significantly positive way. That is, a larger IC leads to improvements in organizational performance.

Shu-hsiao Tsen et al. (2010) argued that, since intellectual capital consists of human, structural and social capitals, it is important that an organization develops human capital hardly replicable by competitors, transforms the accumulated wisdom/abilities into its core capability, creates distinctive organizational qualities using functions of structural capital, and establishes irreplaceable external relationships to bolster social capital. They also consider the synergy resulted from interactions among human, structural and social capitals a crucial factor of organizational competitiveness.

Not only does human capital affect corporate performance in a direct manner, Guang-you Liu (2010) said it also indirectly affects corporate performance through process capital, innovation capital and customer capital.

The following hypothesis is inferred from analyses stated above, although they did not address issues pertaining to Taiwan-listed info-electronics companies:

Hypothesis 1 (H1): IC exerts a positive and significant influence on the organizational performance of Taiwan-listed info-electronics companies.

Influence of Capital Structure on Organizational Performance

Citing theories concerning the capital structure, Modigliani and Miller (1963) mentioned the “tax shield” effect of raising corporate debts when the company/personal income taxes are levied: the greater the amount of corporate debts raised, the larger the benefits of tax shelters and EV. They went on to argue that raising debts helps bolster EV and consequently is positively related to EV.

Kun-zhang Li (1998) linked an increased D/E ratio to declining profits, citing empirical findings that D/E ratio and EPS are related in a significantly negative way. Info-electronics firms exposed to high risks tend to use their own money to meet their massive demand for future investment funding, Li explained, and companies raising the required percentage of such funds for financing purposes may enjoy improved operating performance as they increase after-sales profits by reducing the overall D/E ratio and hefty interest costs.

Citing empirical findings, Pei-zhen Cai (2000) found an insignificantly positive relation between D/E ratio and EV, or operating performance, regardless of the net-worth growth rate.

Guan-zhi Hou (2004) mentioned that, when a business’ operating performance or Tobin’s Q is larger than 1, the inadequate investment and agency problem will appear relatively insignificant, making it possible for businesses raising debts to register a positive growth.
The following hypothesis is inferred from arguments mentioned above for further verification:

Hypothesis 2 (H2): The capital structure exerts a positive and significant influence on the organizational performance of Taiwan-listed info-electronics companies.

Since whether or not IC and capital structure exert a synergetic effect on organizational performance is a topic worth discussions, the third hypothesis is inferred as follows:

Hypothesis 3 (H3): IC and capital structure exert a significant interactive influence on the organizational performance of Taiwan-listed info-electronics companies.

RESEARCH METHOD

As shown in Figure 1, a conceptual research framework is built on the basis of hypotheses inferred from the above-mentioned research motive/purposes and literature review.

Research Framework

![Research Framework Diagram](image)

Figure 1: Research Framework

Design of Questionnaire

The questionnaire for this study was designed using Multi-Dimension Measurement according to each observable dimension. A 7-point Likert Scale was adopted to measure the answers, with 7 being strongly agree and 1 strongly disagree. The higher the point is, the higher the degree of agreement. Data collected from the samples was then centralized, so the sum of scores given to all questionnaire items would be zero after deducting the average. That way, the multicollinearity between independent variables and moderator will be erased to better test their interactive influence. The “centralization” process is illustrated in the mathematical equation below:

\[ \Sigma (x_i - \bar{x}) = \Sigma Y_1 = 0 \]

The 12-item questionnaire of “IC” was created by adding original designs to the one proposed by Mei-chun Chen.
The 8-item questionnaire of “capital structure” was created by adding original designs to the ones proposed by Ai-zhi Lu (2005) and Lin-ju Cheng (2008).

The 16-item questionnaire of “financial performance” adopts the EPS and ROE statistics of target companies during the 2001-2011 period as measurement indicators, with the statistics obtained from TEJ database. The questionnaire of “non-financial performance”, on the other hand, was compiled along the three perspectives under non-financial dimension, as proposed by Kaplan & Norton (1996). These are the customer, internal process, and learning and growth perspective.

**Sampling Method**

Selected using convenience sampling, financial section chiefs or employees of higher levels at Taiwan-listed info-electronics companies participated in a questionnaire-based survey. 15 copies of expert questionnaire were given out in a pilot-test followed by a post-test after a questionnaire revision, as suggested by expert. 300 copies of the official questionnaire were given out, and 232 valid copies were returned at a return rate of 77.3%.

**Information Obtained from Questionnaire and Measurement Model**

To verify the research framework proposed, this study applied linear SEM to a Confirmatory Factor Analysis (CFA) of the framework of research model. The questionnaire comprises three implicit variables (i.e., IC, capital structure, and organizational performance), each containing observable/explicit variables as stated below. The survey was based on these observable/explicit variables, with several questionnaire items categorized under them each. Files were created for the collected primary data after some processing. Although the questionnaire was design using Multi-Dimension Measurement, “Double Measurement” and “Single Measurement” were adopted to expedite the computer software-aided data processing (Shun-yu Chen, 2010). Table 1 shows the number of questionnaire items under each implicit/explicit variable, along with their reference resources.

<table>
<thead>
<tr>
<th>Implicit Variables</th>
<th>Explicit Variables</th>
<th>Number of Items</th>
<th>Reference for the Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC (X)</td>
<td>Human capital</td>
<td>4</td>
<td>Mei-chun Chen (2001)</td>
</tr>
<tr>
<td></td>
<td>Structural capital</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relationship capital</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Capital structure (Mo)</td>
<td>Ratio of long-term debts to overall debts</td>
<td>4</td>
<td>Ai-zhi Lu (2005); Lin-ju Cheng (2008)</td>
</tr>
<tr>
<td></td>
<td>D/E</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Organizational performance (Y)</td>
<td>EPS and ROE</td>
<td>4</td>
<td>Kaplan &amp; Norton (1996); Ya-hui Ling and Ling Hong (2010); TEJ database</td>
</tr>
<tr>
<td></td>
<td>Customer perspective</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal process perspective</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning and Growth Perspective</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**RESULTS AND ANALYSIS**

**Linear Structure Model Analysis**

The Confirmatory Factor Analysis (CFA) is an analytical approach contrary to Exploratory Factor Analysis (EFA), and the CFA in this study involves three unobservable/implicit variables: IC, capital structure and organizational performance. SEM, which consists of the Structural Model and Measurement Model, provides an effective solution to the cause-effect relation between implicit, or latent, variables. The three aspects of model verification in this study are: (1) verification of the goodness-of-fit of Measurement Model; (2) verification of the goodness-of-fit of Structural Model; and (3) verification of the overall model’s goodness-of-fit to ensure its compliance with the goodness-of-fit indicators. In other words, the goodness-of-fit of the overall SEM was judged with relevant indicators (Diamantopoulos & Siguaw, 2000).
Analyzing fit of Measurement Model

The factor loadings of latent/implicit variables and manifest/explicit mostly variables measure how intense the linear correlations between explicit and implicit variables are. The closer to 1 a factor loading is, the more capable the explicit variable is to measure the implicit one. Explicit variables’ factor loadings in this present study invariably range from 0.8 to 0.9, hence the satisfying reliability and the capability of all explicit/manifest variables in the proposed model’s measurement system to appropriately measure the implicit/latent variables. Meanwhile, the Average Variance Extracted (AVE) is calculated to determine the explanatory power of variance between implicit/latent variables versus explicit/manifest ones. A higher VE value suggests greater reliability and convergent validity of the latent/implicit variables. As a rule, VE must exceed 0.5 to indicate the explanatory variance of explicit variables is larger than measurement error (Fornell and Larcker, 1981). Since all AVEs in this study were larger than 0.5, the explicit variables have excellent reliability and convergent validity as well (See Table 2 and Figure 2).

### Table 2: Judgment Indicators of Measurement System in the Proposed Model

<table>
<thead>
<tr>
<th>Unobservable/Implicit Variables</th>
<th>Observable Variables: Centralized Dual Measurement</th>
<th>Factor loading</th>
<th>Variance Extracted (VE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC (X)</td>
<td>X1C</td>
<td>0.87</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>X2C</td>
<td>0.86</td>
<td>0.65</td>
</tr>
<tr>
<td>Capital structure (Mo)</td>
<td>M1C</td>
<td>0.83</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>M2C</td>
<td>0.85</td>
<td>0.64</td>
</tr>
<tr>
<td>X*Mo</td>
<td>X1M1C</td>
<td>0.85</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>X2M2C</td>
<td>0.84</td>
<td>0.63</td>
</tr>
<tr>
<td>Organizational performance (Y)</td>
<td>Z1C</td>
<td>0.86</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>Z2C</td>
<td>0.87</td>
<td>0.63</td>
</tr>
</tbody>
</table>

### ANALYZING FIT OF STRUCTURE MODEL

Path analysis results of structure model

Table 3 shows the parameter estimates, S.E. and Critical Ratio (C.R.) among implicit variables after the overall model passed the goodness-of-fit test. The table also suggests that IC and capital structure (X*Mo) exert a significantly interactive effect on organizational performance (Y) as c=0.692.

### Table 3: Path Analysis Results of the Structural Model

<table>
<thead>
<tr>
<th>Path Coefficients between Implicit Variables</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC (X) → Organizational performance (Y)</td>
<td>.396</td>
<td>.073</td>
<td>4.425</td>
<td>***</td>
<td>a</td>
</tr>
<tr>
<td>Capital structure (Mo) → Organizational performance (Y)</td>
<td>.393</td>
<td>.041</td>
<td>9.585</td>
<td>***</td>
<td>b</td>
</tr>
<tr>
<td>X*Mo → Organizational performance (Y)</td>
<td>.692</td>
<td>.063</td>
<td>10.984</td>
<td>***</td>
<td>c</td>
</tr>
<tr>
<td>X → X1C</td>
<td>.763</td>
<td>.262</td>
<td>2.912</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>X → X2C</td>
<td>.772</td>
<td>.264</td>
<td>2.924</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Mo → M1C</td>
<td>.743</td>
<td>.333</td>
<td>2.231</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Mo → M2C</td>
<td>.723</td>
<td>.323</td>
<td>2.238</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>X*Mo → X1M1C</td>
<td>.842</td>
<td>.184</td>
<td>4.576</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>X*Mo → X2M2C</td>
<td>.833</td>
<td>.181</td>
<td>4.602</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Y → Z1C</td>
<td>.732</td>
<td>.142</td>
<td>5.155</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Y → Z2C</td>
<td>.743</td>
<td>.123</td>
<td>6.041</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates P<0.05; ** indicates P<0.01; *** indicates P<0.001
Coefficient of Determination

Also referred to as Squared Multiple Correlation (SMC), the Coefficient of Determination is the degree of explanatory power of “independent variable” regarding “dependent variable” under each implicit variable. In other words, the R² value shown in Table 4 indicates that the implicit independent variable has adequate explanatory ability on the implicit dependent variable respectively.

**TABLE 4 PATH COEFFICIENT OF DETERMINATION**

<table>
<thead>
<tr>
<th>Table 4.1: Coefficientsa</th>
<th>(Hierarchical Regression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>R</td>
</tr>
<tr>
<td>1</td>
<td>.876a</td>
</tr>
<tr>
<td>2</td>
<td>.885b</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Mo and X 
b. Predictors: (Constant), Mo, X and Mo*X

Table 4.2, as shown below, was derived from Table 4.1.

<table>
<thead>
<tr>
<th>Table 4.2: Coefficientsa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficients of Determination</td>
</tr>
<tr>
<td>IC (X), Capital structure (Mo) versus Organizational performance (Y)</td>
</tr>
<tr>
<td>IC (X), Capital structure (Mo) and X*Mo versus Organizational performance (Y)</td>
</tr>
</tbody>
</table>

Indices of Fit of the Overall Model

SEM was adopted in the modelling phase of this study in order to explore the relationship between unobservable variables within the Structural Model, to examine whether the Measurement Model has measurement reliability or not, and also to measure the overall goodness-of-fit effects of this study using indices such as χ², d.f., GFI, AGFI, NFI, CFI, RMR and RMSEA. Usually it is required that χ²/d.f. <5, 1>GFI>0.9, 1>NFI>0.9, 1>CFI>0.9, RMR<0.05 and RMSEA<0.05 (Bagozzi & Yi, 1988). As shown in Table 5, the goodness-of-fit of the overall model in this study is satisfying because χ²/d.f. <5 and GFI, AGFI and NFI all exceed 0.90, with the RMR under 0.05.

<table>
<thead>
<tr>
<th>Table 5: Assessment of Fit of the Overall Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination index</td>
</tr>
<tr>
<td>Fit value</td>
</tr>
</tbody>
</table>

Standardized Results of SEM Analysis

After computer-aided standardization, the model’s overall framework is shown in Figure. 2.
Analytical Testing of Path Effect for the Structural Model

This study used the hierarchical regression analysis in Table 4.3.1 to test the moderator, followed by centralized hierarchical regression analyses and t-tests for Y versus X, MO and X*Mo. Such analyses help examine whether the regression coefficient c is significant statistically (i.e. whether c is zero or not), as shown in Table 6.

Table 6: Coefficientsa

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>3.817</td>
<td>1.181</td>
<td>2.456</td>
<td>4.913</td>
</tr>
<tr>
<td>X</td>
<td>9.753</td>
<td>.914</td>
<td>3.181</td>
<td>10.933</td>
</tr>
<tr>
<td>Mo</td>
<td>6.886</td>
<td>.423</td>
<td>2.361</td>
<td>13.342</td>
</tr>
<tr>
<td>2 (Constant)</td>
<td>5.032</td>
<td>1.561</td>
<td>1.451</td>
<td>4.611</td>
</tr>
<tr>
<td>X</td>
<td>9.193</td>
<td>.725</td>
<td>3.381</td>
<td>8.923</td>
</tr>
<tr>
<td>Mo</td>
<td>6.383</td>
<td>.316</td>
<td>2.392</td>
<td>9.362</td>
</tr>
<tr>
<td>X*Mo</td>
<td>15.417</td>
<td>.431</td>
<td>13.684</td>
<td>14.963</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Organizational Effectiveness (Y)

We learn from Table 6 that the Path Coefficient of Mo*X versus Y is 0.692, which suggests a moderating effect of Mo*X on Y.
The following verified results are yielded from the above-mentioned analyses:

1. IC exerts a positive and significant effect on organizational performance with a standardized path coefficient of 0.40, which supports H1 (Hypothesis substantiated);
2. Capital structure exerts a positive and significant effect on organizational performance with a standardized path coefficient of 0.39, which supports H2 (Hypothesis substantiated);
3. IC and capital structure have a positive and significant interactive influence on the organizational performance of Taiwan-listed info-electronics firms; the standardized path coefficient of 0.69 supports H3 (Hypothesis substantiated).

CONCLUSION AND SUGGESTIONS

Conclusions

From the data analyses and results mentioned above, we may infer the following specific conclusions:

1. Regarding SEM verification, the SEM in this study has a satisfactory goodness-of-fit in terms of the Measurement Model, Structural Model and the overall structure, hence a good model fitting.
2. Conclusions regarding the verification of business practices at Taiwan-listed info-electronics firms:
   At Taiwan-listed info-electronics, healthy IC implementation and capital structure exert an interactive effect on organizational performance in a positive and significant manner, which proves that “capital structure” in this study is a positive moderator. When the moderator and independent variables exert a significant interactive influence on a dependent variable, according to Shun-yu Chen (2010), neither the independent variable nor the moderator will affect that dependent variable significantly.

Contributions of This Present Study

1. Contributions to the business practices of Taiwan-listed info-electronics companies:
   Unlike the previous studies of info-electronics firms that focused largely on EFA, this study performed modelling on the summarized results of a literature review and verified the model’s goodness-of-fit to find out if its fit-of-goodness effects are satisfactory. As a result, this study is a CFA-based one that addresses a major issue concerning business practices. Such an issue is worth further research in relevant fields, with the research results providing a reference for decision makers at Taiwan-listed info-electronics companies.
2. Innovative application of research methods
   The literature review shows that previous studies on Taiwanese info-electronics firms use mostly exploratory research with multi-regression analysis and seldom adopt the CFA-based research framework that takes into consideration the moderating effects of implicit variables. CFA and linear SEM are a suitable measurement tools and model framework respectively, for this study, where the main dimensions comprise implicit variables. That validates the innovative methodology in this study.

Limitations and Suggestions

1. In the model-building stage, this CFA-based study should adopt a simple verification model to avoid complexity that harms goodness-of-fit (Shun-yu Chen, 2010). This study, therefore, focuses solely on how IC affects organizational performance and adopted capital structure as the moderator;
2. As this study has a sole focus on a CFA of Taiwan-listed info-electronics companies, future studies may consider either extending the scope of research or verifying the goodness-of-fit of businesses in various other sectors to examine if the goodness-of-fit varies among industries in the same model;
3. Given the limited research resources, this study used the non-probability, convenience sampling for convenience purposes and selected samples with the “proximity” and “easy-to-measure” qualities only, hence the sampling bias and weakened reliability. Future studies are advised to use simple random sampling or stratified random sampling instead.

REFERENCES


Cai, Pei-zhen (2000), A Study of Corporate Growth, Capital Structure and Corporate Performance: Taking the Example of Taiwan-listed Companies. MA, Taiwan: Department of Economics, National Tsing Hua University.


Chen, Yan-ming (2008), A Study of the Relations among Organizational Strategies, Intellectual Capital and Organizational Performance, MA, Taiwan: Department of Business Administration, National Changhua University of Education.


Hou, Guan-zhi (2004), A Study of the Correlations among Corporate Growth, Leverage and Tobit”Q at Publicly Traded Companies in Traditional Industries: The Panel Threshold Methods and Applications. MA, Department of Economics, Feng Chia University.

Johnson, K. (1999), Making loyalty program more rewarding, Direct Mark. 61 (11), 24-27.


Liu, Guang-you (2010), A Study of the Relationship between Intellectual Capital and Business Performance, MA, Taiwan: Department of Accounting, National Cheng Kung University.

Lu, Ai-zhi (2004), A Study of How the Internal and External Corporate Governance Mechanisms are Associated with Financial Performance. Taiwan: MA, Taiwan: Graduate Institute of Accounting, Tamkang University.


Pan, Zhi-wei (2002), The Association between Emerging Financial-Performance Indicators and the Value of Non-Financial Information: An Empirical Study of Taiwan-Listed Info-Electronics Companies, Including OTC-Listed Ones, MA, Taiwan: Institute of Business Administration, National Taiwan University of Science and Technology.

Peng, Tzu-ling (2009), A Study of the Relations among KM-Stimulating Factors, Intellectual Capital and Organizational Performance, MA, Taiwan: Department of Business Administration, National Chung Cheng University.


