How Accumulation of Intellectual Capital of IC Design Firms Listed in Taiwan Impacts Organization Performances: Organizational Learning Capability as the Mediator

Keng-Sheng Ting, Department of Business Administration, Kao Yuan University, Taiwan

ABSTRACT

The main purpose of this paper is to understand and validate how the accumulation of intellectual capital of IC design firms listed in Taiwan influences organizational performances. This paper refers to organizational learning capability as the mediator and samples the population based on convenience sampling. A structural equation modelling (SEM) is performed to validate the overall model fit in terms of structural modelling and measurement modelling. The research finds that (1) the accumulation of intellectual capital has positive and significant influence on organizational performance; (2) the accumulation of intellectual capital has positive and significant influence on organizational learning capability; (3) organizational learning capability has positive and significant influence on organizational performances. To sum up, organizational learning capability has certain mediating effects. It is hoped that this research finding can not only shed light to the importance and benefits of the accumulation of intellectual capital to the IC design firms listed in Taiwan, but also serve as a reference to decision makers in the industry.

Keywords: intellectual capital, organizational learning capability, organizational performance

RESEARCH BACKGROUND & PURPOSES

In the era of the knowledge economy, an increasing number of companies are turning to intangible resources from tangible resources for value creation (Itami, 1987). Values such as patents, customers, brands and reputation, cannot be listed on the balance sheet. Therefore, intellectual capital has emerged and is highly relevant to the success and long-term profitability of firms. To achieve sustainable operations, the creation and accumulation of intellectual capital is the key to competitiveness.

Nonaka and Takeuchi (1995) suggest that the knowledge-based society is the future. In the knowledge-based society, the major source of economic growth and capital accumulation is the improvement and utilization of intelligence. The economic boundaries today are becoming increasingly blurry. In the case of Taiwan, traditional production factors are no longer sufficient to enhance its competitiveness in its processing of moving toward a technological island. It is necessary to rely on the integration and management of knowledge. This is why organizational learning capability is critical.

This paper intends to conduct an empirical study on the IC firms listed in Taiwan for the following reasons: (1) the industry is highly reliant on intellectual capital, and (2) the industry boasts knowledge intensity and high value added. Therefore, its business model is a good target for studies on knowledge management (Hsu Ya-Hui, 2008).

To sum up, this paper sets out to explore the impacts of the accumulation of intellectual capital to the listed IC firms in Taiwan by gaining an understanding and performing a validation. The mediating variable is organizational learning capability. This paper intends to achieve the following three research purposes:

1. To validate whether the accumulation of intellectual capital by the IC firms listed in Taiwan has positive and significant influence over organizational performances;
2. To validate whether the accumulation of intellectual capital by the IC firms listed in Taiwan has positive and significant influence over organizational learning capability;
3. To validate whether the organizational learning capability of the IC firms listed in Taiwan has positive and significant influence over organizational performances.
LITERATURE REVIEW

The main dimensions in this research project are intellectual capital, organizational learning capability and organizational performances. Below is the relevant literature review.

Literature Concerning Intellectual Capital


Stewart (1997) believes that intellectual capital consists of human capital, structural capital and customer capital. Human capital refers to innovations, employees’ mentality, tenure, turnover, experience and learning. Structural capital refers to the collation, testing, organization, integration, consolidation and dissimilation of existing knowledge in a highly efficient way. Customer capital refers to the relationships with those an organization deals with. This includes customers’ satisfaction, retention and loyalty.

Sveiby (1998) thinks that intellectual capital consists of personal competences, internal structures and external structures. Personal competences refer to the ability of employees to take actions in different scenarios. This includes explicit knowledge, skills, experience, value judgments and social networks. Internal structures refer to patents, concepts, models, computer and management systems. External structures refer to the relationships with customers and suppliers, e.g. brand, reputation and goodwill.

Johnson (1999) believes that intelligence consists of human capital, structural capital and relationship capital. Human capital refers to idea capital (knowledge-based manpower, competences and attitudes) and leadership capital (expert and manager qualities). Structural capital refers to innovation capital (patents, trademarks, copyrights and knowledge databases) and procedural capital (workflows and trade secrets). Relationship capital refers to customer relationships, supplier relationships and network member relationships.

Knight (1999) argues that intellectual capital consists of human capital, structural capital, external capital and financial performances. Human capital refers to staff turnovers, employees’ satisfaction, the number of new product ideas submitted and accepted. Structural capital refers to capital turnovers, the ratio of sales personnel to administrative personal, and the lead time of new product launches. External capital refers to customers’ retention, customers’ satisfaction, the list of the customers with the highest contributions and the indicator of suppliers’ quality/reliability. Financial performances refer to EVA (economic value added), the receivable within 90 days and value added per employee.

Chen Mei-Chun (2001) indicates that intangible intellectual capital is an important indicator to the value of a firm. Intellectual capital consists of human capital, structural capital and relationship capital. She defines intellectual capital as the skills, knowledge, information, experience, problem-solving capability and wisdom that a company has in general. It integrates into human capital, structural capital and relationship capital. Human capital is the collective knowledge, skills and experience owned by employees and managers of a company. Structural capital is the overall system and procedures a company establishes to resolve problems and create value. Relationship capital refers to the establishment, maintenance and development of external relationships with customers, suppliers and partners, etc.

Li Yu-Tze (2008) indicates in his paper “Relationship and Performance Assessments on Enterprise Innovations, Intellectual Capital and Operations & Management: Listed IT/Electronics Firms in Taiwan” that intellectual capital has
positive and significant influence on organizational performances.

Edvinsson (2003) gives a simple explanation of intellectual capital. It is a pillar for any company in the future, as well as an indicator to whether a company can effectively operate. Without any investments in intangible assets, it will not be possible for any company to generate innovative momentum (Tsen Shu-hsiao & Hu Xiang-Ling, 2010). Meanwhile, Edvinsson & Malone (1997) believe that intellectual capital consists of human capital, structural capital and customer capital. Human capital refers to the personal capability, knowledge, technology and experience of all employees and managers of a company. This also includes an organization’s creativity and innovation capability. Structural capital refers to the materialization and empowerment of human capital, as well as to provide a supporting infrastructure. It is an organizational ability, and it includes a tangible system to store and deliver intellect materials. Customer capital refers to customers’ satisfaction, retention, price sensitivity and the financial status of long-term customers.

To sum up, this paper refers to the conceptual definition by Chen Mei-Chun (2001) that intellectual capital is the skills, knowledge, information, experience, problem-solving capability and wisdom that a company has in general. It integrates into human capital, structural capital and relationship capital. Below is the manipulation definition:

A. Human capital: the knowledge, skills and experience of all employees and managers in a company.
B. Structural capital: the overall systems and procedures for problem solving and value creation.
C. Relationship capital: the establishment, maintenance and development of external relationships, e.g. with customers, suppliers and partners.

Literature Concerning Organizational Learning Capability

Senge (1990) believes that organizational learning can only be achieved via individual learning. Therefore, individual learning can be regarded as the starting point of organizational learning. Nonaka (1994) indicates that knowledge is created by individuals and expanded and applied in an organization. Organizational learning happens between individuals, groups and within the whole organization. After the acquisition of knowledge by an individual, the knowledge is stored with the individual. How can it transform into knowledge accessible to groups or an organization and stored with groups or an organization? The key lies in the dissemination and sharing of knowledge.

Zarraga (2003) believes that individual’s knowledge is the wisdom of the individual. However, organizational knowledge is created via the knowledge management flows of an organization. Huber (1991) suggests that organizational learning is the change of potential behavior via information processing. The procedures of organizational learning can accumulate the momentum of knowledge.

Kim (1993) believes that organizational learning is the enhancement of an organization’s ability to take effective actions. It can be achieved via the accumulation of an individual’s learning outcomes. Therefore, it is a learning structure via a mental model that links personal learning with the organization.

Hsu Ya-Hui (2008) provides a conceptual definition of organizational learning. Useful knowledge is stored in an organization via individual learning and will be retrieved and correctly applied to make improvements where needed. It allows an organizational to operate with greater efficiency in order to respond to the environment or unexpected challenges.

Cohen & Levinthal (1990), Kought & Zander (1992) and Teece (1998) suggest that organizational learning capability is the absorption and internalization of the learning and knowledge picked up from external environments. It becomes one's own advantages and will help an organization to make profits at the right time. This paper groups these three similar concepts into “absorption capability”. Meanwhile, Garud & Nayyar (1994) propose the concept of “transformation capability” by taking into account whether an organization has the capability to increase the value of the absorbed knowledge and transform it into another format beneficial to the organization. In other words, an organization has to have the motivation to learn and the ability to absorb and store external knowledge and information in order to transform it into the knowledge and information it is able to express. The transformation of such knowledge and information can assist an effective response to environmental changes.

Hsu Ya-Hui (2008) divides the dimensions of organizational learning capability into the following:
Absorption capability: This refers to a brand new acknowledgement and understanding of new knowledge or technologies from external sources, assimilates it into one’s own knowledge and applies it to commercial purposes. Absorption capability is the ability to absorb knowledge, i.e. the ability to discern new values, acquire external information and absorb and digest such information so to use it in production. Absorption capability is the development of new knowledge on existing foundations and the transfer of new knowledge.

Transformation capability: This is the supplementary to absorption capability. The internal ability to transform and generate the new knowledge and technologies absorbed from external sources will provide sustainable help to an organization.

To sum up, this paper refers to the dimensions of organizational learning capability developed by Hsu Ya-Hui (2008) and takes into consideration the effects of absorption capability and transformation ability on organizational performances.

Literature Concerning Organizational Performances

Performances refer to the level of competitive advantages in the marketplace (Albaum & Tse, 2001). Performances are a comparison of results or outputs against the previously set targets. It is important to effectively and efficiently utilize resources and meet customers’ needs in order to achieve organizational goals. The ultimate purpose of marketing campaigns of any companies or organizations is to reduce costs and boost profits. After marketing campaigns have been ongoing for a period of time, it is necessary to access the marketing performances to evaluate the appropriateness of such campaigns.

Bonoma & Clark (1988) discovered that the financial measurements frequently used by companies include profit margins, sales growth, market shares and cash flows.

Vorhies & Morgan (2005) suggest that it is possible to effectively measure whether an organization’s marketing capability is creating advantages against major competitors with three indicators. Below is a summary of the characteristics and contents of these three indicators:

1. Customers’ satisfaction: This indicator includes a variety of measurements to boost customers’ satisfaction, e.g. the ability to deliver value to customers, ability to meet customers’ needs and ability to retain valuable customers.

2. Market effectiveness: This indicator measures the abilities to achieve all the market-related targets, e.g. market share growth, sales growth, increase of new customers, and increase of revenue from existing customers.

3. Forecasted or current profitability: This indicator measures the profitability during the past year and the expected profitability in the next year. It includes the profitability of business units, return on investment, return on sales and the ability to achieve financial targets. Clark (2000) finds that sales growth, profit margins and market shares are the measurements most frequently used in the corporate world.

There is extensive literature addressing the measurement of organizational performances. However, the ultimate benefits are translated in the financials. Therefore, most scholars use financial performances as one of the measurements. However, give the easy access to information and rapid changes of market environments, financial performances are no longer the only factor for survival and competition. In other words, financial indicators alone cannot reflect the complete picture of organizational performances (Ling Ya-Hui & Hung Ling, 2010). Meanwhile, Ling Ya-Hui & Hung Ling (2010) believe that organizational performances are the results accomplished by divisions and business units to achieve stage targets or overall goals of an organization.

This paper refers to Daft (1978), Delaney & Huselid (1996), Johns & Johnes (1993), Wu, Se-Hwa (1998) and Ling Ya-Hui & Hung Ling (2010) regarding the financial and non-financial measurements of organizational performances can more accurately measure the impacts of job satisfaction and internal service quality on organizational performances. Financial measurements refer to the outputs in financial accounting. They are the indicators of growth and profitability. For example, EPS (earnings per share) or ROS (return on sales) may be above the industry average. Meanwhile, the measurement of innovative performances is based on multi-facet organizational innovations, such as technology innovations and management innovations. Technology innovations refer to the technologies required for product manufacturing or service rendering; whereas management innovation refers to the social systems and structures associated with employment, management flows and the organization (Daft, 1978; Damanpour & Evan, 1984; Kimberly
To sum up, this paper adopts sale growth (in the domain of marketing) and EPS (in the domain of finance) as the indicators.

**Literature Concerning Intellectual Capital and Organizational Learning Capability**

Kought & Zander (1992) suggest that organizational learning hinges on the ability of organization members in the exchange and integration of existing information, knowledge and thoughts. The higher the caliber of organizational members, the more active brainstorming (Chuang and Lin, 1999) and the stronger the organizational learning capability is. Cohen & Levinthal (1990) believe that if an organization boasts a large number of high-caliber technical R&D personnel, it will benefit the generation of internal knowledge and the absorption of external technical knowledge. It will also help to improve absorption capacity and innovations. Meanwhile, the promotion of organizational learning as part of the corporate culture (Ulrich, Glinow, and Jick, 1993; Yeung et al., 1999) will also benefit the development of learning capability. This may be achieved via the establishment of an open learning atmosphere, the encouragement of non-formal learning and knowledge sharing by members. Arora (2002) argues that the communication via internal procedures can promote knowledge innovations. Hsu Ya-Hui (2008) indicates that the establishment of intellectual property management system will assist in the utilization of patents, intellectual properties and trademarks, in order to maximize value and enhance organizational learning capability. Meanwhile, the establishment of an experience and information database also helps to boost organizational learning capability, shorten the time required for decision making and reduces the costs associated with wrong judgment as a result of insufficient information. Relationship capital can also play the role as a media to initiate knowledge flows and strengthen organizational learning capability.

Intellectual capital is the knowledge valuable to an organization (Bassi, 1997). It includes all the assets created via intellectual activities such as knowledge acquisition, innovation and valuable relationship creations (Wiig, 1997). Intellectual capital is different from the tangible assets, e.g. land, labor and capital, mentioned in the traditional economic theories. It is the promising brainpower assets owned by an organization (Sullivan, 2000). It is also the stored knowledge of an organization. It consists of implicit, such as employees’ know-how, and explicit knowledge, documented or structured by an organization. Therefore, the relationship between intellectual capital and knowledge management is complementary (Wiig, 1997). In other words, intellectual capital can boost the effectiveness of knowledge management and enhance organizational learning capability. On the other hand, good knowledge management helps to accumulate intellectual capital (Hsu Ya-Hui, 2008).

Whilst the above literature does not address the domain of IC design, this paper is still able to develop the following hypothesis:

$H_2$: The intellectual capital of IC design firms listed in Taiwan has positive and significant influence on organizational learning capability.

**Literature Concerning Organizational Learning Capability and Organizational Performances**

Slater & Narver (1995) think that organizational learning refers to the development of new knowledge and insights and the ability to utilize such new knowledge to improve organizational performances.

Hunt & Morgan (1995) believe that learning is an important and complex resource for an organization. Competitive advantages can be created via organizational learning. Slater & Narver (1995) argue that organizational learning is valuable to customers. An organization can easily understand and satisfy the potential needs of customers via learning and hence pursue the improvement of new product developments.

Nevis et al. (1995) mention that organizational learning is the procedures to maintain or improve performances. Slater & Narver (1995) believe that organizational learning is to develop new knowledge and use such new knowledge to better organizational performances.

Hargadon & Sutton (1997) emphasize that organizations can enhance the results of new product developments via the searching, sharing, transferring and integrating of knowledge. Arora (2002) believes that the growth and learning in the process of new product developments encourage knowledge innovations and further improve the effectiveness of new product developments. Organizations acquire knowledge or competences via learning and store such knowledge or
competences within for the right opportunities. In the high tech industry, organizational learning capability represents the ability of an organization. A weak ability means orders will be poached by competitors or canceled by clients. This will also drag the results of new product developments. In the competitive environment of the high tech industry, organizational learning capability is a criterion with which partners determine whether the cooperation should continue on the basis of value added being created. The stronger the capability, the higher the value added thereby creating the largest number of partners. As a result, the better the performances become. Therefore, learning capability has impacts on the performance of new products. In other words, the ownership of correct knowledge or technical competences allows an organization to achieve greater results or faster targets. Most of the literature on new product developments in the context of knowledge management emphasizes that new product developments are the results of organizational learning (Madhavan and Crover, 1998; Hsu Ya-Hui, 2008).

Whilst the above literature does not address the domain of IC design, this paper is still able to develop the following hypothesis:

$H_1$: The organizational learning capability of IC design firms listed in Taiwan has a positive and significant influence over organizational performances.

**Literature Concerning Intellectual Capital and Organizational Performances**

Chen Mei-Chun (2001) believes that the intellectual capital of an organization has positive and significant influence on organizational performances.

Yang Chou-Hsu (2006) examines a total of 211 companies listed on Taiwan Stock Exchange and GreTai Securities Market and finds that intellectual capital makes significant contributions to value creation and competitive advantages. It can work even more effectively by interacting with human capital, structural capital and customer capital.

Rudez & Mihalic (2007) also suggest that the hotel industry has to develop its own intellectual capital to maintain competitive. It can improve financial performances if such intellectual capital interacts with human capital and information technology. In the IT, biotech, high-tech or emerging industries, intellectual capital has a profound impact on organizational performances (Chang, Chen, & Lai, 2008). This is particular the case with international tourist hotels as a service industry. They provide tangible products and intangible services, e.g. employees’ knowledge and organizational management procedures. These are all intellectual capital of an organization.

Li Yi-Shen (2007) finds that high-caliber human capital brings in strong performances for schools. Meanwhile, relationship capital boasts mediating effects between human capital and organizational performances.

Chen Yan-Ming (2008) suggests that there is a positive and significant correlation between intellectual capital and organizational performances.

Peng Tze-Ling (2009) performs case studies to explore the relationship between knowledge management promoters and knowledge management, in order to examine how organizations accumulate intellectual capital via knowledge management and improve organizational performances through the accumulation of intellectual capital.

Zhang Jin-Fan (2009) argues that intellectual capital has positive and significant impacts on organizational performances. The stronger the intellectual capital, the better it is.

Tsen Shu-Hsiao et al. (2010) suggest that intellectual capital consists of human capital, structural capital and social capital. Organizations should develop human capital because it will not be easy for competitors to imitate. The accumulated intelligence and capability will be transformed into the core competences of an organization. The functions of structural capital create the uniqueness of an organization. External relationships that are not replaceable should be established to augment the social capital of an organization. The synergies resultant from the interactions of human capital, structural capital and social capital are the key to the construction of competitiveness.

Liu Guang-Yao (2010) indicates that human capital has direct impacts on organizational performances. It also has indirect effects on organizational performances via flow capital, innovation capital and customer capital.

Whilst the above literature does not address the domain of IC design, this paper is still able to develop the following hypothesis:

$H_3$: The intellectual capital of IC design firms listed in Taiwan has a positive and significant influence over organizational performances.
Based on the above purposes, hypotheses and literature reviews, this paper derives the following research structure as illustrated in Figure 1 (Lee, 2011):

![Figure 1: Research Structure](image)

**RESEARCH METHOD**

**Research Targets & Questionnaire Design**

This paper performed a questionnaire survey on the managers of the IC companies listed in Taiwan based on convenience sampling. To enhance the content validity and reliability of the questionnaire, this paper conducted an expert questionnaire survey and then a pilot test, in order to modify or delete unsuitable questions. Finally, a post-test was run. A total of 300 questionnaires were issued to the managers of the IC companies listed in Taiwan and a total of 236 questionnaires were recovered, with a recovery rate of 78.67%. The measurable dimensions of the questionnaire are divided into different items. The measurement is based on Likert’s seven scales, with 7 representing strong agreement and 1 representing strong disagreement. The higher the score, the stronger the agreement is and vice versa.

This paper refers to the concepts of intellectual capital by Chen Mei-Chun (2001), Tsen Shu-Hsiao & Hu Xiang-Ling (2010) in its design of the questionnaire on intellectual capital. It consists of three dimensions, i.e. human capital, structural capital and relationship capital. There are a total of 14 questions.

The questionnaire on organizational learning capability is based on Hsu Ya-Hui (2008) and the design by this paper. There are a total of 8 questions.

The measurements on organizational performances include innovation performances and ROE. The former is based on Ling Ya-Hui and Hung-Ling (2010) whereas the latter is sourced from Taiwan Economic Journal. There are a total of 6 questions.

Meanwhile, to better understand the organizational performances of IC companies listed in Taiwan, this paper refers to earnings per share (EPS) as the indicator. The data is sourced from Taiwan Economic Journal.

**SEM & Measurement Model**

To validate the research structure proposed by this paper, a structural equation model (SEM) is developed to perform Confirmatory Factor Analysis (CFA). This paper divides the questionnaire into three latent variables, i.e. intellectual capital, organizational learning capability and organizational performances. Each latent variable is further divided into observable/explicit variables. Also, each observable/explicit variable has a number of questions for the survey. The data from the recovered questionnaires was processed and an archive of the original questionnaires was
established. Although the questionnaire was designed for measurements by item, this paper uses dual measurements (Chen Shun-Yu, 2010) for the construction of the measurement model in order to facilitate software processing. Table 1 lists the number of questions covered and the source of references for implicit variables and explicit variables in this paper.

Table 1: No. of Questions Covered for Main and Sub Dimensions

<table>
<thead>
<tr>
<th>Main Dimension</th>
<th>Sub-Dimension or Measurements</th>
<th>No. of Questions</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual capital</td>
<td>Human capital</td>
<td>4</td>
<td>Tsen Shu-Hsiao &amp; Hu Xiang-Ling (2010)</td>
</tr>
<tr>
<td></td>
<td>Structural capital</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relationship capital</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Organizational learning</td>
<td>Absorption capability</td>
<td>4</td>
<td>Hsu Ya-Hui (2008)</td>
</tr>
<tr>
<td>capability</td>
<td>Transformation capability</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Organizational performances</td>
<td>Sales growth &amp; EPS</td>
<td>6</td>
<td>Chen Mei-Chun (2001) Taiwan Economic Journal (TEJ)</td>
</tr>
</tbody>
</table>

Structural Equation Modeling

Confirmatory Factor Analysis (CFA) is an analysis contrast to Exploratory Factor Analysis (EFA). This paper performs pair-wise CFA on the three dimensions, i.e. intellectual capital, organizational learning capability and organizational performances. Structural equation modeling (SEM) consists of structural modeling and measurement modeling. They can effectively resolve the causal relationship of hidden variables. Meanwhile, this paper intends to validate the following three elements of the model, i.e. (1) whether the overall model fit meets with the goodness of fit; (2) the fit of measurement modeling; (3) the fit of structural modeling.

RESEARCH ANALYSIS & RESULTS

Overall Fit Tests

Based on the above literature reviews and factor analyses on the sampled data, this paper constructs an overall model and refers to Hari et al (1998) by dividing the measurement of the overall model fit into measures of absolute fit, measures of incremental fit and measures of parsimonious fit. Table 2 summarizes the test results on overall fit (Cheng Fu-Chiang, Fan Xiang-Gyang, Chen Guo-Jiang & Jie An-Ren, 2008).

Table 2: Overall Fit Tests

<table>
<thead>
<tr>
<th>Fit Measures</th>
<th>Criteria</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute fit</td>
<td>GFI</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td></td>
<td>AGFI</td>
<td>&gt;0.8</td>
</tr>
<tr>
<td></td>
<td>RMR</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Incremental fit</td>
<td>NFI</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td></td>
<td>CFI</td>
<td>&gt;0.9</td>
</tr>
<tr>
<td>Parsimonious fit</td>
<td>PNFI</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td></td>
<td>PGFI</td>
<td>&gt;0.5</td>
</tr>
</tbody>
</table>

Measurement Model

The factor loading of individual latent/implicit variables licit Variables of the main dimensions and manifest/explicit variables of sub-dimensions measures the linear strength between individual manifest/explicit variables and latent/implicit variables. The closer the factor loading is to 1, the better the measured variables or sub-dimension variables can measure the main dimension. The factor loading of all the sub-dimensions in this paper is all greater than 0.7, indicating good reliability. Therefore, the sub-dimensions (all the manifest/explicit variables) in the measurement model are able to appropriately evaluate the main dimensions (all the latent/implicit variables). Meanwhile, Average Variance Extracted (EVA) is the calculation of the explanatory power of latent/implicit variables on measured items. A high VE means high reliability and convergent validity for latent/implicit variables. Usually, VE
should be greater than 0.5. This is evidenced by the measurement error greater than the explained variances (Fornell & Larcker, 1981). All the AVE values in this paper are higher than 0.5, indicating high reliability and convergent validity for latent/implicit variables (Table 3 and Figure 2).

<table>
<thead>
<tr>
<th>Table 3: Judgment Indicators of Measurement Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main dimension</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Intellectual Capital</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Organizational Learning Capability</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Organizational Performances</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Coefficient of Determination**

Coefficients of determination are also known as Squared Multiple Correlation (SMC). They indicate the degree of explanatory power of independent variables (of latent variables) to dependent variables (of latent variables). Namely, the R2 value shown in table 4 indicates that the implicit independent variable has adequate explanatory power over on the implicit dependent variable respectively (Lee, 2011).

<table>
<thead>
<tr>
<th>Table 4: Coefficients of Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficients of Determination</td>
</tr>
<tr>
<td>Intellectual capital (X) → organizational performances (Y)</td>
</tr>
<tr>
<td>Intellectual capital (X) → organizational learning capability (Me)</td>
</tr>
<tr>
<td>Organizational learning capability (Me) → organizational performances (Y)</td>
</tr>
</tbody>
</table>

**Path Coefficients of Latent Variables**

After the model passed the internal fit tests, this paper listed in Table 5 the standardized coefficients estimated and C.R. values between latent/implicit variables and plotted the path analysis in Figure 2 (Lee, 2011).

<table>
<thead>
<tr>
<th>Table 5: Estimated Parameters of Latent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate</td>
</tr>
<tr>
<td>Intellectual capital Organizational performances</td>
</tr>
<tr>
<td>Intellectual capital Organizational learning capability</td>
</tr>
<tr>
<td>Organizational learning capability Organizational performances</td>
</tr>
</tbody>
</table>

*Note: The symbol ***indicates C.R. value is significant (α=0.001)
Analysis & Tests on Path Effects in Structural Model

This paper uses Bayesian estimations to test and analyse the path effects in the structural model regarding the path coefficients of implicit (or unobservable) variables. Organizational Learning Capability (Me) is the mediating factor. According to Table 6:

(1) The path coefficient of intellectual capital (X) to organizational learning capability (ME) is a1=0.78, with 95% confidence level (0.544, 1.222). The statistics are significant and the first-order utility is also significant.

(2) The path coefficient of organizational learning capability (ME) to organizational performances (Y) is b1=0.76, with 95% confidence level (0.464, 1.268). The statistics are significant and the second-order utility is also significant.

(3) The path coefficient of intellectual capital (X) to organizational performances (Y) is c=0.53, with 95% confidence level (0.288, 0.978). The statistics are significant and the third-order utility is also significant.

Table 6: Bayesian Estimations

<table>
<thead>
<tr>
<th>Regression weights</th>
<th>Mean</th>
<th>S.D.</th>
<th>95% Lower bound</th>
<th>95% Upper bound</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual capital (X)→Organizational learning capability (ME)</td>
<td>0.883</td>
<td>0.128</td>
<td>0.544</td>
<td>1.222</td>
<td>a1</td>
</tr>
<tr>
<td>Organizational learning capability (ME)→Organizational performances (Y)</td>
<td>0.866</td>
<td>0.134</td>
<td>0.464</td>
<td>1.268</td>
<td>b1</td>
</tr>
<tr>
<td>Intellectual property (X)→Organizational performances (Y)</td>
<td>0.633</td>
<td>0.115</td>
<td>0.288</td>
<td>0.978</td>
<td>c</td>
</tr>
</tbody>
</table>

Table 7: Custom estimands

<table>
<thead>
<tr>
<th>Numeric Estimands</th>
<th>Mean</th>
<th>S.D.</th>
<th>95% Lower bound</th>
<th>95% Upper bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct utility a1</td>
<td>0.883</td>
<td>0.128</td>
<td>0.544</td>
<td>1.222</td>
</tr>
<tr>
<td>Direct utility b1</td>
<td>0.866</td>
<td>0.134</td>
<td>0.464</td>
<td>1.268</td>
</tr>
<tr>
<td>Direct utility c</td>
<td>0.633</td>
<td>0.115</td>
<td>0.288</td>
<td>0.978</td>
</tr>
<tr>
<td>Indirect utility (a1*b1)</td>
<td>0.765</td>
<td>0.019</td>
<td>0.708</td>
<td>0.822</td>
</tr>
<tr>
<td>Total utility (c+a1*b1)</td>
<td>1.398</td>
<td>0.026</td>
<td>1.320</td>
<td>1.476</td>
</tr>
<tr>
<td>Indirect utility as a percentage of total utility</td>
<td>0.547</td>
<td>0.035</td>
<td>0.442</td>
<td>0.652</td>
</tr>
</tbody>
</table>
According to Table 7:
(1) Indirect utility $a_1 \times b_1$ estimated to be 0.765, with 95% confidence level (0.708, 0.822). The statistics is significant and the indirect utility is significant. Indirect utility accounts for 54.7% of the total utility.
(2) Indirect utility has significant influence and direct utility has significant and positive influence. Therefore, organizational learning capability has certain mediating effects on the influence of intellectual capital on organizational performances.

Based on the above analysis, this paper derives the following conclusions:
1. The implementation of intellectual capital by the IC companies listed in Taiwan has positive and significant influence on organizational performances. The standardized estimated parameter is 0.53. Therefore, $H_1$ is supported. (accepted)
2. The implementation of intellectual capital by the IC companies listed in Taiwan has positive and significant influence on organizational learning capability. The standardized estimated parameter is 0.78. Therefore, $H_2$ is supported. (accepted)
3. The organizational learning capability of the IC companies listed in Taiwan has positive and significant influence on organizational performances. The standardized estimated parameter is 0.76. Therefore, $H_3$ is supported. (accepted)
4. To sum up the above three conclusions, this paper is convinced that the model established boasts fit-of-goodness effects. Meanwhile, the organizational learning capability of IC firms listed in Taiwan has “partial” mediating effects. This conclusion is consistent with Baron & Kenny (1986) who believe that “partial” mediating effects refer to the weakening or undermining of the relationship between the independent variables and dependent variables after the addition of the mediating variable (Lee, 2011).

CONCLUSIONS & SUGGESTIONS

This chapter provides conclusions based on the above analyses and results, and articulates the contributions of this paper. Finally, this chapter summarizes the restrictions in the research process and presents the recommendations to follow-up studies.

CONCLUSIONS

To sum up, this paper performs a survey on the managers of IC companies listed in Taiwan and sources secondary data from Taiwan Economic Journal. An SEM is run to validate the hypotheses. Below is a summary of the research conclusions:

Influence of accumulation of intellectual capital on organizational performances
The research shows that $H_1$ is accepted. This means intellectual capital has significant and positive influence on organizational performances. This is consistent with Chen Mei-Chun (2001), Yang Chou-Xu (2006), Rudez & Mihalic (2007), Li Yi-Shen (2007), Chen Yan-Ming (2008), Peng Tze-Ling (2009), Zhang Jin-Fan (2009), Tseng Shu-Hsiao et al (2010) and Liu Guang-Yao (2010).

Influence of intellectual capital on organizational learning capability
The research shows that $H_2$ is accepted. This means intellectual capital has significant and positive influence on organizational learning capability. This is consistent with Kought & Zander (1992), Cohen & Levinthal (1990), Arora (2002) and Hsu Ya-Hui (2008).

Influence of organizational learning capability on organizational performances
The research shows that $H_3$ is accepted. This means organizational learning capability has significant and positive

Research Contributions
1. Most of the existing literature on the accumulation of intellectual capital and organizational performances of IC companies listed in Taiwan focuses on Exploratory Factor Analysis (EFA). This paper combines the past studies with modeling and validates whether the model has fit-of-goodness effects. Therefore, this paper adopts Confirmatory Factor Analysis (CFA) as a key empirical approach. The result can serve as a reference to follow-up researchers in the relevant domains.
2. This paper aims to encourage and inspire companies to accumulate intellectual capital and boost performances via organizational learning capability. This can enhance the firm value, drive constant growth and strengthen the potential for sustainable developments.
3. All the indicators constructed and validated by this paper are the key factors of sustainable competitiveness. This list can serve as a reference for key decision making by managers.

Research Restrictions
Given the limited resources, this paper did its best to complete different stages of research tasks as robust as possible. However, it was confronted with the following restrictions:
1. The measurements of organizational performances are based on sales growth and EPS. This paper sourced secondary data from Taiwan Economic Journal and cannot guarantee 100% accuracy of such data. It is also possible that these statistics cannot correctly reflect operating performances of the sampled firms.
2. Due to resource limitations, this paper sampled the population based on convenience sampling. As a result, the samples may not be able to fully reflect the actual situation of the population. This is the greatest research restriction of this paper.

Suggestions for Future Studies
The relationship among intellectual capital, organizational learning capability and organizational performances is applicable to all industries, rather than just the IC industry in Taiwan. This paper has its own definitions of intellectual capital and organizational learning capability, as well as its own measurements of organizational performances. Also, this paper only surveys the managers of IC companies listed in Taiwan on the convenience sampling basis. It is suggested that the follow-up studies can extend the reach for data or attempt to explore the effects on organizational performances of different nature or in different industries. This can help to screen out the good qualities or provides a cross-industry analysis.

REFERENCES
Chen Mei-Chun (2001), Effects of IT Investments and Intellectual Capital on Corporate Performances, PhD paper, Department of Information Management, National Central University, Taiwan.

Chen Shun-Yu (2010), Structural Equation Model, Psychological Publishing Co., Ltd., Taiwan.

Chen Yan-Ming (2008), Relationship among Organizational Strategies, Intellectual Capital and Organizational Performances, Master’s thesis, Department of Business Administration, National Changhua University of Education, Taiwan.


Hsu Ya-Hui (2008), Intellectual Capital, Organizational Learning Capability and New Product Developments & Innovations: IC Design Industry, PhD paper, Department of Business Administration, National Taipei University, Taiwan.


Li Yi-Shen (2007), Relationship between Intellectual Capital and Organizational Performances: Higher Education Institutions, Master’s paper, Department of Business Administration, National Chengchi University, Taiwan.

Li Yu-Tze (2008), Relationships and Performance Reviews on Corporate Innovations, Intellectual Capital and Operational Development: IT/Electronics Companies Listed in Taiwan; unpublished PhD paper, Jinan University, China.


Pong Tse-Ling (2009), Relationship among Knowledge Management Promoters, Intellectual Capital and Organizational Performances, Master’s thesis, Department of Business Administration, National Chung Cheng University, Taiwan.


Tsen Shu-Ihsiao & Hu Xiang-Ling (2010), Organizational Competitiveness and Intellectual Capital Indicators of International Tourist Hotels, Issue 1, Volume 10, Journal of Human Resource Management, Taiwan 【ISSN：1026-5309】.


Wu Si-Hua (1998), Knowledge Dissemination & Industry Innovations, 7th Symposium on Industrial Management, Taiwan.


Zhang Jin-Fan (2009), Relationship among High-Performance Work Systems, Intellectual Capital and Organizational Performances, Master’s thesis, Department of Human Resources Management, National Central University, Taiwan.