THE EFFECT OF KNOWLEDGE-SHARING ON ORGANIZATIONAL PERFORMANCE: ORGANIZATIONAL CITIZENSHIP BEHAVIOR AND KNOWLEDGE-ABSORPTION AS MEDIATORS

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Abstract

The semiconductor industry consists of IC design, IC manufacturing, sealing system, testing and support businesses etc. Amongst the employees in the industry, the knowledge-sharing and absorption boosts organizational performance, while the knowledge-sharing increases organizational citizenship behavior to create positive organizational performance. The two systems mentioned above are currently used in Taiwan’s semiconductor industry to create good performance and should be validated as a research topic. As such, the aim of this study is to verify the effect of knowledge-sharing on organizational performance, using organizational citizenship behavior and knowledge absorption as mediators. The sample population is the senior staff of Taiwan’s listed IC companies, using simple random sampling. Meanwhile, this study performs Structural Equation Modeling (SEM) to validate the model fit and the goodness-of-fit effects between the structural model and the measurement model. For each structural model’s path coefficient between the implicit variables (also known as latent variables), the Maximum Likelihood Estimation (MLE) is used for the Sobel test to validate the significance of the direct effect, mediation effect or total effect of the results. This study’s results found that: knowledge-sharing has an insignificant direct effect on organizational performance and an significant mediation effect. This effect is demonstrated through the two mediators of “Organizational Citizenship Behavior” and “Knowledge Absorption”. Therefore, the study’s results can serve as a reference to the management in Taiwan’s semiconductor industry.

Keywords: Knowledge-Sharing, Organizational Performance, Organizational Citizenship Behavior, Knowledge Absorption

1. Introduction

While the semiconductor industry is important to the economic development of a country, it is highly capital and technology-intensive including IC design, IC
manufacturing, sealing systems, testing and support businesses etc. Among the countries with leading positions in semiconductor manufacturing, Taiwan is the only country with a vertically integrated supply chain. The government seeks to boost the productivity of the industry by establishing science parks and creating cluster effects. In fact, Taiwan is the role model for countries who seek to develop their semiconductor industries. The semiconductor industry in Taiwan is known for unparalleled competitiveness in efficiency and cost due to a comprehensive supply chain. This also provides an ideal backdrop for the booming development of IC design houses (Peng, 2009).

Moreover, since the semiconductor industry is a condensed and capital-intensive investment sector, to gain a dominant position in the era of knowledge economy, one part is to enhance organizational performance through employee’s knowledge-sharing and absorption, while another part is to increase the employee’s organizational citizenship behavior and hence create positive organizational performance through employee’s knowledge-sharing; the former will accumulate intellectual capital due to knowledge-sharing and absorption, generate higher business value, enhance organizational performance, bring a competitive edge to the company, and become the core competitiveness needed for the company to survive (Chiang, 2006). The latter can enhance coherence between employees and organizations, produce a positive organizational climate, and thus raise organizational performance. In other words, through employee’s knowledge-sharing and absorption to enhance organizational performance and through employee’s knowledge-sharing to increase the organizational citizenship behavior amongst employees and create positive organizational performance; this study will aim to prove if the above two methods are generating good performance for the current semiconductor industry in Taiwan.

Therefore, using Taiwan listed IC companies’ managerial level and above employees as research subjects, this study will establish and validate the research model to realize the goodness-of-fit effects. In other words, this study’s aims are as below:

(1) To validate and understand the effect of Taiwan listed IC companies’ employees’ knowledge-sharing on organizational performance, using organizational citizenship behavior as the mediator to show if there is significant indirect mediation effect;

(2) To validate and understand the effect of Taiwan listed IC companies’ employees’ knowledge-sharing on organizational performance, using knowledge absorption as the mediator to show if there is significant indirect mediation effect.

(3) To validate and understand the effect of Taiwan listed IC companies’ employees’ knowledge-sharing on organizational performance and show if there is a direct positive effect on the industry.
2. Literature Review

Through using Taiwan listed IC companies’ managerial level and above employees as research subjects, the main aim of this study is to validate the effect of employee’s knowledge-sharing on organizational performance while using organizational citizenship behavior and knowledge absorption as mediators. The theory and relevant research are shown below respectively.

2.1 Definition and Types of Knowledge-sharing

In this paper, the “conceptual definition” of “knowledge-sharing” refers to “the use of knowledge databases, best practices conferences, technology, cross-functional teams, emails and social network software etc. to share self-constructed knowledge with colleagues. Through deep conversations and brainstorming from this sharing process, one’s knowledge will become more inclusive and complete; while the synergistic effect of the accumulation of organizational knowledge assets will be developed during knowledge transfer and sharing”. The above conceptual definition is summarized from the literature below.

Over the years, scholars have had different definitions of knowledge-sharing. For example, Senge (1997) defined knowledge-sharing as the ability of assisting others to develop their capacity for effective action, and successfully transfer this knowledge through interaction for others to become their capacity to act. On knowledge research issues, Holtshouse (1998) suggested much knowledge-sharing and exchange could be achieved directly through first hand observation, personal interaction and body language etc. Whereas Liao, Fei, and Chen (2005) believed that knowledge-sharing could be defined as activities of knowledge spread and transfer amongst individuals, groups or organizations. Dixon (2000) defined knowledge as “organizational members use various tools and processes to conduct knowledge-sharing” and these knowledge-sharing and transfer tools could be knowledge database, practical seminar, technology, cross-functional team, e-mail and social network software etc. Hence, teachers need not be selfish, but should self-construct knowledge and share it with colleagues. Through deep conversation and brainstorming from this sharing process, the self-constructed knowledge would become more detailed and comprehensive. Davenport and Prusak (1998) considered knowledge as a unique asset; by giving it some suitable stimulation, knowledge-sharing and exchange concurrently would produce a cumulative effect in the accumulation of organizational knowledge.

Ven den Hooff & Weenen (2004) suggested dividing knowledge-sharing into two forms: knowledge gift and knowledge collection. Hendriks (1999) pointed out that knowledge-sharing is a type of communication process; knowledge is not like a product that can
be freely passed around. When a member of an organization asks for knowledge from another person, this means sharing his knowledge, while “knowledge absorber” must rebuild and must have the knowledge to learn and share knowledge. Therefore, knowledge-sharing involves two secondary dimensions:

(1) Externalization behavior: knowledge holder must be determined or willing to give lectures, assemble knowledge systems, construct knowledge files or use databases or use any other ways to conduct knowledge interaction with others.

(2) Internalization behavior: knowledge requester must have the internalizing behavior of knowledge reconstruction, including learning whilst doing, reading books, and trying to understand the knowledge inside knowledge databases etc.

Based on the above, the research dimension of knowledge-sharing in this study will be divided into externalization and internalization behaviors.

2.2 Organizational Citizenship Behavior

2.2.1 Definition of Organizational Citizenship Behavior

The “conceptual definition” of organizational citizenship behavior used in this study will be Robbins’ (2001) definition, “organization member’s discretionary behavior towards the organization, and develop coherence for the organization, will consequently affect the performance of the organization”. The above conceptual definition is summarized from the literature below.

Seeking excellence and improved quality has always been an organization’s ultimate objective. organizational citizenship behavior is an organization member’s behavior that exceeds his/her role officially laid down in the organizational rules, which is almost always a spontaneous personal expression that suggests something positive for the long-term organizational performance (Daw-ran Shew, 2002). Likewise, Organ (1988) said organizational citizenship behavior contributes to the organizational effectiveness. Apparently, whether or not an organization achieves its goals is closely related to organizational citizenship behavior. Non-Taiwanese researchers have focused on organizational citizenship behavior studies such as Posdakoff and Mackenzie (1994), and Podsakoff, Ahearne and Mackenzie (1997) surveyed U.S. insurers and paper mills and found most of the dimensions of organizational citizenship behavior positively affected a group’s performance. Organizational citizenship behavior studies in Taiwan were conducted by Tung-Cheh Wang (1995) and Yi-Jiun Guo (2004), both of whom found a positive correlation between organizational citizenship behavior and organizational effectiveness.

While Organ (1988) mentioned the close connection between organizational culture and organizational citizenship behavior, Taiwanese studies in this regard are mostly focused on state- or private-run businesses or business units,
and few of them address issues in the education circles or academic disciplines, which makes this study’s topic worth further exploration.

Member’s actions inside the organization can be regarded as one type of organizational behavior. The origin of organizational behavior comes from Hawthorne studies that found work motivation and social interaction are deciding important factors in organizational work performance (Cheng, 2003).

The concept of organizational citizenship behavior originated from Katz’s (1964) idea of extra role behavior, which uses role theory as a starting point, describing how people in organizations shape role behaviors according to what the organization wanted (Jiang and Cheng, 2003).

Robbins (2001) also stated that “organizational member behavior” refers to “discretionary and unconditional behavior which is not part of an employee’s formal job requirement but which nonetheless promotes the work performance of the organization”.

While there is a considerable amount of literature addressing the dimensions of organizational citizenship behavior, this paper’s author was inspired by experts’ theoretical models and decided to measure the “teachers’ organizational citizenship behavior” variables in the four dimensions put forth by Sheng-Yu Hsieh, Fang-Lin Lang and Mei-Hsiu Chen (September 2010), namely “identification with the organization,” “colleague assistance,” “absence of selfish pursuit of profits” and “dedication to work”. In this study, the operational definition of organizational citizenship behavior is based on the definitions/categorization proposed by Hsieh, Lang and Chen.

2.3 Knowledge Absorption

The “conceptual definition” of knowledge absorption used in this study refers to “organizational absorptive capacity is to effectively attain and utilize external knowledge, and the ability to adapt to changes in the external environment. It is a set of practices and procedures divided into 4 steps - acquisition, absorption, conversion and utilization. Additionally, value can be generated by identifying external information, digesting and applying it for commercial purposes.” The above conceptual definition is summarized from the literature below.

In recent years, academics have frequently used the term knowledge absorptive capacity when analyzing complicated organizational phenomenon. The concept of knowledge absorptive capacity is mainly used in fields such as strategic management, technology management, organizational economics, organizational learning and international business. Cohen and Levinthal (1990) proposed the concept of knowledge absorptive capacity and defined it as “the firm’s ability to recognize, assimilate and develop knowledge from its surroundings”. Subsequently, they then defined knowledge absorptive capacity as “recognizing the value of external information, assimilate it and apply it to commercial ends”. This definition
provides a clearer description of the abilities of knowledge absorptive capacity and acts as a stable theoretical basis for future research (Xiaobing Zhang, 2011).

Zahra and George (2002) pointed out that organizational knowledge absorptive capacity is a set of practices and procedures divided into 4 steps - acquisition, absorption, conversion and utilization.

Daghfous (2004) believed that organizational absorptive capacity is the ability to effectively attain and utilize external knowledge, and the ability to adapt to changes in external environments.

2.4 Organizational Performance

The “conceptual definition” of “organizational performance” used in this study will be Ya-Hui Ling and Ling Hung’s (2010) definition. “Organizational performance refers to the organization’s relevant businesses and departments achievements completed within deadline in order to accomplish phased or overall goals.” The above conceptual definition is summarized from the literature below.

Bonoma and Clark (1988) found that firms frequently used profitability, growth of sales, market share and cash flow to measure their financial aspects.

Vorhies and Morgan (2005) pointed out that companies use three performance indicators to decide if organizational marketing capabilities can generate a competitive advantage. These three indicators need to be built between the company’s main competitors and act as a comparison benchmark to effectively measure if marketing capabilities have a competitive advantage,. The features and contents of the three indicators are as below:

1) Customer satisfaction: this indicator contains all measurements that can assess actions used to increase customer satisfaction. For example: customer satisfaction, ability to deliver customer value, ability to satisfy customer’s needs and retain valued customers etc.

2) Market performance: this indicator is mainly used to measure the company’s ability to achieve market-related goals. For example: growth of market share, growth in sales, growth in the amount of new customers and increasing the current growth of customer sales volume.

3) Expected or current profitability: this indicator measures the company’s profitability over the past year and the expected profitability in the coming year. For example: profitability of subsidiaries, return on investments, return on sales and the ability to achieve financial goals. Baldwin and Clark (2000) found in their research companies mostly used growth of sales, profitability and market share as indicators.

Choy, Yew, and Lin (2006) indicate that there are 38 outcomes garnered impressive theoretical and empirical support. Based on this, a comprehensive set of performance outcomes is proposed and grouped into five key dimensions. Atkinson and McCrindell (1997) believed that the development trends of performance system will improve the current financial indicators (e.g.
economic value added) and also guide organization in non-financial indicators (e.g. Customer satisfaction, employee satisfaction, product quality etc.).

Tatikonda’s (1998) study indicated that in an environment change, emphasizing only the development trends of performance system of short-term financial goals would waste the company’s limited resources. Therefore, companies need a dynamic performance measurement indicator that will project financial performance and more. Jenny María Ruiz-Jiménez, Maria del Mar Fuentes-Fuentes (2013) mention the knowledge combination capability has a significant impact on product and also the process innovation mediate the relations between knowledge combination capability and organizational performance.

There have been many studies on measurement dimensions of organizational performance in the past. As it will ultimately lead back to financial dimensions, most scholars will use financial performance as one of the measurement indicator. However, in today’s environment where information transfer is convenient and markets are rapidly changing, companies cannot only rely on financial performance as the only factor to achieve survival and competition. In other words, just using a single financial performance indicator cannot fully measure organizational performance (Ling and Hung, 2010). Additionally, Ling and Hung (2010) believed that organizational performance refers to an organization achieving phased or overall goals, and with all related businesses and departments inside the organization accomplishing it within the deadline.

Kaplan and Norton (1996) emphasized that organizations should not place an over-reliance on just the financial dimension to achieve strategic objectives, but should consider both financial and non-financial dimensions. In other words, measuring financial performance should be proceeded from both the financial and non-financial dimension. Non-financial dimension includes 1. Customer dimension; 2. Internal business process dimension and 3. Learning and growth dimension.

In summary, this study uses Kaplan and Norton’s (1996) “financial dimension” and “non-financial dimension” from the Balance Scorecard to measure corporate performance.

2.5 The Relationship between Knowledge-sharing, Organizational Citizenship Behavior and Organizational Performance

2.5.1 Knowledge-Sharing and Organizational Citizenship Behavior

The following literature shows the relationship between knowledge-sharing and organizational citizenship behavior.

Iue-E Shiu (2005) believed that knowledge-sharing and organizational citizenship behavior is significantly positive correlated.

Man Pan Lo (2009) pointed out that organizational commitment has an effect on
organizational citizenship behavior using knowledge-sharing as a mediator.

Yi-Ju Chen (2010) pointed out that knowledge-sharing has a significant positive effect on organizational citizenship behavior.

Yu Ming Huang (2011) believed that knowledge-sharing has a significant positive effect on organizational citizenship behavior.

In summary, although the scope of the above literature does not apply to Taiwan’s listed IC industries range, this study still develops the following hypothesis:

Hypothesis 1-1 (H1-1): Knowledge-sharing in Taiwan’s listed IC companies’ managerial level and above employees has a significant positive effect on organizational citizenship behavior.

2.5.2 Organizational Citizenship Behavior and Organizational Performance

The following literature shows the relationship between organizational citizenship behavior and organizational performance.

Chen-Fong Wu and Li-Ya Huang (2005) believed that organizational citizenship behavior and organizational performance are correlated.

Hsin-Jui Chang (2005) pointed out that organizational citizenship behavior will affect organizational performance.

Chiung-Ying Huang (2008) believed that service-oriented organizational citizenship behavior has a partial mediation effect on high performance human resource management practices, productivity and turnover rate.

Li-Na Hsieh (2009) also pointed out that service-oriented organizational citizenship behavior has a partial mediation effect on high performance human resource management practices and productivity of organizational performance.

Mei-Hui Lee (2009) stated that service-oriented organizational citizenship behavior has a partial mediation effect on high performance human resource management practices and turnover rate.

Mei-Ling Hsiao (2010) believed that organizational citizenship behavior has a significant positive effect on organizational performance.

According to the above analysis, although the scope of the above literature does not apply to Taiwan’s listed IC industries range, this study still develops the following hypothesis:

Hypothesis 1-2 (H1-2): Organizational citizenship behavior of Taiwan’s listed IC companies’ managerial level and above employees has a significant positive effect on organizational performance.

2.6 The Relationship between Knowledge-sharing, Knowledge Absorption and Organizational Performance

2.6.1 Knowledge-sharing and Knowledge Absorption

Mei-Hsiang Wang, Tarng-Yao Yang and Kuo-Chan Huang (2010) believed that “interpersonal interaction” knowledge-sharing is an important factor in affecting a team’s
creativity. Additionally, the team’s knowledge absorption of their learning ability in “technology/documents”, “practical experience” knowledge-sharing has a significant interference effect on the team’s creativity.

Chih-Chiang Chen (2005) pointed out that knowledge absorption is the mediator for knowledge-sharing and creativity, while knowledge-sharing has a significant positive effect on the ability of knowledge absorption.

Shu-Hsien Liao, Wuchen Fei and Chih-Chiang Chen (2005) stated that the ability of knowledge absorption is the mediator for knowledge-sharing and creativity, while knowledge-sharing has a significant positive effect on the ability of knowledge absorption.

In conclusion, although the scope of the above literature does not apply to Taiwan’s listed IC industries range, this study still develops the following hypothesis:

Hypothesis 2-1 (H2-1): Knowledge-sharing of Taiwan’s listed IC companies’ managerial level and above employees has a significant positive effect on knowledge absorption.

2.6.2 Knowledge Absorption and Organizational Performance

As there is not much literature on the relationship between knowledge absorption and organizational performance, the important points are as below:

Xiaobing Zhang (2011) stated that an integrated research model is built in a China context for organization learning’s knowledge absorption ability and organizational performance. He believes that when employees are motivated with their abilities, knowledge acquisition and, information distribution, information interpretation and organizational memory will develop an effect which will impact on financial and innovation performances.

Lian-Chao Liu and Chien-Hsun Chen (2008) pointed out that customers are knowledge providers for external part of the organization. Decision-making risk is reduced while organizational performance is improved through the introduction of external information into each individual. Customers involved in the organization are categorized into three levels of involvement: low, moderate or high. Also, there are three different levels of customer knowledge absorption for the organization: individual, group and organization levels. Individual, group and organizational performances can be improved through observational and innovative learning in these three levels.

In conclusion, although the scope of the above literature does not apply to Taiwan’s listed IC industries range, this study still develops the following hypothesis:

Hypothesis 2-2 (H2-2): Knowledge absorption of Taiwan’s listed IC companies’ managerial level and above employees has a significant positive effect on organizational performance.

2.7 Knowledge-sharing and Organizational Performance

Ya-Lin Hsueh (2004) pointed out that as
the knowledge-sharing mechanism becomes more comprehensive, it will strengthen the positive relationship between organizational executive power and innovative performance management.

Wei-Yao Weng (2006) believed that knowledge-sharing has a positive effect on employees’ work performance within an organization; organizational trust also has a positive effect on increasing employees’ work performance; lastly, employees’ knowledge-sharing behavior within the organization has a mediating effect on organizational trust and employee’s work performance.

In conclusion, although the scope of the above literature does not apply to Taiwan’s listed IC industries range, this study still develops the following hypothesis:

Hypothesis 3 (H3): Knowledge-sharing of Taiwan’s listed IC companies’ managerial level and above employees has a significant positive effect on organizational performance.

3. Research Method

The hypotheses are generated based on the above research, purpose and literature review, and the conceptual research framework of the research model is shown in Figure 3.1.

![Figure 3.1 Conceptual Research Framework](image)
3.2 Designing the Questionnaire

The questionnaire in this study was compiled on the basis of Multi-Dimension Measurement and the afore-mentioned observable dimensions. On a 7-point Likert Scale, the answers were measured with 7 denoting Strongly Agree and 1 denoting Strongly Disagree. A higher score represents a greater level of agreement, and vice versa.

As for the knowledge-sharing questionnaire, it is manipulated and formulated according to dimensions from Hendriks (1999), including two measurement dimensions: externalization and internalization. The questionnaire is designed according to the multi-dimension measurement, with four questions from each dimension; thus, gives a total of eight questions.

This study uses Sheng-Yu Hsieh, Fang-Lin Lang & Mei-Hsiu Hsieh’s (2010) classification in the “Organizational Citizenship Behavior” questionnaire. “Organizational Citizenship Behavior” is classified into four measurements dimensions “identification with the organization”, “colleague assistance”, “absence of selfish pursuit of profits” and “dedication to work”. There are four questions in each measurement dimension, with the sixteen questions in the entire questionnaire.

Besides, this study also uses Zahra and George’s (2002) research for the knowledge absorption questionnaire and designed it for use, with a total of four questions.

Kaplan and Norton’s (1996) two dimensions from the Balance Score Card - “Financial” and “Non-Financial” are used in the organizational performance questionnaire. The former uses EPS as a measurement indicator with the information from Taiwan Economic Journal’s database. The latter consists of three sub-dimensions (1) Customer dimension; (2) Internal process dimension and (3) Learning and growth dimension, with a total of sixteen questions.

3.3 Sampling Method

This research uses simple random sample to conduct the survey using Taiwan’s listed IC companies’ managerial level and above employees as research subjects. This research gave out 20 copies of expert questionnaire as pilot test and revised the questionnaire based on the experts’ advice. The post-test was then conducted, with 600 copies of questionnaire sent out. The response rate was 33.5%, with 201 returned questionnaires.

3.4 The Data Obtained from Questionnaire and Measurement Model

This study adopts SEM in a Confirmatory Factor Analysis (CFA) of the research model framework, and based the questionnaire design on four latent variables (i.e., knowledge-sharing, organizational citizenship behavior, knowledge absorption and organizational performance), each of which was divided into observable/explicit sub-variables containing several questions. After processing the collected data, the author created a primary file that
preceded the design of questionnaire, using Multi-Dimension Measurement for the construction of this study’s measurement system. However, Double Measurement was adopted to ensure the computer software efficiently handled and/or measured all data (Shun-Yu Chen, 2010).

3.5 Common-method-variance Test (CMV Test)

This study performs a CFA test and finds no common-method-variance problems, as Table 3.1 shows.

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>DF</th>
<th>$\Delta\chi^2$</th>
<th>$\Delta$DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single factor</td>
<td>1328.6</td>
<td>98</td>
<td>897.4</td>
<td>97</td>
<td>0.000</td>
</tr>
<tr>
<td>Multi factors</td>
<td>431.2</td>
<td>195</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Results and Analysis

4.1 Linear Structure Model Analysis

This study includes a CFA, an analytical method contrary to the Exploratory Factor Analysis (EFA), on the four latent/implicit variables of knowledge-sharing, organizational citizenship behavior, knowledge absorption and organizational performance. SEM is made up of structural and measurement models to efficiently tackle the cause-effect relations among implicit/latent variables. The three parts of model-testing in this study are: (1) goodness-of-fit of the measurement model; (2) goodness-of-fit of the structural model; and (3) the overall model’s conformity with goodness-of-fit indices. In other words, relevant goodness-of-fit indictors were applied to a test of the overall goodness-of-fit effect of SEM (Diamantopoulos & Siguaw, 2000).

4.2 Analyzing Fit of Measurement Model

To a large extent, factor loading is intended to measure the intensity of linear correlation between each latent/implicit variable and a manifest/explicit one. The closer the factor loading is to 1, the better an observable variable is in measuring latent variables. Since this study’s reliability is supported by the fact that factor loadings for all observable variables ranged between 0.7 and 0.9, all observable/explicit variables in the measurement model appropriately gauged the latent/implicit ones. The Average Variance Extracted (AVE), on the other hand, gauges a latent/implicit variable’s explanatory power of variance with regard to an observable one, with the VE value growing in
proportion to the reliability and convergent validity of that particular implicit/latent variable. As a rule, AVE must be larger than 0.5 for an observable variable’s explainable variance to exceed the measurement error (Fornell and Larcker, 1981). As Table 4.1 and Figure 4.1 show that all AVEs in this study exceed 0.5, the explicit variables have excellent reliability and convergent validity.

Table 4.1 Judgment Indicators for the Measurement Model

<table>
<thead>
<tr>
<th>Unobservable variables (Implicit variables)</th>
<th>Observable variables: (Explicit variables)</th>
<th>Factor loading</th>
<th>Average Variance Extracted, AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge-sharing (KS)</td>
<td>KS₁</td>
<td>0.79</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>KS₂</td>
<td>0.76</td>
<td>0.60</td>
</tr>
<tr>
<td>Organizational Citizenship Behavior (OCB)</td>
<td>OCB₁</td>
<td>0.78</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>OCB₂</td>
<td>0.77</td>
<td>0.61</td>
</tr>
<tr>
<td>Knowledge Absorption (KA)</td>
<td>KA₁</td>
<td>0.81</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>KA₂</td>
<td>0.81</td>
<td>0.63</td>
</tr>
<tr>
<td>Organizational Performance (OP)</td>
<td>OP₁</td>
<td>0.83</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>OP₂</td>
<td>0.84</td>
<td>0.66</td>
</tr>
</tbody>
</table>

4.3 Analyzing Fit of Structure Model

4.3.1 Path Analysis Results of Structure Model

This study makes sure that the overall model passed the goodness-of-fit test before calculating the parameter estimates; Standard Errors (S.E.) and Critical Ratio (C.R.) among latent variables (see Table 4.2). This table shows the path coefficients from latent variables and besides, the path coefficient between knowledge-sharing and organizational performance being less than significant, the coefficient of other variables were of positive and significant levels.

Table 4.2 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>Knowledge-sharing (KS) → Organizational Citizenship Behavior (OCB)</td>
<td>0.46</td>
<td>0.03</td>
<td>15.33</td>
<td>***</td>
<td>H₁,₁</td>
</tr>
</tbody>
</table>
Organizational Citizenship Behavior (OCB) $\rightarrow$ Organizational Performance (OP) & 0.68 & 0.04 & 17.00 & *** & H$_{1,2}$

Knowledge-sharing (KS) $\rightarrow$ Knowledge Absorption (KA) & 0.49 & 0.03 & 16.33 & *** & H$_{2,1}$

Knowledge Absorption (KA) $\rightarrow$ Organizational Performance (OP) & 0.54 & 0.03 & 18.00 & *** & H$_{2,2}$

Knowledge-sharing (KS) $\rightarrow$ Organizational Performance (OP) & 0.18 & 0.19 & 0.95 & & H$_{3}$

<table>
<thead>
<tr>
<th>Coefficients of Determination</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS $\rightarrow$ OCB</td>
<td>0.61</td>
</tr>
<tr>
<td>OCB $\rightarrow$ OP</td>
<td>0.79</td>
</tr>
<tr>
<td>KS $\rightarrow$ KA</td>
<td>0.58</td>
</tr>
<tr>
<td>KA $\rightarrow$ OP</td>
<td>0.79</td>
</tr>
</tbody>
</table>

4.3.2 Coefficient of Determination

The $R^2$ are the squared multiple correlation coefficients for the latent variables in "Independent variable" and "Dependent variable". Therefore, the $R^2$ value shown in Table 4.3 indicates that the implicit independent variable has adequate explanatory ability on the implicit dependent variable respectively.

4.4 The Indices of Fit of the Overall Model

This study adopts SEM for modeling in order to explore how unobservable variables connect to one another in the Structural Model, whether the measurement model has measurement reliability, and how the overall model’s goodness-of-fit effect is. While $\chi^2$, d.f, GFI, AGFI, NFI, CFI, RMR and RMSEA are the goodness-of-fit indices for the overall model, it is usually required that $\chi^2$/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). In this study, the overall model has a satisfactory goodness-of-fit effect because $\chi^2$/d.f. < 5 and the values of GFI, AGFI and NFI all exceed 0.90, with a below-0.05 RMR, as shown as in Table 4.4.
4.5 Correlation Analysis

The results indicate that all the correlations between factors are significant. As can be seen, the relationships between research variables are as follows:

(1) KS is positively related to OCB; (2) OCB is positively related to OP; (3) KS is positively related to KA; (4) KA is positively related to OP; (5) OCB is somewhat related to KA; and (6) KS is a somewhat related to OP as shown in Table 4.5.

Table 4.5 Correlation matrix

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>KS1 (1)</th>
<th>KS2 (2)</th>
<th>OCB1 (3)</th>
<th>OCB2 (4)</th>
<th>KA1 (5)</th>
<th>KA2 (6)</th>
<th>OP1(7)</th>
<th>OP2(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS1 (1)</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS2 (2)</td>
<td>.852***</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCB1 (3)</td>
<td>.583***</td>
<td>.581***</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCB2 (4)</td>
<td>.579***</td>
<td>.564***</td>
<td>.583***</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KA1 (5)</td>
<td>.501***</td>
<td>.492***</td>
<td>.063</td>
<td>.061</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KA2 (6)</td>
<td>.492***</td>
<td>.493***</td>
<td>.061</td>
<td>.064</td>
<td>.924***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OP1(7)</td>
<td>.181</td>
<td>.182</td>
<td>.496***</td>
<td>.492***</td>
<td>.546***</td>
<td>.553***</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>OP2(8)</td>
<td>.173</td>
<td>.172</td>
<td>.682***</td>
<td>.684***</td>
<td>.551***</td>
<td>.542***</td>
<td>.934***</td>
<td>1.000</td>
</tr>
</tbody>
</table>

***denotes α<0.001
4.6 Standardized Results of SEM Analysis in Figure 4.1.

The model’s overall framework resulted from computer-aided standardization, as shown.

Figure 4.1 Standardized results of SEM analysis

4.7 Analytical Testing of Path Effects for the Structural Model

Regarding path coefficients among the various "latent variables" (or unobservable variables) of the structural model, Maximum Likelihood Method (MLE) is used to run the Sobel test and test for the significance of direct effect, mediation effect and total effect of the model path. In other words, this study uses MLE to run the analytical testing of path effects for the structural model (i.e. Sobel test), using organizational citizenship behavior (OCB) and
knowledge absorption (KA) as mediators;

Table 4.5 shows: Individual indirect effects (a1 * b1) or (a2 * b2) account 54.01% and 45.68% respectively of the total effect [c + (a1 * b1) + (a2 * b2)]

While overall indirect (mediation) effects account for 99.69% of the proportion in total effect, and its calculation formula is as follows:

\[
\frac{(a1 * b1) + (a2 * b2)}{c + (a1 * b1) + (a2 * b2)} = 99.69%,
\]

This model shows significant mediation effect and total effect, while direct effect is not significant.

Table 4.5 Structural model paths of direct effects, indirect (mediation) effects and total effects

<table>
<thead>
<tr>
<th>Path Hypothesis</th>
<th>Direct effect</th>
<th>Overall indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>KS → OP</td>
<td>0.18(c)</td>
<td>(a1<em>b1)+(a2</em>b2)</td>
<td>0.18+(0.46<em>0.68)+(0.49</em>0.54) =57.92</td>
</tr>
<tr>
<td>KS → OCB</td>
<td>0.46(a1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCB → OP</td>
<td>0.68(b1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS → KA</td>
<td>0.49(a2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KA → OP</td>
<td>0.54(b2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the above analysis, the following verified results can be obtained from this study:

1. Knowledge-sharing has a significant indirect mediation effect on organizational performance, with organizational citizenship behavior as a mediator. Hypotheses H1 and H2 are supported. (Hypothesis established)

2. Knowledge-sharing has a significant indirect mediation effect on organizational performance, with knowledge absorption as a mediator. Hypotheses H2,1 and H2,2 are supported. (Hypothesis established)

3. Knowledge-sharing has a positive but not significant direct effect on organizational performance, standardized path coefficient is 0.18, thus hypothesis H3 is partially supported. (Hypothesis partially established)

This study’s results found that:
knowledge-sharing has no significant direct effect on organizational performance while having a significant mediation effect. This mediation effect is demonstrated through the two mediators of “Organizational Citizenship Behavior” and “Knowledge Absorption”. Therefore, the study’s results can serve as a reference to the management in Taiwan’s semiconductor industry.

5. Conclusion and Suggestions

5.1 Research Conclusion

The following conclusions can be obtained from the above data analysis and results:

\( H_1 \): Knowledge-sharing has a significant indirect (mediating) effect on organizational performance, with organizational citizenship behavior as a mediator (hypotheses \( H_{1,1} \) and \( H_{1,2} \) established). Hypothesis \( H_{1,1} \) is similar to the research presented by Shiu (2005), Lo (2009), Chen (2010) and Huang (2011); while hypothesis \( H_{1,2} \) is similar to the research presented by Huang (2004), Chang (2005), Huang (2008), Hsieh (2008), Lee (2008) and Hsiao (2010).

\( H_2 \): Knowledge-sharing has a significant indirect (mediating) effect on organizational performance, with knowledge absorption as a mediator (hypotheses \( H_{2,1} \) and \( H_{2,2} \) established). Hypothesis \( H_{2,1} \) is similar to the research presented by Chen (2005) and Liao et al (2005); hypothesis \( H_{2,2} \) is similar to the research presented by Zhang (2011) and Liu (2008).

\( H_3 \): Knowledge-sharing has a positive but not significant direct effect on organizational performance (hypothesis \( H_3 \) partially established). This conclusion is partially similar to Hsueh’s (2005) and Weng’s (2006) research.

5.2 Contributions of the Present Study

1. Contributions to the business practices of Taiwan-listed IC companies:

Unlike the previous studies that were largely based on EFA, this study’s author performed modeling in accordance with the summarized literature review and then verified the model’s fit-of-goodness effects. The present study, consequently, is a CFA-based one addressing topics that are both important and innovative in terms of business practices, with the study’s results providing a reference for further studies in relevant fields. Additionally, the results from this study can also be delivered to the management of Taiwan’s semiconductor industry for the reference of business policies; therefore, this study’s results have extremely practical reference value.

2. Innovative Applications of Research Method

Looking back at the relevant literature, many studies had used multi-regression analysis to conduct exploratory research, while few studies used “cause, effect and two mediators” as
a CFA-based research framework. Since the present study's main dimensions are implicit variables, CFA and SEM must be used as the suitable measurement tool and model framework instead of multi-regression analysis. Thus, this explains why this study is relatively innovative in terms of research method.

5.3 Research Limitations and Suggestions

(1) This research uses the simple random sampling method, with a low response rate for the returned of usable questionnaires. Thus, the amount of samples might not be sufficient to represent the phenomenon in the entire population.

(2) This study is a confirmatory factor analysis. A simpler verification model should be used while constructing the framework to avoid complicating the goodness of fit index (Shun-Yu Chen, 2010). This research only studies the effect between knowledge-sharing and organizational performance while merely using organizational citizenship behavior and knowledge absorption as mediators.

(3) This research is limited to the CFA on individual case basis, and future researchers can consider attempting to extend the research scope or verifying different industries to compare whether the goodness-of-fit will be different between those industries in the same model.
References


33. Lo, Man Pan (2009). Research on Timing of Sales Promotions - In The Case of Taiwan Automobile Market. Taiwan: Master’s Thesis, Institute of International Business Studies, National Chi Nan University


