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Organizational commitment, knowledge sharing and organizational citizenship behaviour: a case of Taiwanese semiconductor industry

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Abstract

The semiconductor industry has made great contributions to Taiwan's economy in the past 20 years. Because of competitive salaries and generous fringe benefits, some famous semiconductor manufacturers have become the best choice for students right after graduation. However, such magnetic effect has gradually faded away in the face of implementation of expensive employee bonuses. In changeable environment, sharing knowledge will maintain organizational competitiveness and improve employees' cohesions. As the semiconductor industry is characterizing a low-wage and high-turnover rate, the incurred job insecurities and career uncertainties have begun to force employees to change their cohesion, loyalty to organizations and even to reduce their willingness to share knowledge with others. This study aims to explore the relationships among organizational commitment (OC), knowledge sharing (KS) and organizational citizenship behavior (OCB) in Taiwanese semiconductor industry. On the basis of 428 subjects, the results show that KS has a partial mediating effect on the OC–OCB relationship.

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Keywords: organizational commitment; knowledge sharing; organizational citizenship behavior; semiconductor; SEM

Introduction

Over the past 20 years, the semiconductor industry has become the most significant export industry in Taiwan. It has not only advanced high-tech human resources and employment opportunities, but also spurred considerable overall GDP growth and significant industrial linkages in this island's economic development as well (Liu *et al*, 2010). During these years, many famous semiconductor manufacturers such as Taiwan Semiconductor Manufacturing Co. Ltd. and MediaTeK have become the best choice of career for students right after graduation by offering them competitive salaries and generous fringe benefits. However, the magnetic effect has gradually faded away in the face of the implementation of expensive employee bonuses. As the semiconductor industry is characterizing a low wage and high-turnover rate, the incurred job insecurities and career uncertainties have begun to influence employees to change their cohesion and loyalty to organizations and even to reduce their willingness to share knowledge with others.

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Organizational commitment (OC), the linkage between members and organizations, is defined as the relative strength of an individual's identification with and involvement in a particular organization (Porter & Smith, 1976). However, its strength differs according to the individual's reactions/perceptions of organizational changes. Alotaibi (2001) points out that OC is highly associated with organizational citizenship behavior (OCB), meaning highly committed employees are apt to identify with organizational goals and values and are willing to make extra contributions to their organizations. Accompanied with organizational changes, job enrichment/enlargement enhances employees' job achievement by giving them a positive working attitude, thereby maintaining their loyalty and commitment to the organization (Hackman & Oldham, 1975; Niehoff *et al*, 2001).

Many organizations in knowledge-based societies are unable to function as knowledge-based organizations because they suffer from learning disabilities (Senge, 1990). For any manufacturing strategy, it is necessary to stabilize demand and to reduce supply chain uncertainty to work well (Kemppainen & Vepsalainen, 2007). Knowledge has been hailed as the differentiating element of the new organization (Drucker, 1993) and knowledge sharing (KS) may be a power to encourage knowledge exchange/creation in the organizations to recognize their competitive advantages (Liao *et al*, 2004). KS focuses on the supply side of knowledge management (KM), whereas knowledge creation concentrates more on the demand side (Shin *et al*, 2012). In a changeable environment, KS can help employees within an organization grow rapidly, maintain organizational competitiveness and improve employee cohesion. That is when organizations are undergoing changes, increasing every employee's will to share knowledge with others is important for them to maintain positive attitudes and beliefs and behave altruistically. On the other hand, human resource practices (HRPs), which impact employee abilities, motivation and opportunities are expected to be positively related to knowledge creation through their effect on KS within organizations (Pastor *et al*, 2010).

OCB is a personal and voluntary behaviour that is not mentioned directly in official rewards systems among organizations, but it contributes to effectiveness/efficiency in an organization (Appelbaum *et al*, 2004). Organ (1988) has proposed that in-role behaviour could not effectively achieve organizational goals alone. Extra-role behaviour is also essential. To empirically examine the causality among OC, KS and OCB in the traditional semiconductor industry whether is consistent with that occurred in any service organization in Taiwan, this study focuses on the staff of Taiwan's semiconductor industry for the purpose of exploring the relationships between OC, KS and OCB.

Literature review

Organizational commitment

OC focuses on a bond linking individuals to the organization (Meyer & Allen, 1991, 1997). OC refers to the extent

to which an employee identifies with an organization and is committed to its goals (Sikorska-Simmons, 2005). Organizations with higher OC levels are apt to promote employees' creativity and highly committed employees perform better than those with low levels of commitment (Mowday *et al*, 1982). Mowday *et al* (1979) suggest that the processes related to OC have important implications for employees, organizations and society as a whole. To some degree, OC refers to an individual's attitude towards an organization with (1) a strong belief in, and acceptance of, the organization's goals and values; (2) a willingness to exert considerable effort on behalf of the organization (Mowday *et al*, 1982).

Bateman & Strasser (1984) define OC as multidimensional in nature, involving an employee's loyalty to the organization, willingness to exert effort on behalf of the organization, degree of goal and value congruency with the organization, and desire to maintain membership. Allen & Meyer (1990) developed the idea of normative commitment arising from the internalization of normative pressures and organizational socialization (Shaw *et al*, 2003). Kanter (1968) divides OC into continuance commitment, cohesion commitment and control commitment; Allen & Meyer (1990) and Meyer *et al* (1993) classify OC into three components, namely, affective, normative and continuance commitment. In addition, Porter *et al* (1974), the most frequently used definition of OC, defined it as strong belief in and acceptance of the organizational goals and value, willingness to exert considerable effort on behalf of the organization and a definite desire to maintain organizational membership. According to this definition, OC has three distinct dimensions: value commitment (VC), effort commitment (EC) and retention commitment (RC).

Knowledge sharing

Senge (1997a) treated knowledge as the capacity for effective action. KS is the process in which individuals mutually exchange their explicit or implicit knowledge and jointly create new knowledge (van den Hooff & de Ridder, 2004). KS occurs when people are genuinely interested in helping one another develop new capacities for action (Senge, 1997b, 1998). Recently many organizations are encouraging the KS behaviour among their employee in order to meet the organization's objective and goals. There are some organizations which gain benefit after implementing KS (Alam *et al*, 2009). However, KS seems to be a difficult challenge for organizations (Szulanski, 1996; Bakker *et al*, 2006) while people are not likely to share their knowledge unless they think it is valuable and important (Ryu *et al*, 2003). Hidding & Shireen (1998) argue that knowledge has no value if it is not shared or used in some way. The reason why individuals dislike sharing knowledge with others involves his/her concerns about the damage to uniqueness/equity resulting from knowledge diffusions after KS (Hendriks, 1999).

KS can be defined as activities of transferring or disseminating knowledge from one person, group or organization

to another (Lee, 2001); helping communities of people work together, facilitating the exchange of their knowledge, enhancing organizational learning capacity, and increasing their ability to achieve individual and organizational goals (Dyer & Nobeoka, 2000). KS can refer to an organizational innovation that has the potential to generate new ideas and develop new business opportunities through the socialization and learning processes of knowledge workers (Darroch & McNaughton, 2002; Lin, 2006). On the basis of Senge's (1997b) study, Cheng & Li (2001) developed three constructs of KS, including *sharing individual knowledge* (SIK), *sharing learning opportunity* (SLO) and *encouraging learning motive* (ELM).

Organizational citizenship behavior

OCB provides the organization with additional resources and eliminates the need for expensive formal mechanisms otherwise crucial to successful restructuring processes (Bogler & Somech, 2004). The concept of OCB is early derived from that of Katz's (1964) theory of extra-role behaviour demonstrating that individuals must be induced initially to enter and remain with an organization. OCBs are important to the organization because through formal job descriptions, organizations cannot anticipate the whole range of behaviours needed for the achievement of organizational goals (Vanuyperen *et al*, 1999).

Described by Organ *et al* (2006), OCBs are discretionary individual behaviours that are not directly recognized by the reward system, but in the aggregate promote the overall effectiveness and functioning of the organization. OCB refers to various dimensions such as altruism and general compliance (Smith *et al*, 1983); altruism, conscientiousness/generalized compliance, sportsmanship, courtesy and civic virtue (Organ, 1988); obedience, loyalty and various types of participation (Van Dyne *et al*, 1994); altruism, courtesy, conscientiousness, sportsmanship, civic virtue, interpersonal harmony, protecting company resources and organizational loyalty (Ahmadi, 2010); helping behaviour, sportsmanship, organizational loyalty, organizational compliance, individual initiative, civic virtue and self-development (Podsakoff *et al*, 2000); identification with organization, altruism towards colleagues, conscientiousness, interpersonal harmony and protecting organizational resources (Farh *et al*, 1997); altruism, conscientiousness, sportsmanship, courtesy, civic virtue, functional participation, advocacy participation, loyalty and voice (Farh *et al*, 2004).

Hypotheses development

OC and OCB

OC is defined based on the individual's relative ability and involvement in a certain organization. It indicates the attitudes of people towards the organization's values and goals (Mowday *et al*, 1982). OCB is voluntary; it's not recognized explicitly by the official reward system and generally promotes the employee's functioning at the

organization (Wayne & Green, 1993). To some degrees, OC refers to attitude whereas OCB refers to behaviour. There is substantial evidence supporting the notion that certain individual-level variables (e.g., *job satisfaction and OC*) correlate with individuals' OCB (e.g., Meyer *et al*, 2002; Lavelle *et al*, 2009; Salehi & Gholtash, 2010). Most empirical results indicate that OC is the determinant factor of OCB (e.g., Herscovitch & Meyer, 2002; Lepine *et al*, 2002).

On the other hand, cognitive variables among previous literature such as job satisfaction, OC, perception of appropriateness and disinterest in reward, are positively related to OCB (Organ, 1988; Diefendroff *et al*, 2002; Spector & Fox, 2002). On the basis of a sample from the public and private sectors, Kuehn & Al-Busaidi (2002) found that an employee with higher job satisfaction and normative commitment would have better OCB. Investigating the effects of profit sharing on OCB, Chiu & Tsai (2007) have supported the mediating role of OC between profit sharing and OCB. Therefore, we propose hypothesis 1 as follows:

Hypothesis 1: *OC has positive influence on OCB.*

OC and KS

As one knowledge-centered activity, KS is the fundamental means through which employees can contribute to knowledge application, innovation and ultimately the competitive advantage of the organization (Jackson *et al*, 2006). Even though few researches do not support the positive relationship between OC and KS (e.g., Teh & Sun, 2012), most extant literature still strongly support it (e.g., Scarbrough & Carter, 2000; McKenzie *et al*, 2001). Exploring employee relationships within Taiwanese finance and securities firms, Liao *et al* (2004) found that the success of KS in organizations depends not only on technological means, but is also related to behavioural factors. Storey & Quintas (2001) suggest that trust, motivation and commitment of workers all represent key issues in relations with management workers. Staw & Salancik (1982) concluded that OC encourages employees to work hard for their organization. Therefore, we propose hypothesis 2 as follows:

Hypothesis 2: *OC has positive influence on KS.*

KS and OCB

As a form of OCB, KS needs to be akin to altruism/helping (Organ 1988; Williams & Anderson, 1991), at least if the primary aim is to help one's coworkers deal with specific challenges or to work more efficiently. KS is defined as a voluntary social behaviour (Nonaka & Takeuchi, 1995; Levin & Cross, 2004; Quigley *et al*, 2007) that shares characteristics with OCB (Bolino, 1999; Brief & Motowidlo, 1986). Therefore, we propose hypothesis 3 as follows:

Hypothesis 3: *KS has positive influence on OCB.*

The relationship between OC, KS and OCB

Positively associated with OCB, OC is defined as the relative strength of an individual's identification with and involvement in a particular organization (Mowday *et al*, 1982). Hislop (2003) suggested that both OC and OCB are linked with willingness to KS. Although the research issues on OC–OCB relationship are popularly seen in extant Human Resource literature, there still have debates on the causality between KS and OCB. So far, most of research support that the OCB has a positive impact on KS (e.g., Al-Zu'bi, 2011; Demirel *et al*, 2011; Jo & Joo, 2011; Ramasamy & Thamaraiselvan, 2011) whereas few focuses on the mediated role of KS on OC–OCB relationship. Therefore, we propose hypothesis 4 as follows:

Hypothesis 4: *KS positively mediates the relationship between OC and OCB.*

On the basis of these hypotheses mentioned above, the research framework of this study is drawn as Figure 1.

Methodology

Measurement

A 5-point Likert scale (1 = totally disagree, 5 = totally agree) was used to measure the constructs. In this study, the measurement items in English of three constructs (e.g., OC, KS and OCB) will be collected from past scholars and would be translated into Chinese. Next, all these Chinese items would be revised with semantic modification by one HR scholar and two managers of semiconductor companies. Finally, we invite a foreign language lecturer to translate the Chinese-version questionnaire into English.

OC was measured using Porter *et al*'s (1974) organizational commitment questionnaire (OCQ), which comprises VC, EC and RC. The 15 items on the OCQ are designed to assess respondents' loyalty and desire to remain with the organization, their beliefs in and acceptance of the values and goals of the organization, and their

willingness to put in extra effort to help the organization succeed (Yousef, 2003). Concerning its cultural difference, we deleted three items, such as *I could just as well be working for a different organization as long as the type of work was similar*, *I find that my values and the organization's values are very similar* and *This organization really inspires the very best in me in the way of job performance*. In the same time, we also added two items, such as *I often see company profit as my personal profit* and *Working at this company, it enables me to make full use of my abilities*. In the 14-item OC scale, 6 items refer to VC, 4 items refer to EC and 4 items refer to RC.

Adopting Senge's (1997b) concept, KS is described as a dynamic learning process helping people to develop new capacities for actions. This paper modified the measurement scale of Cheng & Li (2001), which is composed of three categories, including SIK, SLO and ELM. In the 10-item KS measurement scale, 5 of which refer to SIK, 3 of which refer to SLO and 2 of which refer to ELM.

As for OCB, we modified the measurement scale proposed by Farh *et al* (1997), which suggests that OCB contains five dimensions, including *identification with the organization* (IDO), *altruism towards colleagues* (ALC), *conscientiousness* (CON), *interpersonal harmony* (ITH) and *protecting organizational resources* (POR). Compared with Farh *et al*'s (1997) 20-item scale, we add an item *Will economize on company resources* (e.g., *water, electricity and supplies*) to the dimension 'POR'. In the 21-item OCB scale, 4 of the total refer to IDO, 4 of the total refer to ALC, 5 of the total refer to CON, 4 of the total refer to ITH and 4 of the total refer to POR. All measurement items of these three construct (i.e., OC, KS and OCB) are shown in Appendix A, B and C.

Data collection and sample structure

This study focuses on different tiers in Taiwan's semiconductor industry, including upstream, midstream and downstream. Before the finalization of our research questionnaire, we first conducted a pre-test to evaluate its

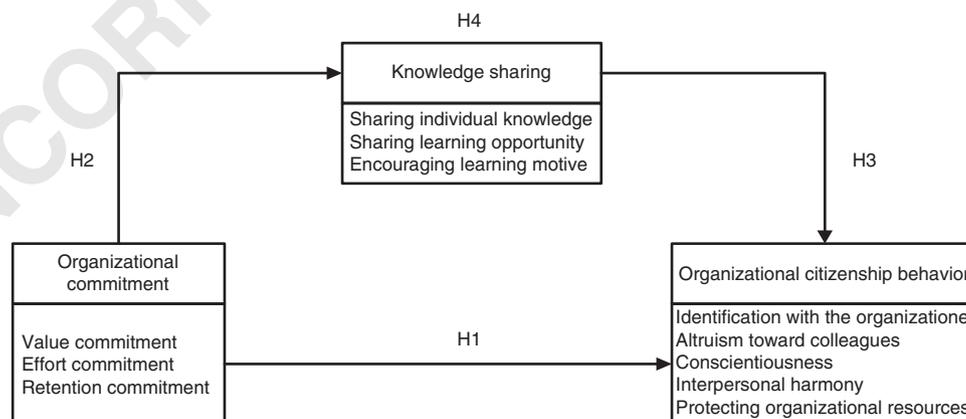


Figure 1 The research framework.

design and semantic appropriateness. Therefore, a total of 80 questionnaires were sent out for a pre-test and 54 were returned. Excluding 4 invalid returns, a total of 50 valid responses were received. In this pre-test stage, the Cronbach's α of all the 11 dimensions is greater than 0.7, meaning the internal consistency of each dimension in this study was acceptable.

All 45-items in this questionnaire were remained with minor semantic appropriateness, a total of 700 final questionnaires were sent out and 473 were returned. Excluding 45 invalid questionnaires, a total of 428 valid responses were received for an effective response rate of 61.14%. These valid samples are collected from semiconductor design (i.e., *upstream of the semiconductor*), 100 of the total is collected from semiconductor manufacturing (i.e., *midstream of the semiconductor*) and the rest of the total is collected from semiconductor assembly and test and semiconductor material (i.e., *downstream of the semiconductor*), respectively. All our questionnaires were sent to those representatives of different streams of semiconductor companies by post. On the basis of sample structure, 217 of the total is male and 211 of the total is female; the age of respondent mostly ranged from 31 to 40 and the range from 26 to 30 of age was secondary; most of respondents were unmarried and had a *bachelor's degree*; our respondents mostly worked at department of production; the tenure of respondents ranged from 4 to 5 years.

Q6

Criteria for model fit

Using structural equation modelling (SEM), this paper aims to explore the relationship among OC, KS and OCB. To clearly find the convergent validity of each construct/dimension and/or the model fit in CFA, we usually examine the relative measurement indexes, such as GFI, CFI, NNFI, SRMR, RMSEA and normed χ^2 and so on. All the criteria for these indexes were shown in Table 1.

Data analysis and results

Reliability and validity

One of the most popular reliability statistics in use today is Cronbach's (1951) α . Cronbach's α determines

the internal consistency or average correlation of items in a survey instrument to gauge its reliability (Santos, 1999). Usually the value of Cronbach's α equals 0.7 and above is acceptable (Nunnally, 1978). In this study, the Cronbach's α value of the 11 dimensions ranged from 0.831 to 0.927 while the values of reliability for the three constructs were 0.929, 0.950 and 0.943. It means that the internal consistency of each variable/dimension in this study was acceptable (see Table 2). This study further verified the convergent and discriminate validity of our constructs to ensure construct validity. Apparently, all these t -value of each construct are significant and it indicates that the convergent validity of this model is acceptable (see Table 3). According to Anderson & Gerbing (1988), the measurement scale of discriminant validity is the differences of χ^2 ($\Delta\chi^2$) between the restricted model and the unrestricted model. The greater the value of ($\Delta\chi^2$), the higher the discriminant validity. In this paper, the range of $\Delta\chi^2$ is from 182.09 to 344.32. This means that the discriminant validity of each construct in this study was acceptable.

Table 2 The reliability analysis

Constructs	Dimensions	Items	Cronbach's α
OC	VC	6	0.887
	EC	4	0.831
	RC	4	0.866
KS	SIK	5	0.886
	SLO	3	0.909
	ELM	2	0.879
OCB	IDO	4	0.927
	ALC	4	0.877
	CON	5	0.889
	ITH	4	0.853
	POR	4	0.898

Table 3 The convergent validity analysis

	Construct	Parameter	Standardized parameter	Standard deviation	t-value
Exogenous variable	OC	λ_{11}	0.83	0.57	20.32***
		λ_{21}	0.90	0.55	22.74***
		λ_{31}	0.75	0.49	17.40***
Endogenous variable	KS	λ_{11}	0.88	0.63	22.73***
		λ_{21}	0.92	0.61	24.64***
		λ_{31}	0.92	0.70	24.49***
Endogenous variable	OCB	λ_{11}	0.83	0.71	20.71***
		λ_{21}	0.84	0.58	21.00***
		λ_{31}	0.86	0.65	21.89***
		λ_{41}	0.61	0.45	13.37***
		λ_{51}	0.59	0.48	12.89***

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Table 1 The criteria for CFA

Index	Criteria for acceptance	Sources
GFI	≥ 0.9 is better	Hu & Bentler (1999)
CFI	≥ 0.95 is better	Bentler (1995)
NNFI	≥ 0.9 is better	Hu & Bentler (1999)
SRMR	≤ 0.08 is better	Hu & Bentler (1999)
RMSEA	≤ 0.05 is better	McDonald & Ho (2002)
	Ranging from 0.05 to 0.08 is acceptable	
	≥ 0.1 is worse	Brown & Cudeck (1993)
Normed χ^2	≤ 3 is better	Anderson & Gerbing (1988)

Q12

Correlation analysis

The results from Table 4 indicate that all the correlations between factors are significant. As can be seen, the relationships between research variables are as follows:

- (1) OC is positively related to KS. It means that a higher level of OC within an organization is associated with higher value of individuals' willingness to share knowledge.
- (2) KS is positively related to OCB. It indicates that an organization with great KS behaviours will be highly associated with higher level of OCB.
- (3) OC is positively related to OCB. It means that an organization with a higher level of OC is apt to improve the OCB of individuals.

However, the value of correlation only reveals the degree of relationship between two constructs. To facilitate a good understanding of indirect/direct and mediated

effects, this study therefore used SEM to validate the effects among the constructs.

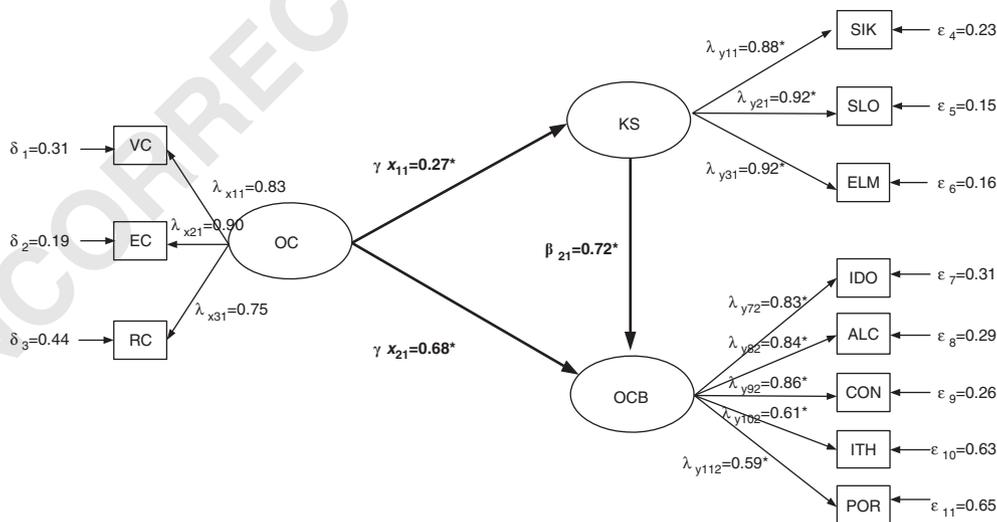
Structural model analysis

From Figure 2, the findings of this analysis showed that the *t*-value of OC–KS, KS–OCB and OC–OCB are significant, that is all of the hypothesized paths were significant ($P < 0.05$). As shown, each index of path analysis, such as GFI = 0.90, AGFI = 0.84, SRMR = 0.053, RMSEA = 0.11, NFI = 0.96 and CFI = 0.97 also indicated that it is an adequate fit in this model according to the value of criteria for acceptance in Table 1. On the other hand, the path coefficient (γ_{11}) from OC–OCB was 0.29 (t -value = 5.39, $P < 0.001$) and this meant that Hypothesis 1 was supported. OC was positively associated with KS ($\beta_{21} = 0.72$, t -value = 14.61, $P < 0.001$) and this meant Hypothesis 2 was supported. The path coefficient (γ_{21}) from KS–OCB

Table 4 Correlation matrix

Dimensions	1	2	3	4	5	6	7	8	9	10	11
VC (1)	1										
EC (2)	0.750**	1									
RC (3)	0.624**	0.668**	1								
SIK (4)	0.533**	0.582**	0.491**	1.000							
SLO (5)	0.532**	0.601**	0.509**	0.798**	1.000						
ELM (6)	0.508**	0.581**	0.512**	0.801**	0.853**	1.000					
IDO (7)	0.596**	0.600**	0.481**	0.702**	0.657**	0.687**	1.000				
ALC (8)	0.529**	0.544**	0.448**	0.629**	0.691**	0.663**	0.689**	1.000			
CON (9)	0.543**	0.581**	0.481**	0.691**	0.677**	0.655**	0.731**	0.742**	1.000		
ITH (10)	0.339**	0.437**	0.386**	0.435**	0.451**	0.454**	0.413**	0.527**	0.507**	1.000	
POR (11)	0.257**	0.335**	0.311**	0.486**	0.478**	0.469**	0.453**	0.468**	0.472**	0.716**	1.000

** $P < 0.05$.



Chi-Square=254.52, df=41, P-value=0.00000, RMSEA=0.110

Figure 2 The measurement model analysis.

was 0.68 (t -value = 12.49, $P < 0.001$) and this meant that Hypothesis 3 was supported. All these three parameter estimates (i.e., γ_{11} , β_{21} , γ_{21}) are positive and significant indicating our findings are consistent with previous studies (e.g., Mowday *et al*, 1979; Bolino, 1999; Meyer *et al*, 2002; Hislop, 2003; Liao *et al*, 2004). Table 5

As to Hypothesis 4, this paper aims to empirically examine the mediating effect of KS on OC–OCB relationship. Therefore, we will take the direct/indirect effect among OC, KS and OCB into account. From Table 4, we clearly find that the value of total effects (1.24) of OC on OCB can be divided into 0.75 (i.e., a direct effect of OC on OCB) and 0.49 (i.e., an indirect effect of OC on OCB comprising OC–KS and KS–OCB). As these two effects are significant, it is obviously to see that there are two ways for OC to impact OCB, one is by itself, and the other is by means of KS. Therefore, this study strongly supports that KS acts as a partial mediator factor in the relationship between OC and OCB.

Competitive model analysis

To empirically validate whether KS plays a role of mediator in our measurement model, this study used SEM to verify the relationships among OC, KS and OCB. In this model, OC is an antecedent, KS is a mediator and OCB is an outcome. However, researchers need to propose different competitive models and make comparisons among them to get a rigorously mediated result (Hair *et al*, 1998). Therefore, competitive model analysis is expected.

Table 5 Direct and indirect effect

Variables		Endogenous			
		KS		OCB	
		Effect	t -value	Effect	t -value
Exogenous	OC				
	Direct	0.72	14.61***	0.75	14.72***
	Indirect			0.49	10.24***
	Total	0.72	14.61***	1.24	24.96***
Endogenous	KS				
	Direct			0.68	12.49***
	Indirect				
	Total			0.68	12.49***

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

In general, the competitive model analysis used in most of empirical studies aims to compare the theoretical model with other alternative measurement models to find which one is the optimal. Therefore, the more research variables were presented, the more alternative models were shown, thereby facilitating a better understanding of competitive analysis. Similar to Porter's (1980) concept, the competitive model analysis we used represents an assessment process between the theoretical model and its alternative models. Model I (i.e., partial mediated model) here is to explore the relationships among OC, KS and OCB and Model II (i.e., complete mediated model) is Model II ignoring the direct effect of OC on OCB. From the value of Table 6, we find that the value of $\Delta\chi^2$ between Model II and Model I is significant ($\Delta\chi^2 = 29.23$, $P < 0.01$), indicating the optimal model is Model I.

Discussions, managerial implications and future works

Managerial implications

This study presents several managerial implications. First, research results show that OC in Taiwan's semiconductor industry has a significant impact on OCB. It is consistent with several studies (e.g., Mowday *et al*, 1979; Salehi & Gholtash, 2010; Allen *et al*, 2011). Obviously, high-committed employees in the real world today are apt to perform higher OCB, lower turnover intentions and higher job satisfaction. Therefore, how to maintain a higher level of an individual's VC, EC and RC to increase the intention of OCB has become a critical issue for managers of Taiwanese semiconductor industry.

Second, empirical evidence indicates that higher OC in Taiwanese semiconductor companies would enhance the willingness for KS. It is consistent with McKenzie *et al* (2001) and Nonaka *et al* (2001), defending that OC may greatly influence the willingness of workers to create and share their knowledge. From this, OC here can be seen as a key to KM activity within an organization to some extent. Therefore, managers in semiconductor industry need to be concerned with those possible factors (e.g., organizational culture, job satisfaction) influencing OC and make great efforts to enhance OC to achieve an excellent performance of KM (i.e., KS). Besides, KS occurs when people are genuinely interested in helping one another develop new capacities for action (Senge, 1997b, 1998), such as SIK (i.e., *teach others the inherent knowledge*),

Table 6 Competitive analysis

Index models	χ^2 (DF)	$\Delta\chi^2$	GFI	AGFI	SRMR	RMSEA	NFI	NNFI	CFI
Model I	254.52(41)		0.90	0.84	0.053	0.11	0.96	0.96	0.97
Model II	283.75(42)	29.23*	0.89	0.83	0.061	0.12	0.96	0.95	0.96

$\Delta\chi^2$ = The difference between χ^2 value of hypothesized model and χ^2 value of the others.

The symbol '*' means that $\Delta\chi^2 > 3.84$ ($\Delta DF = 1$), or $\Delta\chi^2 > 5.99$ ($\Delta DF = 2$), or $\Delta\chi^2 > 7.81$ ($\Delta DF = 3$) at $\alpha = 0.05$.

SLO (i.e., *help others access external knowledge*) and ELM (i.e., *encourage others to learn*). Apparently, how to effectively induce/encourage our employee's willingness to help others to develop their capabilities for actions will become a critical issue for those managers for the following years.

The last is that the empirical result shows that KS successfully acts as a partial mediator in the relationship between OC and OCB. It means that the same OC level, employees with greater willingness to share knowledge display higher levels of OCB. Therefore, managers need to improve KS or other factors affecting KS to get more OCB from the OC they have.

Suggestions and future works

Among extant literatures, a number of studies explore the factors that affect KS. For example, Seba *et al* (2012) confirm the influence of leadership, trust, organizational structure, time and information technology on the attitude to KS. Wang and Noe (2010), reviewing qualitative and quantitative studies of individual-level knowledge sharing, identify five areas of emphasis of KS research: organizational context, interpersonal and team characteristics, cultural characteristics, individual characteristics and motivational factors. All these influencing factors are discussed as follows:

Undoubtedly, a company with excellent performance may positively promote employee's attitude (e.g., *loyalty, commitment*) towards his/her organization. Therefore, future studies on the relationship between employee's behaviour (e.g., *job satisfaction, work stress, turnover intention*) and organizational factors (e.g., *leadership, organization's age, organizational culture, organizational learning, job satisfaction and capability*) are required. For example, Kim and Brymer (2011) indicate that executives' ethical leadership is positively related to their middle managers' job satisfaction and their affective commitment, while Strauss *et al* (2009) demonstrate the importance of leadership as an antecedent of proactive work behaviour. On the other hand, leadership and the organization's age are the best predictors of OC (Glisson & Durick, 1988), the use of leadership behaviours and employee outcomes are significantly correlated (Loke, 2001). Therefore, if managers expect higher levels of OC, they really need to pay more attentions to their leadership.

Employee work commitment is related to organizational support, job characteristics and perceptions of gender discrimination (Peng *et al*, 2009); several quantitative reviews have documented the negative relationships that

role stressors have with task performance (Eatough *et al*, 2011). Moreover, occupational stress not only has a direct negative effect on job satisfaction, it also has an indirect negative effect on OC (Aghdasi *et al*, 2011). Therefore, managers should make great efforts to improve overall work quality to enhance employee's job satisfaction and reduce employee's work stress, thereby promoting higher levels of OC.

Khalil *et al* (2006) suggest that a company should devote itself to developing KM strategies, creating a supportive culture, and adopting proper IT tools and techniques so as to enhance the implementations of KM (i.e., *knowledge acquisition, documentation, transformation, creation and application*). Liao *et al* (2012) further support that organizational culture may affect organizational learning through knowledge acquisition. Therefore, cultivating a positive/favourable culture (e.g., *innovative, learning*), for managers, is apparently conducive to KM activities.

Various HRP's were significantly predicting OC (Shahnawaz & Juyal, 2006). Lee & Kim (2010) suggest that commitment-based HRM was positively related to OCBs. Liu & Liu (2011) further find that HRP's, incentive compensation plans, performance appraisal systems and face-to-face communication foster KS. Chen & Cheng (2012) also propose that internal marketing and OC influence KS attitudes and perceived behavioural control. Therefore, managers need to properly make good use of HRM/HRP's to improve OC, implement KS and enhance OCB.

In essence, knowledge-intensive industry (KII) is characterizing large knowledge input, short product life cycles, high demand for customized products and great quantities of production value (Liao *et al*, 2007). Therefore, to further examine another KII (e.g., *biotech industry, leisure and hospitality industry and automobile industry*) in Taiwan is expected. In a word, the test of model generalization is required.

Conclusions

This study aims to explore the relationships among OC, KS and OCB. By using SEM with 428 subjects from the Taiwanese semiconductor industry, our empirical results show that KS has a partial mediating effect on the OC–OCB relationship. That is OC may have a significant impact on OCB through a direct implementation of KS within an organization. Obviously, it highlights an important role of KS in facilitating employee's altruistic behaviour within an organization towards ultimate performance.

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Q10

Q8
Q9

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Appendix A

Table A1 Organizational commitment scale

VC	(1) I talk up this company to my friends as a great company to work for (2) I often see company profit as my personal profit (3) I am proud to tell others that I am part of this company (4) Working at this company, it enables me to make full use of my abilities (5) I am extremely glad I chose this company to work for (6) For me, this is the best of all companies for which to work
EC	(7) I am willing to put in a great deal of effort beyond that normally expected in order to help this company be successful (8) I feel very little loyalty to this company. (R) (9) I am willing to keep working at this company (10) I really care about the fate of this company
RC	(11) It would take very little change in my present circumstances to cause me to leave this company. (R) (12) There's not much to be gained by sticking with this company indefinitely. (R) (13) I find it difficult to agree with this company's policies on important matters relating to its employees (R) (14) Deciding to work for this company was a definite mistake on my part. (R)

(R) indicates that the item is reverse coded.

Appendix B

Table B1 Knowledge sharing scale

SIK	(1) I am willing to tell others about my knowledge and experience actively (2) I am willing to give my opinions as much as possible in attending meeting or discussion (3) When colleagues have problems, I will answer all their problems possibly (4) While writing document or report, I am willing to record what I know and provide it to others (5) I would love to make a demonstration in hardly explainable things for colleagues
SLO	(6) I am willing to offer learning opportunities to my less-experienced colleagues (7) When my colleagues are in need of notes, documents and data, I am willing to share with them (8) When I fail to help my colleagues to solve their problem, then I will guide him to seek other helps
ELM	(9) I like to encourage my colleagues to learn new knowledge and skills (10) In teaching others, I am willing to use the express way they easily understand as much as possible

Appendix C

Table C1 Organizational citizenship behaviour scale

IDO	(1) Willing to stand up to protect the reputation of the company (2) Eager to tell outsiders good news about the company and clarify their misunderstandings (3) Make constructive suggestions that can improve the operation of the company (4) Actively attend company meetings
ALC	(5) Willing to assist new colleagues to adjust to the work environment (6) Willing to help colleagues solve work-related problems (7) Willing to cover work assignments for colleagues when needed (8) Willing to coordinate and communicate with colleagues
CON	(9) Complies with company rules and procedures even when nobody watches and no evidence can be traced (10) Take one's job seriously and rarely make mistakes (11) Don't mind taking on new or challenging assignments (12) Try hard to self-study to increase the quality of work outputs (13) Often arrive early and start to work immediately
ITH	(14) Use illicit tactics to seek personal gain. (R) (15) Use position of power to pursue selfish personal gain. (R) (16) Take credits, avoid blame and fight fiercely for personal gain. (R) (17) Often speak ill of the supervisor or colleagues behind their backs. (R)
POR	(18) Conduct personal business on company time (e.g., stock trading, go shopping or go to beauty salon). (R) (19) Use company resources to do personal business (e.g., company phones, copy machines, computers and cars). (R) (20) View sick leave as benefit and make excuses for taking a sick leave. (R) (21) Will economize on company resources (e.g., water, electricity and supplies)

(R) indicates that the item is reverse coded.

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