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Structural and informal knowledge acquisition and dissemination in organisational learning: An exploratory analysis

Siu Loon HOE
Singapore Management University, slhoe@smu.edu.sg

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Structural and informal knowledge acquisition and dissemination in organizational learning

An exploratory analysis

Siu Loon Hoe and Steven McShane
UWA Business School, The University of Western Australia, Crawley, Australia

Abstract

Purpose – The topic of organizational learning is populated with many theories and models; many relate to the enduring organizational learning framework consisting of knowledge acquisition, knowledge dissemination, and knowledge use. However, most of the research either emphasizes structural knowledge acquisition and dissemination as a composite construct, or focuses solely on the structural aspect of knowledge acquisition and dissemination. The primary objective of this study is to develop and test a model of organizational learning that incorporates both structural and informal knowledge acquisition and dissemination and as separate processes. The predictors of these processes are also proposed

Design/methodology/approach – A model of organizational learning that incorporates both structural and informal knowledge acquisition and dissemination constructs, along with three predictors of these organizational learning constructs were developed and quantitatively tested.

Findings – An inference to the research questions and hypotheses suggests that informal knowledge acquisition and dissemination have significant paths to market knowledge use, whereas structural knowledge acquisition and dissemination have, at best, a weak association with market knowledge use. Although the results were based on exploratory analysis, they provide tentative quantitative evidence that informal knowledge processes are at least as important as structural knowledge processes in market-based organizational learning.

Originality/value – While the hypothesized model did not satisfy the goodness-of-fit tests, data-driven exploratory analysis helped to refine two separate structural and informal models for future testing. The statistical explanation provided and procedures used to remedy the non-fit issues should help future researchers to deal with structural equation-modeling issues when similar non-fit problems arise.

Keywords Knowledge management, Process management, Organizational performance, Modelling

Paper type Research paper

Introduction

Organizational learning is an organization's enhanced ability to acquire, disseminate and use knowledge in order to adapt to a changing external environment. Scholars across disciplines such as management, marketing, and strategic management have proposed and found evidence that organizational learning is vital to an organization's performance and competitive advantage (Goh, 2003; Jiménez-Jiménez and Cegarra-Navarro, 2006; Nonaka and Takeuchi, 1995; Stewart, 2002; Swartz, 2003).

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Success stories abound of organizations that have developed an organizational learning capability, resulting in breakthroughs in product quality, innovation, and workplace efficiency (Baldwin *et al.*, 1997; Edvinsson and Malone, 1997; Jonsson and Elf, 2006; Saint-Onge and Wallace, 2003).

Many studies have been conducted to understand the dynamics of organizational learning. Yet there is limited quantitative research about the effects of informal knowledge processes i.e. acquisition and dissemination in organizational learning. Informal knowledge acquisition and dissemination are defined as defined as spontaneous and voluntary activities for collecting and sharing knowledge. The study seeks to establish quantitatively that informal knowledge processes play a role in organizational learning along side structural knowledge processes. In addition, the study examines the effect of antecedents such as shared vision, interpersonal trust, and perceived importance of market knowledge on these constructs. The data cover 11 business units of a Singapore-listed information and communications technology (ICT) multinational corporation (MNC).

While the hypothesized model did not satisfy the goodness-of-fit tests, data-driven exploratory analysis helped to refine two separate models for future testing. The statistical explanation provided and procedures used to remedy the non-fit issues should help future researchers deal with structural equation modeling issues when similar non-fit problems arise.

Overview of organizational learning processes

The topic of organizational learning is populated with many theories and models. Many enduring organizational learning frameworks consist of a sequence of three knowledge processes i.e. knowledge acquisition, knowledge dissemination and knowledge use (DiBella and Nevis, 1998; Huber, 1991). In particular, Huber (1991) pioneered the three-sequence knowledge process idea in he management literature, which was, later, adopted by marketing scholars.

Knowledge acquisition is defined as the development or creation of skills, insights and relationships. It is also how knowledge is collected. Examples of knowledge acquisition activities include having casual conversation with competitors at trade shows, and conducting regular customer visits and in-house market research. Knowledge dissemination is the process by which knowledge is shared and diffused throughout the organization. Examples of knowledge dissemination activities include employees informing other colleagues of plans through hallway conversations and marketing personnel scheduling regular meetings to discuss customers' future needs with departments.

Knowledge use is defined as the integration of learning so that the knowledge is broadly available and can be generalized to existing and new situations. Knowledge use happens when knowledge is being applied to a business context. It refers to the way in which knowledge is applied by members of an organization to better understand the area of assigned work so as to be able to make informed managerial decisions, and implement changes (Maltz and Kohli, 1996; Moorman, 1995). When such knowledge is generated from customers and competitors, it is referred to as market knowledge in this study. Examples of market knowledge use activities include shaping of organizational policies, implementing new products and services, and increasing productivity through application of acquired and disseminated market knowledge.

This study specifically refers to market knowledge use because knowledge that is generated from external stakeholders such as customers and competitors are key to an organization's competitiveness.

Issues related to current organizational learning models

On closer examination of the knowledge processes proposed in past studies, two important issues arise. These issues are discussed in the following section.

Composite versus single measure

Quantitative research on organizational learning has been prolific in the marketing discipline (Baker and Sinkula, 1999; Farrell, 2000; Hurley and Hult, 1998; Li and Calantone, 1998). Specifically, a large number of marketing studies have quantitatively tested the predictors and consequences of market orientation, which refers to the organization-wide generation of knowledge on current and future customer needs, dissemination of knowledge across departments, and organization-wide responsiveness (Kirca *et al.*, 2005; Kohli and Jaworski, 1990). These studies have examined how market knowledge is managed through knowledge acquisition and dissemination activities such as conducting market surveys and sharing information across departments on market trends.

Organizational learning scholars sometimes include the concept of learning orientation, which is the presence of values that influence an organization's propensity to proactively pursue new knowledge and challenge the status quo (Baker and Sinkula, 1999; DiBella and Nevis, 1998). Although less often discussed in organizational behavior and strategic management literature, learning orientation has become an integral concept in marketing research on organizational learning, where it has been further articulated as consisting of three values: the organization's commitment to learning, open-mindedness, and shared vision. Marketing scholars generally conclude that the combination of a strong market orientation and a strong learning orientation are necessary for high-level organizational learning and sustained competitive advantage (Baker and Sinkula, 2002).

In examining marketing researchers' quantitative investigation on the dynamics of organizational learning, two apparent concerns stand out. First, marketing researchers typically combine knowledge acquisition and dissemination into a single variable (market orientation) and its corresponding measure. Popular measures of market orientation, such as the MARKOR scale (Kohli *et al.*, 1993), include separate subscales for knowledge acquisition and dissemination, but researchers routinely study only the composite market orientation measure.

This situation has occurred even though the conceptual origins of organizational learning in marketing, the same seminal writers (DiBella and Nevis, 1998; Huber, 1991) who helped shape organizational learning in other fields, distinguish knowledge acquisition and dissemination. Furthermore, knowledge acquisition and dissemination are logically distinct sets of activities with potentially unique predictors and consequences, both of which are buried in a composite measure in marketing studies.

Structural versus informal knowledge processes

The second concern with quantitative research on organizational learning is that, on closer inspection, the measures of knowledge acquisition and dissemination in

marketing research are restricted to planned, organized and systematic activities (Kohli *et al.*, 1993). These "structural" knowledge acquisition activities, as the authors shall call them, include planned focus group sessions with current and potential customers, organized formal meetings with key suppliers, and systematic environmental scanning activities to monitor competitor activities. Structural knowledge dissemination activities include scheduled inter-departmental meetings to discuss market trends and development, systematic distribution of market research reports to within the organization.

Although structural knowledge processes are important for organizational learning to occur, informal knowledge processes should not be ignored as part of the measure. Following the definition from Stohl and Redding (1987), informal knowledge processes are defined in this study as spontaneous and voluntary activities for collecting and sharing knowledge. Spontaneity refers to whether the knowledge activities are planned ahead of time. For example, disseminating knowledge during an unexpected meeting in the hall is spontaneous, whereas disseminating knowledge during a monthly review meeting is non-spontaneous (Maltz and Kohli, 1996). Voluntariness refers to whether the acquisition or dissemination of knowledge was mandated by the organization. As an example, voluntary knowledge dissemination occurs when an employee shares the necessary market knowledge on his or her own without being told by the managers.

The distinction between structural and informal activities is important because it captures the differences in outlook and fundamental assumptions about the nature of interaction of an organization (Allen, 1977; Armistead and Meakins, 2002; Dow, 1988; McGrath and Krackhardt, 2003). This is because the actual informal knowledge acquisition and dissemination relationships of an organization may be less rational than the structural processes (Johnson, 1993). Since there are numerous informal exchanges at work as a result of human interactions, there is also plentiful informal knowledge acquired and disseminated which lead to an improved market knowledge advantage.

Informal knowledge acquisition and dissemination are widely discussed in organizational learning theories and conceptual writing (Akgun *et al.*, 2003; DiBella and Nevis, 1998; Nonaka and Takeuchi, 1995; Swap *et al.*, 2001), yet have been overlooked in most quantitative marketing studies on this topic. Some experts suggest that employees tend to rely more on informal than structural knowledge processes to acquire and share knowledge in organizational settings (Armistead and Meakins, 2002; Jaworski *et al.*, 2002). Nidumolu *et al.* (2001) further suggest that there is only limited value in the structural aspects of a knowledge network as the formal features are only fair-to-poor in highlighting the network's capabilities. They conclude that much of the critical knowledge is context-dependent and the approaches used by organizational members to acquire this knowledge are primarily informal.

Hypothesized model

The objective of this study is to develop and test a model of organizational learning that first separates knowledge acquisition from knowledge dissemination as a single measure and, more importantly, structural from informal knowledge processes. Furthermore, the model introduces specific predictors of these organizational learning processes. The objective is to establish an empirically testable model that remains true to the conceptual foundations of organizational learning includes distinct knowledge acquisition, dissemination and knowledge use, and recognizes that organizational

learning activities occur both structurally and informally. The proposed model, shown in Figure 1, includes four hypotheses (*H1*, *H2*, *H3* and *H4*) relating to the predicted effects of the four structural and informal knowledge processes on market knowledge use. Also, six hypotheses (*H5*, *H6*, *H7*, *H8*, *H9* and *H10*) relating to predictors of structural and informal knowledge acquisition and dissemination. The next sub-sections shall further explain the specific variables and hypotheses.

Structural and informal knowledge processes

Structural knowledge acquisition and dissemination processes are planned, organized and systematic way of collecting and sharing knowledge. This definition suggests that structural processes are pre-arranged activities to collect and share market knowledge from the customers and competitors. Such activities are generally performed in a controlled and orderly manner. This definition is derived based on close examination of the characteristics of the list of knowledge acquisition and knowledge dissemination activities identified by Kohli *et al.* (1993) to measure market orientation. They proposed and tested the market orientation measure, which focused on knowledge acquisition and dissemination activities in order to achieve a competitive advantage. These knowledge acquisition and knowledge dissemination activities are items found in the market orientation construct. Furthermore, Grosser (1991) explained that structural processes are reflected in organizational flow charts and an ordered system that regulates and generates an orderly flow of information for decision making. Structural knowledge processes are considered to be more "official". For example, like the required oral communication up and down the organizational chart, and written communication contained in formal memoranda and departmental directives.

Goh (1998) suggested that knowledge acquisition is useless unless the knowledge can be disseminated across the organization. Over time, the acquired and disseminated market knowledge would result in the organization developing a large stock of knowledge. A greater stock of acquired knowledge would lead to employees having more choices in tapping such knowledge and use them in their daily work. Similarly, the greater the extent that market knowledge is disseminated in an organization, the higher the tendency for employees to use the knowledge. Supporting this view, many previous research studies suggest that structural knowledge acquisition and dissemination promote market knowledge use (Conduit and Mavondo, 2001; Kohli *et al.*, 1993; Stone, 2000). These arguments lead to the hypotheses:

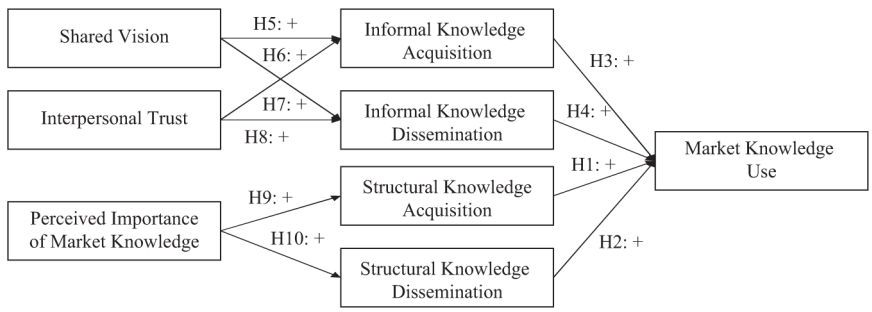

Figure 1.
Hypothesized model of structural and informal knowledge acquisition and dissemination

H1. Structural knowledge acquisition is positively associated with market knowledge use.

H2. Structural knowledge dissemination is positively associated with market knowledge.

Following the definition of Stohl and Redding (1987), two criteria used for characterizing informal knowledge processes are spontaneity and voluntariness. Spontaneity refers to whether the knowledge activities are planned ahead of time. For example, disseminating knowledge during an unexpected meeting in the hall is spontaneous, whereas disseminating knowledge during a monthly review meeting is non-spontaneous (Maltz and Kohli, 1996). Voluntariness refers to whether the acquisition or dissemination of knowledge was mandated by the organization. For example, voluntary knowledge dissemination occurs when an employee shares the necessary market knowledge on his or her own without being told by the managers. Based on the two criteria set by Stohl and Redding (1987), informal knowledge process is defined as the spontaneous and voluntary way of collecting and sharing knowledge. Informal knowledge processes usually do not follow the reporting structure of the organizational chart and tend to be more personal in nature (Johnson *et al.*, 1994). Such informal knowledge processes do not follow the hierarchical structure and are not affected by formal authority. Thus, activities in an informal knowledge process are generally more ad hoc and casual in nature (Storck and Hill, 2000).

Informal processes facilitate knowledge acquisition and dissemination, and maintain a sense of organizational cohesion and autonomy (Smelser, 1963). This viewpoint recognizes that informal knowledge processes are not solely based on the positions individuals occupy within formal organizations or accepted norms or procedures. Informal knowledge may be acquired and disseminated without official sanctions from management or having to follow standard operating procedures (Jaworski *et al.*, 2002). Such informal knowledge processes are generally voluntary, unstructured, haphazard, and can take place anytime and anywhere.

In an informal setting, employees are more likely to seek clarifications given the spontaneity of the informal environment to seek clarifications. Informal knowledge processes generally help employees cope with breakdowns in the organizational structure's structural knowledge processes (Deetz, 1995). Since informal knowledge processes are more spontaneous and voluntary, they may serve to compensate for the structural knowledge processes' shortcomings. The informal sources of learning take into account trial-and-error experiences with past decisions directed toward customers, feedback from seller contacts with individual customers, and managers' personal observations of customers. Hedlund (1994) and Walsh (1995) found that such social processes play an important role in the transition of knowledge across individuals or group.

Given the pervasiveness of informal knowledge acquisition and dissemination activities, it is argued that not only do informal acquisition and dissemination have an effect on knowledge use but the effect may even be greater than those of structural knowledge acquisition and dissemination. Therefore, it is reasonable to assert that informal knowledge processes must also consist of informal knowledge acquisition, informal knowledge dissemination, and market knowledge use. These arguments lead to the hypotheses:

H3. Informal knowledge acquisition is positively associated with market knowledge use.

H4. Informal knowledge dissemination is positively associated with market knowledge use.

Predictors of structural and informal knowledge processes

The hypothesized model also includes six hypotheses relating to three predictors of these knowledge processes: shared vision, interpersonal trust, and perceived importance of market knowledge.

Shared vision. One of the more frequently identified influences on knowledge acquisition and knowledge acquisition processes is shared vision (Goh, 1998; Hult, 2003; Santos-Vijande *et al.*, 2005; Sinkula *et al.*, 1997; Yang *et al.*, 2009), which refers to a clear and common picture of a desired future state that members of a group or organization identify with themselves. Shared vision is believed to be an important foundation for proactive learning because it provides direction and a focus for learning (Andreadis, 2009; Slater and Narver, 1995; Marsick and Watkins, 2003). This perceived understanding commitment to the organization's strategic direction potentially motivates employees to engage more fully in informal knowledge acquisition and dissemination (*H5* and *H6*). Shared vision is not expected to influence structural knowledge processes because these activities are typically initiated by management or specialists (e.g. marketing research) as part of their expected job duties. The hypotheses are:

H5. Shared vision is positively associated with informal knowledge acquisition.

H6. Shared vision is positively associated with informal knowledge dissemination.

Interpersonal trust. Interpersonal trust, which refers to the employee's positive expectations about the supervisor's intentions and actions toward him or her in risky situations, has also received considerable attention in the organizational learning literature (Abrams *et al.*, 2003; Davenport and Prusak, 1998; Armistead and Meakins, 2002; Desouza and Awazu, 2003; Dymock, 2003). The proposed model identifies interpersonal trust as a predictor of informal knowledge acquisition and dissemination (*H7* and *H8*). The rationale is that knowledge usually brings about change, so employees are more willing to acquire and share market knowledge if they believe that the supervisor will not use this knowledge to harm the employee's status and wellbeing in the organization. Interpersonal trust is not identified as a predictor of structural knowledge acquisition or structural knowledge dissemination, because these activities are initiated by managers themselves, or, by specialists, whose job mandate is to conduct these activities. In other words, interpersonal trust influences voluntary and spontaneous rather than systematic and planned activities. The hypotheses are:

H7. Interpersonal trust is positively associated with informal knowledge acquisition.

H8. Interpersonal trust is positively associated with informal knowledge dissemination.

Perceived importance of market knowledge. This variable, which refers to the employee's perception of the extent to which management emphasizes the importance of organizational learning, is also identified in diverse literature sources as an important influence on organizational learning (Farrell, 2000; Hannah and Lester, 2009; Li and Calantone, 1998; Marsick and Watkins, 2003). The proposed model hypothesizes that perceived importance of market knowledge predicts structural knowledge processes (*H9* and *H10*). The logic here is that if management emphasizes market knowledge, more structural knowledge acquisition and dissemination activities will be put in place to facilitate the market knowledge sharing. This linkage makes sense, because, most of these structural knowledge activities, are controlled, by management. For example, it is business leaders who emphasize the value of market knowledge would allocate more resources to market surveys and other forms of environmental scanning. Perceived importance of market knowledge is not expected to influence informal knowledge processes because they are within employee discretion. The hypotheses are:

H9. Perceived importance of market knowledge is positively associated with structural knowledge acquisition.

H10. Perceived importance of market knowledge is positively associated with structural knowledge dissemination.

Method

Population and sample

Data were collected through confidential surveys completed by 219 sales, customer service, and technical consulting employees in 11 business units of a listed, Singapore-based ICT MNC. This company is owned, by a multinational conglomerate, with core businesses in engineering, technology, infrastructure and logistics, property, and financial services. The 11 business units of the ICT company employ 630 people, of who 300 fit the description of boundary spanners i.e. employees who interact with external stakeholders such as customers and competitors. Boundary spanners are generally in a better position than employees in other job groups to acquire and disseminate market knowledge (Chonko *et al.*, 2003; Dollinger, 1984; Leifer and Huber, 1977). The 219 completed questionnaires represented a 73 per cent response rate.

The 11 business units sampled were the customer service centre, business strategy consultancy unit, system software unit, special technologies unit, electronic-commerce services unit, system integration unit, enterprise systems unit, enterprise applications unit, multimedia unit, electronic solutions licensing unit and networks unit. These units were selected because they employed the most number of boundary spanners.

Of the respondents, 55.8 per cent were male, and 70 per cent reported having a university or postgraduate education. On average, respondents had approximately two years employment with the company. In total, 42.4 per cent held sale positions and 28.6 per cent consulting and project management positions. The average time spent with external customer of 49.4 per cent each day, indicated a high degree of interaction with external customers.

Measures and pretest

All data were collected through a questionnaire completed confidentially and voluntarily by respondents. Most measures in this study were derived from previous research on market orientation and organizational learning (Jaworski and Kohli, 1993; Kohli *et al.*, 1993; Narver and Slater, 1990; Sinkula *et al.*, 1997; Baker and Sinkula, 1999). The questionnaire was pre-tested in two ways. First, it was reviewed by a survey methodology professional, next, five people whose job description fits the definition of boundary spanning, completed the questionnaire. These people were individually asked about issues they encountered while filling out the questionnaire. Based on this two-stage pretesting process, some items were rewritten to improve readability and understanding by respondents. All these measures used a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). Please refer to Table I for the list of constructs and measures.

The second pretest stage was a small pilot test that emulated the procedures proposed for the main study. Five boundary spanners were asked to complete the questionnaire as if they received it in the office and complete it in whatever way they would if the researcher was not there. After the questionnaires had been completed, the five pilot test respondents were asked individually about each of the problems they encounter while filling out the questionnaire. Again, the suggestions were incorporated into the final draft.

Structural knowledge acquisition. Structural knowledge acquisition was measured using three items from the six-item knowledge acquisition subscale found in the MARKOR scale (Kohli *et al.*, 1993). The MARKOR scale is a well established in marketing studies (Conduit and Mavondo, 2001; Stone, 2000). However, only three items of this subscale represent specific knowledge acquisition activities or strategies (e.g. "In this business unit, we meet customers regularly –, e.g. at least twice per year – to find out what products or services they will need in the future"). The remaining three items fall outside the construct domain because they represent broad evaluations of the work unit's environmental responsiveness (e.g. "We are slow to detect changes in customers' product preferences"). Cronbach's alpha reliability for the three-item measure in this study was 0.71, only slightly below the 0.74 reliability reported by Kohli *et al.* (1993) of the six-item MARKOR subscale.

Structural knowledge dissemination. Structural knowledge dissemination is defined as the planned, organized and systematic way in which market knowledge is distributed within an organization. Structural knowledge dissemination was measured with the five-item knowledge dissemination items in the MARKOR scale. Essentially, the measure assessed the dissemination of market knowledge across the organization as a result of the organizational processes that have been put in place to distribute knowledge. All of the items in this scale fall within the definition of structural knowledge dissemination. Cronbach's alpha was 0.84 in the present study, compared with 0.82 in Jaworski and Kohli's (1993) original study.

Informal knowledge acquisition. No existing measure for this construct was found because previous studies on knowledge acquisition relied mostly on the MARKOR scale, which captures only structural knowledge acquisition (Baker and Sinkula, 1999; Conduit and Mavondo, 2001; Kohli *et al.*, 1993; Stone, 2000). Consequently, the informal knowledge acquisition measure was developed for the study. A doctoral dissertation by Schwebach (1998) provided the foundation for development of the informal

Construct	Measure	Source
Market knowledge use	A five-point Likert-type scale and seven-item measure: The market knowledge that we acquired and disseminated Helped shaped our policies Improved implementation of new products and projects Improved my productivity. Improved my understanding of the dynamics of the marketplace Was rarely used. Increased my understanding of how things work here Led to concrete actions	Maltz and Kohli, 1996
Structural knowledge acquisition	A five-point Likert-type scale and three-item measure: In this business unit, we meet customers at least twice per year to find out what products or services they will need in the future In this business unit, we do a lot of in-house market research We frequently review the likely effects of changes in our business environment, e.g. regulation on customers In this business unit, we meet customers at least twice per year to find out what products or services they will need in the future	Jaworski and Kohli, 1993
Structural knowledge dissemination	A five-point Likert-type scale and five-item measure: We have interdepartmental meetings at least once a quarter to discuss market trends and developments Marketing personnel in our business unit regularly schedule meetings to discuss customers' future needs with other functional departments When something important happens to a major customer or market, the whole business unit is informed about it within a short period of time through formal channels Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis When one department finds out something important about competitors, it is quick to alert other departments through formal channels	Jaworski and Kohli, 1993
Informal knowledge acquisition – new measure	A five-point Likert-type scale and five-item measure: I will informally "pick the brains" of the competitors at trade shows to better understand the market I will informally analyze the customers' and competitors' recruitment ads and public solicitations for bids to determine their strategy and type of projects they are contemplating I will voluntarily obtain market information through publicly available sources, e.g. internet and trade magazines I will meet voluntarily with regular customers to talk about the market and our products without the instructions of management I will call a friend who is working with the customer in order to find out more about their company, should the need arise	Schwebach, 1998

(*continued*)

Table I.
List of measures

Construct	Measure	Source
Informal knowledge dissemination – new measure	A five-point Likert-type scale and five-item measure: General information flow in the business unit is *ad hoc*, diffused and unstructured. We share a lot of knowledge across the various departments The way we work here is more of a joint effort than one-to-one discussions. Sometimes I inform colleagues of plans and issues through hallway conversations. Rather than relying solely on a centralized "push" of information, I share knowledge as when it is available.	Storck and Hill, 2000
Shared vision	A five-point Likert-type scale and four-item measure: There is commonality of purpose in my business unit There is total agreement on our business unit's vision across all levels and functions All employees are committed to the goals of this business unit Employees view themselves as partners in charting the direction of this business unit	Sinkula *et al.*, 1997
Interpersonal trust	A five-point Likert-type scale and four-item measure: I have confidence that my supervisor is technically competent at the critical elements of her/his job When my supervisor tells me something, I can rely on what s/he tells me My supervisor will back me up in a pinch I feel that I can tell my supervisor anything about my job	Nyhan and Marlowe, 1997
Perceived importance of market knowledge	A five-point Likert-type scale and five-item measure: The management in my business unit places high emphasis on: Continuous interaction with users. Knowledge of customers' needs. Continuous learning of market trends and change. Generating competitive intelligence. Knowledge of competitors' products.	Li and Calantone, 1998
Other effects		
Boundary spanner	A two-item measure: How much of your time is spent in contact with the customers? (0-100 per cent) Which one of these best describes your role in the business unit? (managerial, sales, technical, customer service, administrative)	
Age of employee	A single-item measure: What is your age group? (18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-59, 60 and above)	
Gender	A single-item measure: What is your gender? (male/female)	
Educational Level	A single-item measure: What is your educational level? (primary, secondary/vocational institute, junior college/polytechnic, university, postgraduate)	
Length of service	A single-item measure: How long have you been with this business unit? (years or months)	

Table I.

knowledge acquisition scale. Five informal knowledge acquisition activities were selected from Schwebach's list of 59 knowledge acquisition methods used by salespersons reporting competitor knowledge in the USA. An example of an item in this scale is "I will meet voluntarily with regular customers to talk about the market and our products without the instructions of management". The five-item scale's alpha reliability was 0.77.

Informal knowledge dissemination. As with the informal knowledge acquisition measure, no existing measures were found for informal knowledge dissemination because previous quantitative studies measured only structural knowledge dissemination. Thus, a new five-item scale was created from informal knowledge sharing behaviors identified from a report on strategic communities by Storck and Hill (2000), and an earlier research by Maltz and Kohli (1996). However, reliability of the five-item scale was unacceptable (0.28). Fortunately, item analysis revealed that removal of two items produced a three-item scale with more acceptable alpha reliability of 0.65. An example of an item in this scale is "Sometimes I inform colleagues of plans and issues through hallway conversations".

Shared vision. This variable is measured using the four-item subscale of the same name as part of the learning orientation scale developed by Sinkula *et al.* (1997). Cronbach's alpha was 0.86 in the original study and 0.91 in the present study. An example of an item in this scale is "There is commonality of purpose in my business unit".

Interpersonal trust. This variable was measured using the four-item subscale on trust in the supervisor from the Organizational Trust Inventory of Nyhan and Marlowe (1997). Cronbach's alpha was 0.87 in the original study and 0.92 in the present study. An example of an item in this scale is "My supervisor will back me up in a difficult situation".

Perceived importance to management of market knowledge. This variable was measured using the five-item scale developed by Li and Calantone (1998). Cronbach's alpha was 0.87 in the original study and 0.94 in the present study. An example of an item in this scale is "The management in my business unit places high emphasis on: Knowledge of competitors' products."

Perceived market knowledge use. This variable was measured with the seven-item scale developed by Maltz and Kohli (1996). Respondents were asked the extent to which market knowledge collected by and disseminated in the business unit had various outcomes (e.g. "improved my productivity", "was rarely used" (reverse scored)). Maltz and Kohli (1996) reported an alpha reliability of 0.86. In this study, Cronbach's alpha was 0.84.

Procedure

The goodness-of-fit of the hypothesized model was tested using structural equation modeling with EQS. There are several indicators of goodness-of-fit and most structural equation-modeling scholars recommend evaluating the models by observing more than one of these indicators (Bentler and Wu, 1995; Hair *et al.*, 1998). Marsh *et al.* (1988) proposed that the criteria for ideal fit indices are relatively independent of sample size, accuracy and consistency to assess different models, and ease of interpretation aided by a well defined pre-set range. Based on this stated criteria, Garver and Mentzer (1999) recommended non-normed fit index (NNFI); comparative fit index (CFI), and root mean

squared approximation of error (RMSEA). Therefore, the fit indices included in the study are the NNFI and CFI (>0.90 indicates good fit), RMSEA (<0.08 indicates acceptable fit), and commonly used χ^2 statistic (χ^2/d.f. ratio of 3 or less). Structural equation modeling also tested predicted paths among the variables.

The hypothesized model was tested using the total aggregation approach. Structural equation modeling scholars increasingly recommend partial disaggregation rather than complete disaggregation or aggregation of items within each factor. However, possibly due to sample size and the number of free parameters in the proposed model, partial disaggregation resulted in a linear dependence error in this study. Consequently, total aggregation was necessary, in which the summed score for each measure rather than individual item scores were entered into the model.

Examination of the measures and scatter plots of the residuals found that the four basic assumptions of linearity, normality, homoscedasticity, and independence of residuals in structural equation modeling were satisfied. All measures were also assessed for unidimensionality using principal components analysis for all items within each measure. Except for market knowledge use, only the first eigenvalue was greater than 1 for all the rest of the scales. This evidence provided support for the unidimensionality of these scales. For market knowledge use, two eigenvalues were greater than 1 but the second eigenvalue was only 1.04. Since second eigenvalue is close to 1 and this is a measure that has been used extensively in previous research, it is reasonable to accept the unidimensionality of this scale.

The fit indices, shown in Table II, were far below the minimum requirements for the benchmark fit indices. This result clearly indicates that the data do not fit the proposed hypothesized model, so it was rejected.

Theoretical and statistical explanation of non-fit results

Theoretically, in hindsight, some of the hypotheses could have been more thoughtfully constructed. For example, *H1* and *H2* state that structural knowledge acquisition and dissemination are positively associated with market knowledge use. These hypotheses were formulated based on the separation of item from the composite market orientation construct, MARKOR scale, into knowledge acquisition and knowledge dissemination. Subsequently, knowledge acquisition and knowledge dissemination were hypothesized to be positively associated to market knowledge use based on Huber's (1991) conceptualization of organizational learning. However, notwithstanding that argument for the hypotheses could be further strengthened, a simple and cautious data-driven approach could be adopted to build on the current foundation of knowledge established. Doing so would be an important first step in deepening the understanding of informal knowledge acquisition and dissemination and developing a model, which incorporates both structural and informal knowledge acquisition and dissemination.

Statistically, structural equation modeling adopts a confirmatory approach to multivariate data analysis. This approach means that the pattern of interrelationships among the constructs is specified a priori and grounded in established theory. Chin

Table II.
Fit Indices for hypothesized model

Model	d.f.	χ^2	NNFI	CFI	RMSEA
Hypothesized model	18	416.69	−0.043	0.330	0.321

(1998) cautioned that structural equation modeling works best in a confirmatory mode and there is a need to avoid slipping into exploratory analysis where the final results may be unduly influenced by a specific data set. However, Chin (1998) also acknowledged that models that are initially tested are typically rejected. Therefore, the non-fit results of the hypothesized model were not entirely surprising. To remedy the non-fit situation and build on the "failed" hypothesized model, the Wald and Lagrange Multiplier tests were cautiously used for exploratory analysis to make the necessary conclusions to the research questions and hypotheses.

Exploratory analysis to build model for future research

Jöreskog and Sörbom (1986) recommended considering alternative plausible models when the hypothesized model has a poor fit. The Wald and Lagrange multiplier tests were run repeatedly on each model until none of the free parameters was dropped in the process, none of the univariate Lagrange multipliers was significant, and the indices indicated that the resulting model is good fit. This procedure indicated that two paths should be dropped – structural knowledge acquisition and structural knowledge dissemination with market knowledge use. It also indicated that a path should be added between shared vision and market knowledge use in the exploratory model. Finally, the Wald and Lagrange multiplier tests revealed that the three exogenous variables – shared vision, interpersonal trust and perceived importance of market knowledge – are sufficiently intercorrelated to be so indicted in the exploratory model.

This exploratory model provided a better fit of the data than the hypothesized model, but it also fell short of the minimum acceptable index standards for a "well-fitting" model. These results led the authors to believe that structural knowledge acquisition and dissemination should be studied separately from informal knowledge acquisition and dissemination. As noted previously, the exploratory analysis found no significant paths between structural knowledge acquisition and dissemination and market knowledge use in the presence of informal knowledge acquisition and dissemination. Previous studies examined the influence of the structural variables without measurement of the informal variables (Li and Calantone, 1998; Sinkula *et al.*, 1997). Thus, the authors developed two separate models, which included either the structural or informal knowledge acquisition and dissemination measures along with market knowledge use and the three exogenous variables. As this stage was also exploratory, the Wald and Lagrange Multiplier tests were applied to estimate the optimal models.

Table III shows the goodness-of-fit tests for both the exploratory informal and structural knowledge models. These results indicate that the exploratory informal knowledge model has an excellent fit to the data. The standardized paths of the informal knowledge model are presented in Figure 2. This model includes significant direct paths from perceived importance of market knowledge and interpersonal trust to

Table III.
Fit indices for exploratory informal and structural knowledge models

Model	d.f.	$\chi 2$	NNFI	CFI	RMSEA
Exploratory informal knowledge model	6	5.39	1.000	1.000	0.000
Exploratory structural knowledge model	6	86.23	0.583	0.833	0.249

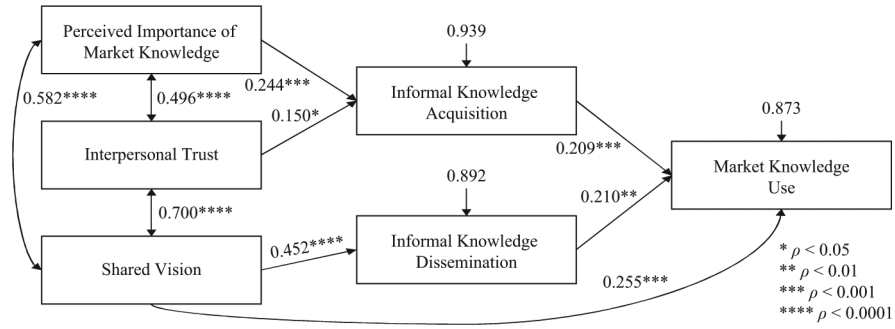

Figure 2.
Exploratory informal knowledge model

informal knowledge acquisition, and shared vision to informal knowledge dissemination and market knowledge use.

Table III also shows that the exploratory structural knowledge model has a poor fit to the data. These fit indices are better than those in the model that combined structural and informal knowledge, but they are still far below the minimum standards for the fit tests. The standardized paths of the structural knowledge model are presented in Figure 3. The exploratory structural knowledge model is shown in Figure 3. Structural knowledge acquisition has a small, yet significant, path to market knowledge use, whereas structural knowledge dissemination still has no significant path to market knowledge use. The perceived importance of market knowledge, and shared vision, has direct paths to structural knowledge acquisition and structural knowledge dissemination. As in the informal knowledge model, shared vision also has a significant direct path to market knowledge use. Notwithstanding the lack of model fit, the exploratory structural knowledge model met all structural equation modeling assumptions. The revised structural knowledge-model, was deemed statistically adequate, since the underlying distribution of the data has been assessed to be normally distributed. Therefore, meaningful observations could still be made from the analysis (Kaplan, 2000).

Discussion

The primary objective of this study was to develop and test a model of organizational learning that incorporates both informal and structural knowledge acquisition and

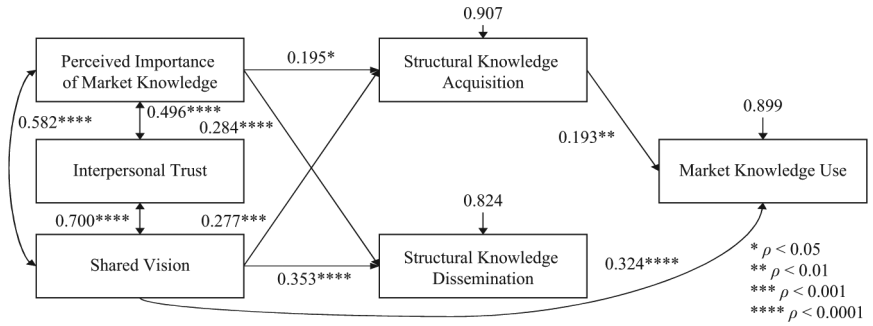

Figure 3.
Exploratory structural knowledge model

dissemination activities, as well as predictors of these activities. The discussion will first focus on the effect of informal knowledge acquisition and dissemination, and then, the predictors.

Effect of informal knowledge acquisition and dissemination

The findings suggest that informal knowledge acquisition and dissemination have significant paths to market knowledge use, whereas structural knowledge acquisition and dissemination have, at best, a weak association with market knowledge use. Although these results were based on exploratory analysis, they provide tentative evidence that informal knowledge processes are at least as important as structural knowledge processes in market-based organizational learning.

One reason why informal knowledge processes might have a stronger link than structural knowledge processes to market knowledge, as these exploratory results suggest, is that informal knowledge processes are more spontaneous and frequent than are structural knowledge processes. Boundary-spanning employees discover information from clients and competitors daily, whereas knowledge gathered through structural knowledge acquisition activities tends to occur much less frequently. Also, research suggests that employees tend to prefer an informal network of people than structural activities or mechanisms to acquire and share knowledge (Armistead and Meakins, 2002; Cross *et al.*, 2001; Jaworski *et al.*, 2002). Thus, compared with structural knowledge processes, informal knowledge processes likely capture more information over time and disseminate that information more frequently.

A second explanation is that informal knowledge processes are likely more compatible with the acquisition and dissemination of tacit knowledge. Through observation and casual conversations with external stakeholders, employees learn subtle information and share that knowledge with co-workers through observation and face-to-face communication. Structural knowledge processes, on the other hand, are mostly restricted to acquiring and transmitting explicit knowledge, such as customer attitudes measured from surveys and focus groups. This limitation is due to the impersonal nature of most data collection and relatively low media richness of the knowledge sharing process (such are market reports).

The previous arguments explain why informal knowledge processes would have a stronger link than structural knowledge processes to market knowledge, but why did the structural knowledge processes have a weak or negligible effect in this study whereas they were stronger in previous marketing studies? The answer may be that marketing studies typically combine structural knowledge acquisition and dissemination as a single construct (Jaworski and Kohli, 1993; Matsuno *et al.*, 2002). The problem with combining acquisition and dissemination is that the most widely acknowledged organizational learning models distinguish these two concepts (DiBella and Nevis, 1998; Huber, 1991). Furthermore, acquiring and sharing knowledge are logically distinct concepts and practices. In addition, this study reports that knowledge acquisition and sharing have unique predictors, which we discuss next.

Predictors of knowledge acquisition and dissemination

This study predicted that shared vision, interpersonal trust, and perceived importance of market knowledge would have unique significant effects on informal and structural knowledge acquisition and dissemination. Some of our hypotheses were supported, but

others were not. Given that the initial hypothesized model had a poor fit and subsequent results were exploratory, our discussion and conclusions regarding these relationships are necessarily tentative.

Shared vision was a significant predictor of informal knowledge dissemination as well as with both structural knowledge processes. The first observation is consistent with one of our hypotheses (*H6*) and previous organizational learning studies and contemporary knowledge management practice that shared vision is a key strategic building block in a learning organization (Goh, 1998; Van den Hooff *et al.*, 2003; Senge, 1990). A shared vision also implies strong team cohesiveness and/or organizational commitment, which motivates employees, to more actively share, organizationally beneficial knowledge (Chiu *et al.*, 2002). However, contrary to one hypothesis (*H5*), shared vision did not predict informal knowledge acquisition. One possible explanation is that shared vision provides guidance on knowledge processes, so would provide role clarity for structural knowledge activities as well as for employees to informally share what they learned. However, informal knowledge acquisition is more serendipitous; employees "bump into" knowledge more than actively search for it during their daily interactions with external stakeholders. They might not even actively remember some information, yet it later comes to mind and is shared when the value of that knowledge becomes apparent. Whereas employees actively choose to share knowledge informally, they have less choice regarding opportunities to acquire knowledge. Thus, shared vision would have little influence on informal knowledge acquisition.

The significant effects of shared vision on both structural knowledge processes were unexpected. Shared vision apparently plays a direct role in structural knowledge activities, not just the individual's voluntary and spontaneous knowledge gathering and sharing activities. Shared vision was also a direct predictor of market knowledge use. The explanation for this result could be that shared by vision provides sufficient guidance and motivation for employees to directly apply market knowledge in their daily activities. Being aligned with the general direction of the organization through a shared vision, employees no longer feel bound by standard operating procedures. Indeed, research suggests that employees experience more empowerment when they are psychologically connected to a shared mission or vision (Menon, 2001). A shared vision makes it easier for employees to directly apply market knowledge.

As predicted, interpersonal trust was not significantly associated with either of the structural knowledge processes. The hypothesized path to informal knowledge acquisition (H7) was significant, but minimally, and the hypothesized path to informal knowledge dissemination (H8) was not significant. These results are contrary to previous writing on the importance of trust on organizational learning activities (Botkin, 1999; Davenport and Prusak, 1998; Desouza and Awazu, 2003; Huemer *et al.*, 1998; Levin and Cross, 2004). One possible reason why interpersonal trust was not associated with informal knowledge processes in this study is its strong intercorrelation with shared vision. For example, these results may suggest that the effect of interpersonal trust on informal knowledge dissemination operates through shared vision.

Perceived importance of market knowledge has significant, although moderate, positive associations with structural knowledge acquisition and dissemination. These findings are consistent with our two hypotheses (*H9* and *H10*) and with previous

research (Deshpandé *et al.*, 1993; Kohli and Jaworski, 1990; Li and Calantone, 1998). If management emphasizes market knowledge, more structural knowledge acquisition and dissemination activities will be put in place to facilitate the market knowledge sharing. This linkage makes sense, because most of these structural knowledge activities, are controlled by management. Unexpectedly, perceived importance of market knowledge was also associated with informal knowledge acquisition. One possible explanation for this relationship is that perceived importance of market knowledge might increase employee mindfulness of knowledge acquisition opportunities.

Limitations

There are two key limitations to the present study. First, it is noted that the hypothesized model was not supported. This problem led to an exploratory analysis for the revised informal knowledge model and revised structural knowledge model. The Wald and Lagrange Multiplier tests were cautiously used for exploratory analysis to make the necessary conclusions to the research questions and hypotheses. Both revised models were optimized using the collected data and the discussion is based purely on exploratory analysis. Since this is an exploratory analysis that is entirely data-driven, the revised models need to be tested with a new set of data. Second, another limitation concerns two of the newly developed measures used in the study. While the new measures for informal knowledge acquisition and informal knowledge dissemination had acceptable reliability levels, more work needs to be done to further test and refine these informal knowledge process constructs.

Future research

Although the hypothesized model was rejected, this study's subsequent exploratory analysis offers tentative models of informal and structural knowledge processes. Future research is needed to test these models, as well as to determine the conditions and parameters that would allow an integrated model of both informal and structural knowledge processes. Similarly, although the results supported some of the hypothesized predictors of informal and structural knowledge processes, other hypotheses were not supported and some paths were unexpectedly significant. Future research is needed to further test the robustness of these observed relationships and flesh out the theoretical grounds for these relationships. Research also needs to test other relevant predictors of informal and structural knowledge processes. Although this study introduced three of the most widely discussed variables, others have been suggested and should be considered in future research.

Contribution to research and practice

This study has provided the foundation with help for researchers to better understand informal knowledge, and structural knowledge processes, and their antecedents. Along with crossing disciplinary boundaries in the study of organizational learning, this study developed new measures for informal knowledge acquisition and informal knowledge dissemination that should prove useful in future research. While previous studies focused on the structural activities of acquiring and disseminating knowledge (Conduit and Mavondo, 2001; Kohli *et al.*, 1993, Stone, 2000), the two new measures will help organizational learning researchers better understand and measure the full range

of knowledge acquisition and dissemination processes. Future research should further test and refine the two measures developed in this study. This is in line with Guilford's (1954) view that the progress of a discipline is determined by the extent to which the measures for its constructs have been successfully developed.

Conclusion

The results suggest that informal knowledge acquisition and informal knowledge dissemination are positively associated with organizational learning as measured by market knowledge use. This study also reports that informal knowledge dissemination increases with the level of shared vision. Based on these results, organizations intending to develop an organizational learning capability should focus on shaping a shared vision and continuously emphasize the importance of market knowledge to the organization's survival and success.

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About the authors

Siu Loon Hoe is an adjunct research fellow at UWA Business School, The University of Western Australia. His research interests are in organizational learning and boundary spanning. His publications have appeared in *International Journal of Organization Theory and Behavior, Journal of Information and Knowledge Management* and *Learning and Development in Organizations*. Siu Loon received his BSc from the National University of Singapore, and his MBA and PhD (management) from the University of Western Australia. He also holds a graduate diploma in Marketing Communications from the Marketing Institute of Singapore. Siu Loon is the corresponding author and can be contacted at hoesl@graduate.uwa.edu.au

Steven L. McShane is Winthrop Professor of Management in the Business School at the University of Western Australia. He earned his PhD from Michigan State University, a Master of Industrial Relations from the University of Toronto, and an undergraduate degree from Queen's University. He has written and published several dozen articles and conference papers on values, training transfer, organizational learning, exit-voice-loyalty, employee socialization, wrongful dismissal, media bias in business magazines, and other diverse topics. His work has appeared in *Journal of Occupational and Organizational Psychology*, *Industrial and Labor Relations Review*, *Rehabilitation Psychology*, and many other journals. He is also the lead co-author of several organizational behavior books, all of which are widely adopted by universities and colleges throughout the world.