FROM INDIVIDUAL TO ORGANIZATION - KNOWLEDGE SHARING WITHIN FIRMS AND KNOWLEDGE PROTECTION BETWEEN FIRMS

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The knowledge-based theory of the firm suggests that knowledge is the organizational asset that enables sustainable competitive advantage in hypercompetitive environments. Many organizations are developing information systems specifically designed to facilitate the sharing and integration of knowledge. Simultaneously, organizations exert themselves to protect their key knowledge from their competitors.

This dissertation aims to synthesize relevant theories on knowledge sharing and knowledge protection from multiple disciplines that advance our understanding of the factors that facilitate knowledge sharing within firms and impede imitation between firms. The dissertation consists of an introduction, conclusion, and three independent studies on different topics.

The first study investigated the antecedents to hierarchical knowledge sharing within organizations in China. The second one explored employees’ preference for different knowledge sharing tools. The third study analyzed organizational strategies to protect key knowledge against counterfeiters. Quantitative design, such as surveys, and qualitative method, such as interviews, were applied in this research. Through regression modeling and between-subject design, the empirical findings of the study on a medium-sized Chinese company (N=860) revealed antecedents to employees’ knowledge sharing with their supervisors. The identified independent variables that had direct effects were affect-based trust, power distance, and affect commitment. Power distance moderated the relationship between affect commitment and the knowledge shared with supervisors. In an attempt to identify the determinants of
employees’ usage of different knowledge sharing tools, between-subject design helped to identify the key effects of openness to give and seek knowledge, trust, and role-breadth self-efficacy. Finally, the third study suggests a comprehensive anti-counterfeit strategy model aimed at helping companies to understand different sources of threats within the unique Chinese environment. This strategy model is aimed at examining and improving companies’ existing corporate strategies against counterfeiting, and, lastly, it aims at developing and introducing new and effective approaches against counterfeiting. The model includes five different strategic perspectives: the marketing, channel, defensive, relationship, and surveillance perspectives. Implications for practice and suggestions for future research were drawn from the study findings.

KEYWORDS: knowledge sharing; knowledge sharing tools; hierarchies; trust; power distance; affective commitment; role breadth self-efficacy; knowledge protection; counterfeit, China
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INTRODUCTION

As the 21st century unfolds, global economy is changing into a knowledge economy (Davenport, Leibold and Voelpel 2006). Contrary to physical assets, which have been the traditional basis for obtaining competitive advantages, knowledge has been considered the most strategically important resource a company can possess (e.g., Grant 1996; Zander and Kogut 1995), since it represents intangible assets, operational routines, and creative processes that are hard to imitate (Liebeskind 1996). It is therefore not surprising that organizations encourage knowledge sharing among their employees and the application of that shared knowledge for work-related activities, which many researchers have identified as a vital source of competitive advantage (e.g., Kogut and Zander 1992; Nonaka and Takeuchi 1995; Teece, Pisano and Shuen 1997). In a competitive environment, the organization’s goal is considered a result of three imperatives: (1) an organization must produce new knowledge within itself; (2) an organization must share and diffuse knowledge within itself; and (3) an organization must bind knowledge to the firm; that is, prevent knowledge from being exposed to opportunistic behavior of competitors for the organization to retain its core proprietary assets (Kale, Singh and Perlmutter 2000). Unique knowledge is considered the most fundamental source of above-normal returns (Spender 1996; Teece 1998). If this knowledge or the firm’s trade secrets are weakly protected by law, as is the case in most emerging markets, firms risk losing their valuable information without proper strategies to protect their knowledge. How a firm accomplishes these goals is essential for companies to survive in today’s
knowledge economy. The amount of knowledge shared within an organization depends on the specific strategy that an organization adopts to maximize the use of its knowledge resources. Meanwhile, in the face of the knowledge hazards they may encounter, organizations have to be fully aware of the effects of strategies on knowledge leakage, especially in the specific legal environment to which they are subject. Organizations may also adopt a strategy of restricting their knowledge to a few employees, or they may want to share it as much as possible to provide an innovative environment.

The aim of this research is to, first, identify the research gap in knowledge sharing and in knowledge protection in extant research. Second, it aims to synthesize the relevant theories on knowledge sharing and protection from multiple disciplines that advance understanding of the factors that facilitate knowledge sharing within firms and impede imitation.

As shown in Figure 1, the dissertation is organized as follows: the next section presents a literature review of the management literature on factors that influence knowledge sharing within firms and knowledge protection between firms. This section provides a comprehensive summary of alternative views on knowledge diffusion within firms, the usage of different tools within firms for knowledge exchange within firms, and firms’ strategies to bind key knowledge to the firm. This is followed by three separate articles on these perspectives. The first article focuses on the key antecedents for employees to engage in knowledge sharing with their supervisors in a Chinese organizational context, while the implications for firms adopting corresponding strategies are specified at the end of this paper. The second article aims at identifying the key determinants for employees
to use different knowledge sharing tools, and the antecedents to employee’s preferences for various tools. The last paper identifies organizational strategies to protect their key knowledge in emerging markets that have a relatively weak legal environment regarding Intellectual Property laws. The final section of this article provides a summary and the discussion of general the conclusions of this work.

**Figure 1. Dissertation structure**

**KNOWLEDGE**

The Oxford English Dictionary defines knowledge as: (1) expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject, (2) what is known in a particular field or in total; facts and information and (3)
awareness or familiarity gained by experience of a fact or situation. However, there is no single agreed upon definition of knowledge in management literature (e.g., Davenport, Jarvenpaa and Beers 1996).

In management literature, knowledge is viewed from five perspectives: (1) a state of mind, (2) an object, (3) a process, (4) a condition of having access to information, and (5) a capability (Alavi and Leidner 2001). Schubert and colleagues (1998) define knowledge as a state or fact of knowing, with knowing being a condition of understanding gained through experience or study. Subsequently, knowledge can be defined as the sum or range of what has been perceived, discovered, or learned. This perspective focuses on enabling individuals to expand their personal knowledge (Alavi and Leidner 2001). The second view defines knowledge as an object (Carlsson et al. 1996; McQueen 1998; Zack 1998) that can be regarded as something that is stored and manipulated. The third viewpoint classifies knowledge as a process of simultaneously knowing and acting (Carlsson et al. 1996; McQueen 1998; Zack 1998). The process perspective focuses on the application of expertise (Zack 1998). The fourth view regards knowledge as a condition of access to information (McQueen 1998). According to this view, organizational knowledge must be organized to facilitate access to and retrieval of content. Finally, knowledge can be viewed as a capability that has the potential to influence future action (Carlsson et al. 1996). Watson (1999) builds upon the capability view by suggesting that knowledge is not so much a capability for specific action, but the capacity to use information. Moreover, learning and experience result in an ability to interpret information and to ascertain what information is necessary in decision making.
These different views of knowledge lead to different perceptions of knowledge management (Carlsson et al. 1996). Since the first two articles of this research focuses on knowledge flow and the processes of creation, sharing, and the distribution of knowledge, it falls within the process perspective on knowledge. Consequently, this study follows Davenport and Prusak’s (1998) definition of knowledge, which classifies it as a fluid mixture of framed experiences, important values, contextual information, and expert insight. This classification provides a framework for evaluating and incorporating new experiences and information. The last article of this research handles counterfeiting issues, which focuses on products. As a result, knowledge in the third article falls within the object perspective.

KNOWLEDGE SHARING

Organizations are more productive when they are able to successfully create the conditions in which knowledge is shared by potential providers and then actively put to use by the recipients of new knowledge (Argote et al. 1990; Baum and Ingram 1998). Wolf and Egelhoff, for example, have found out that firms with a worldwide functional and product division tend to have more intensive intra-company transfer, for a global coordination across all manufacturing operations within a company or within a business area. Consequently, it is not surprising that scholars from several different fields have actively studied knowledge management (Nonaka 1994; Nonaka, von Krogh and Voepel 2006). For example, strategy and organizational learning researchers have considered the knowledge management issue the firm level (e.g., Cole 1998; Kogut and Zander 1996; Nonaka and Takeuchi 1995; Spender and Grant 1996), while information technology (IT)
and organizational design researchers have considered organizations as systems that enable knowledge exchange (e.g., Alavi and Leidner 2001; Pentland 1995). Organizational behavior researchers and social psychologists have in turn considered interpersonal issues and the role of group dynamics in knowledge management (e.g., Bartol and Srivastava 2002; Moreland and Myaskovsky 2000; Stasser and Titus 2003).

The discussion below assesses extant literature on these perspectives of knowledge sharing and identifies the resultant research gaps. These quite different perspectives of the motivations of knowledge sharing can roughly be termed organizational issues. These issues include companies’ strategy and culture to promote knowledge sharing, individual issues such as employees’ motivators, and technical issues such as the applications of knowledge sharing tools. With regard to knowledge sharing, Dyer and Nobeoka’s (2000) definition is adopted, which defines knowledge sharing as activities aimed at helping communities of people work together, facilitating the exchange of their knowledge, enabling learning orientation, and increasing the ability to achieve individual and organizational goals.

**Knowledge Sharing and Organizational Level Factors**

Organizational knowledge is contingent upon the firm’s ability to institutionalize individual-based knowledge with the intention of making it available to other organizational members (Szulanski 1996). The promotion of knowledge sharing does not simply involve the enhancement of employees’ knowledge sharing capabilities or the installation of an electronic document system. Research concerning the factors that affect knowledge sharing has identified a number of organizational variables. Researchers and
practitioners increasingly acknowledge that the success of knowledge-sharing initiatives depends fundamentally on the existence of senior managers promoting knowledge-sharing environments (Gupta and Govindarajan 2000; Macneil 2001; Hislop 2003). A survey by Lin and Lee (2004) also found that senior managers’ attitudes towards knowledge sharing behavior positively influence intentions to encourage knowledge sharing. Furthermore, Stoddart (2001) identified several factors that are essential for launching a successful knowledge-sharing strategy, namely that the strategy must fit the organization’s needs, and that it must complement the organization’s strategic objectives. Moreover, previous knowledge management research indicated that the organizational climate (Bartol and Srivastava 2002; Lin and Lee 2004; Bock et al. 2005), and organizational culture (Martiny 1998; Kelloway and Barling 2000) can often be an important facilitator of knowledge sharing. According to extant research, knowledge sharing should not be perceived as difficult; therefore research encourages a social interaction culture (Lin and Lee 2006). When employees are embedded in a strong social network, they are motivated to share knowledge with their colleagues (Huysman and Wit 2004).

Nevertheless, even when knowledge sharing is actively promoted, many companies fail to establish a knowledge sharing environment (e.g., Davenport, De Long and Beers 1998), since employees are concerned about loss of power and put self-interest first (Jarvenpaa and Staples 2001). Consequently, individual-level determinants have a significant role in knowledge sharing. In the following section, extant research on individual factors will be reviewed.
Knowledge Sharing and Individual Determinants

Research concerning individual factors that affect knowledge sharing has identified a number of “social” issues, such as employee characteristics (Bock and Kim 2002; Connelly and Kelloway 2003; Ryu et al. 2003), organization commitment, role breadth self-efficacy, and job autonomy (Cabrera, Collins and Salgado 2006). Lin (2007) identified employees’ extrinsic motivations – such as reciprocal benefits – as well as intrinsic motivations – such as knowledge self-efficacy and enjoyment from helping others – as determinants of employees’ knowledge sharing attitudes and intentions.

In their research, Hansen, Mors, and Lovas (2005) suggest that knowledge sharing should be separated into different phases (e.g., knowledge seeking and providing), while the properties that have a positive or negative effect on outcomes in one phase, such as knowledge transfer, may have the opposite or no effect on outcomes in other phases. Moreover, in their attempts to develop a clearer understanding of the knowledge sharing and utilization process between providers and recipients, researchers from different disciplines identified the critical role of motivation (e.g., Argote and Ingram 2000; Alavi and Leidner 2001; Hansen 1999; Goodman and Darr 1998; Spender and Grant 1996; Szulanski 1996; 2000). For instance, previous studies suggested that knowledge providers’ motivation is important for them to engage in the effort and time required for the transfer of knowledge and to overcome their concerns regarding the ownership of information (Davenport and Prusak 1998; Goodman and Darr 1998; Hansen et al. 2005; Kostova 1999).
Similarly, researchers have begun examining how motivational factors influence the extent to which recipients seek out, accept, and utilize external knowledge (Hayes and Clark 1985; Levin and Cross 2004; Mayer et al. 1995; Szulanski 1996). In addition, results show that the same variable has a different effect on knowledge sharing when the relationship between the knowledge seekers and providers differs. For example, Bock and colleagues (2005) discovered that reward does not affect individuals who engage in knowledge sharing. However, Quigley, Tesluk, Locke, and Bartol (2007) noticed that group-based incentive structures are essential for group members to engage in knowledge sharing. Prior studies on the relationship between the knowledge provider and seeker consistently observed that knowledge sharing is positively related to factors such as strong ties (Wellman and Wortley 1990), co-location (Allen 1977; Kraut et al. 1990), demographic similarity (Pelled 1996), status similarity (Cohen and Zhou 1991), and a history of a prior relationship (Krackhardt 1992). This indicates that researchers should pay special attention to the relationship between knowledge seekers and providers, which may determine the impact of some variables on the final sharing behavior.

**Obstacles to Sharing Knowledge**

The determinants of as well as the barriers to attain efficient knowledge sharing have been identified in extant literature. Some of these concern knowledge and the ability of knowledge receivers and/or providers, some are technological (e.g., information system technology and design), while others relate to people’s behavioral inclinations and their responses to control systems (Bukowitz and Petrash 1997; O’Dell and Grayson 1998).
Thus, reported initiatives notwithstanding, the level of knowledge sharing within most firms still tends to be low (Davenport et al. 1998).

Research has identified numerous barriers of knowledge transfer, including knowledge tacitness (Teece, 1986), the limited absorptive capacity of knowledge receivers (Szulanski, 1996), knowledge providers’ perceptions of competition (Hansen, Mors, and Lovas, 2005; Tsai, 2002), and the lack of trust between providers and receivers (Levin and Cross, 2003). Many reasons have been examined for withholding knowledge, including data manipulation (e.g., Merchant 1990), biasing communications to create budgetary slack (e.g., Chow et al. 1988), and escalating resource commitment to failing courses of action (e.g., Harrison and Harrell 1993). In addition, studies have examined the effects of management’s control (e.g., audits and performance evaluation/reward systems) over such behavior (Baiman 1990; Ghosh 1997). Riege (2005) summarized 17 potential individual barriers, 14 organizational barriers, and 8 potential technology barriers to knowledge sharing.

**Knowledge Sharing Tools**

A new aspect of knowledge management is the potential use of modern information technologies (e.g., the Internet, intranets, browsers, data warehouses, data filters, and software agents) to systematize, facilitate, and expedite firm-wide knowledge management. Previous knowledge management research indicated that technical issues, such as technologies and tools, are often important facilitators of knowledge sharing (Stoddart 2001). Furthermore, researchers identified advanced information and
communications technology (ICT) applications and network systems as the primary drivers of organizational knowledge sharing (Pan and Leidner 2003).

Electronic networks that focus on knowledge exchange frequently emerge in fields where the pace of technological change requires access to knowledge, which is unavailable within any single organization (Powell et al. 1996). Since the introduction of email and voice mail within organizations in the 1990s, some research has distinguished between computer-mediated communication (CMC) and old-fashioned communication channels, finding a variety of antecedents to their concomitant use (e.g., Trevino, Webster, and Stein 2000; Rice 1992). Picot, Ripperger, and Wolff (1996), for example, have analyzed the consequences of the appearance of information and communication technologies and argued that this lead to the boundaries of the firm to fade altogether, as firms develop more complex linkages among themselves and begin to adopt market-like mechanisms within themselves. The usage of CMC is influenced by (1) environmental characteristics; (2) the ways in which decisions are made and actions are taken; (3) the involved individuals’ previous experience; and (4) the methods used to acquire and process information (e.g., Daft and Weick 1984; Rice, Grant, Schmitz and Torobin 1990). For example, with regard to task urgency, the choice of an asynchronous medium was found to be positively associated with task urgency (Picot, Klingenberg and Kranz 1982; Steinfeld 1986), and negatively with recipient availability (Rice and Aydin 1991; Reinsch and Beswick 1990). Electronic networks have been found to support organizational knowledge flows between geographically dispersed coworkers (Constant et al. 1996) and distributed research and development efforts (Ahuja et al. 2003). In
addition, these networks assist cooperative open-source software development (Raymond 1999; Von Hippel and Von Krogh 2003) and open congregation on the Internet for those interested in a specific practice (Butler 2001; Wasko and Faraj 2000).

However, as the management of many organizations has discovered, the availability of electronic communication technologies does not guarantee knowledge sharing will take place (Alavi and Leidner 1999; Orlikowski 1996). One of the problems with accessing knowledge from acquaintances and unknown others, is that it requires individuals to depend on the "kindness of strangers" (Constant et al. 1996). Despite a growing interest in online cooperation and virtual organizing, there is surprisingly little empirical research on the communication and organization processes of electronic networks, or how participating in these networks relates to sharing knowledge (Lin 2001).

Extant research on the evaluation of the usage of knowledge management tools focuses mostly on formal and informal knowledge sharing tools. Early research, dating back to Pelz and Andrews (1966), Mintzberg (1973), and Allen (1977), indicates that when gathering information, people prefer to turn to other people rather than documents. More recently, this tendency was also found even when people have good access to the Internet and their firm’s extensive intranet. For example, in their empirical study, Cross and Sproull (2004) discovered that managers receive information from other people far more frequently than from impersonal sources, such as their PC archives, Internet or databases.

**Research Gap**
Researchers have highlighted the importance of the relationship between the knowledge seeker and provider. Subsequently, they discovered that the same factors have different effects on knowledge sharing because relationships between knowledge providers and seekers differ. Nevertheless, little attention has been paid to hierarchical relationships in knowledge sharing. In particular, knowledge sharing between subordinates and their supervisors has gained special importance due to the rapid increase in employee responsibilities and autonomy in modern teamwork-oriented organization settings (Bennis and Townsend 1997; Kirkman and Rosen 1999). In addition, the inherent tension between workers and their supervisors regarding who owns and controls knowledge may impact workers’ willingness to share their knowledge (Storey and Barnett 2000). Owing to these specifics in the hierarchical relationship between supervisors and subordinates, theories on horizontal knowledge sharing in organizations cannot properly explain the vertical sharing behavior between hierarchies. For example, openness to experience has been identified as having a positive correlation with knowledge sharing, because the individual’s curiosity and originality could lead to seeking other people’s insights (Cabrera et al. 2006). However, this seeking behavior could be hindered in those employees with high power distance within a relationship with unequally distributed power. Currie and Kerrin (2003) point out that in organizations, employees’ knowledge sharing not only comprises normative but also political characteristics. In this context, subordinates may be reluctant to disclose their knowledge due to power relations, disputes regarding property rights to the knowledge, and job insecurity. However, no research has empirically disentangled the specificities of knowledge sharing across
hierarchies. Consequently, there is an urgent need to uncover this black box and analyze the forces that drive subordinates to share knowledge with their supervisors.

The author identified a shortage of literature on employees’ preference for different knowledge sharing tools as another research gap. Despite the emphasis on and interest in formal and informal mechanisms for knowledge sharing when studying the knowledge sharing and utilization process, there are several limitations in the existing literature. First, little systematic attention has been paid to the conditions determining which tools are preferred by which group of employees for purposes of knowledge sharing. Extant research focuses mostly on CMC. However, recent knowledge management systems are well beyond mere CMC in the sense that many new communication channels have been developed and, together with old channels, they have been systematically structured to cater to organizations’ needs. Second, there are no coherent, integrated theoretical frameworks of the determinants that explain recipients’ and providers’ different motivations for utilizing knowledge sharing tools. Existing findings may be incomplete to the extent that explanatory properties that have a positive or negative effect on the outcomes of recipients, may have the opposite or no effect on the outcomes of providers.

The first two studies aim at covering these two research gaps and extending this dissertation’s theoretical understanding of knowledge sharing phenomena. In addition to the theoretical contribution, this research enables human resource management practices to mediate a functionally based organizational structure and knowledge sharing instrument within firms.
KNOWLEDGE PROTECTION

In this section, the author discusses how firms bind key knowledge. Given key knowledge’s significant role, firms will inevitably develop specific organizational mechanisms to address the problem of binding this knowledge. Organizations rely on legal mechanisms and organizational strategies to appropriate and control critical knowledge resources. Legal systems, such as patent, trademark, and copyright laws, prevent the abuse of intellectual property rights (IPR). Apart from IPR, many other legal regimes have significant but indirect effects on a firm’s ability to appropriate and control knowledge resources. Legal rules and contract laws that govern employment agreements are also important for knowledge management. In addition, Professional Conduct rules may prevent unwanted knowledge transfer. Other examples are accounting and tax benefits for employee stock options, which high-tech firms vigorously defended as a critical mechanism for retaining knowledgeable employees. However, even in countries that apply these mechanisms, legal protection is not perfect, imitation is widespread, and important information often leaks, even during a new product’s development process (Mansfield, Schwartz and Wagner 1981; Mansfield 1985). This problem has been exacerbated by developing countries, some of which have not signed international treaties on the protection of intellectual property rights, and others that have laxly enforced domestic laws and regulations designed for this purpose (Benko 1987).

Of the various limitations, this study addresses the counterfeiting of IPR infringement cases, since it is extremely hazardous to society as a whole. Counterfeiting has developed into an economic problem of international significance. Global sales of counterfeit
products are estimated at $300 billion (Gentry et al., 2006; Chaudhry and Walsh, 1996), and the International Chamber of Commerce states that counterfeit products account for 8% of world trade (Freedman 1999).

The Quality Brands Protection Committee, which is an anti-piracy body under the auspices of the China Association of Enterprises with Foreign Investment, claims that government statistics show that counterfeit products outnumber genuine products in the Chinese market by 2:1. Moreover, no product categories are left unscathed (Shultz and Saporito, 1996). Clearly, counterfeiting has become a significant economic phenomenon.

Counterfeiting differs from legal imitation or reverse engineering in that it is an infringement of IPR. Reverse engineering is the process of discovering the technological principles of a mechanical application through an analysis of its structure, function, and operation (WIPO). Moreover, it is the main method in which competitors’ product technologies are learnt (Patel and Pavitt 1995). Similarly, firms imitate others in an effort to maintain their relative position or to neutralize the aggressive actions of rivals. In his study of the Japanese innovation system, Freeman (1987) revealed the widespread use of reverse engineering in the 1950s and 1960s. In particular, he identified the Japanese integrated approach to product and process design as one of the major sources of Japan’s competitive success. More recently, Hobday et al. (2004) emphasized the importance of imitation skills, and develop technological learning strategies that have helped Korea develop into a technological leader (see also Kim 1993). Studies of industrial history show that the US has also reverse engineered technologies imported from Britain, which
evolved into substantial original scientific research (Nelson and Winter 1982; Nelson 1993; Church 1999).

By definition, counterfeits are those products that bear a trademark, which is identical to, or indistinguishable from, a trademark registered to another party, thus infringing the rights of the holder of the trademark (Chaudhry and Walsh 1996; Grossman and Shapiro 1988a, b). There are three different types of counterfeiting. In first type, counterfeit goods are those that imitate a legitimate product’s legal trademark, copy the packaging, and duplicate the products. The second type of counterfeiting is a copy of a legitimate product’s packaging or trademark, but changes the original product’s style completely, replacing it with a new design, color or material, and including other details, for example, a mobile cover shaped like a Ferrari. The third type of counterfeiting is to deliberately apply a trademark or use packaging that resembles that of the original product to confuse consumers, for example, a coffee bar that uses the same color scheme and logo as Starbucks.

While previous research classified counterfeit products into deceptive and non-deceptive counterfeiting (Grossman and Shapiro 1988a; 1988b), Bosworth (2006) suggested that a spectrum of deception should be considered. This spectrum runs from “super-deceptive,” which refers to branded and counterfeit goods that appear identical to the genuine product, to “completely non-deceptive,” which means that all buyers can distinguish the counterfeit from the genuine article. The quality of counterfeits has certainly improved over the years and it is becoming increasingly difficult for consumers to identify them (Gentry et al. 2006). The extent to which consumers will be deceived by counterfeits
depends on their awareness, knowledge, and experience. Consumers’ perceptions may vary according to the quality and utility of the counterfeit in comparison to the genuine product (Gentry et al. 2001).

Although counterfeiting has kept the media busy for a long time, academic research into this area is insufficient. In general, the research on counterfeiting as an obstacle has been conducted from three angles: from the buyer’s side to prevent consumers from buying, from the seller’s side to offer suggestions on various tactics to impede copying, and from a regulatory side to call for appropriate regulations against counterfeiting on a national and international level. This study focuses on the first two perspectives. Evaluating IPR’s effectiveness and suggesting improvements lie outside the scope of this research.

**CONSUMER MOTIVES**

Previous research revealed that about one-third of consumers would knowingly purchase counterfeit goods (Tom et al., 1998). Since demand is always the key driver of a market, a number of researchers have argued that consumers’ demand for counterfeits is one of the leading causes of the existence and upsurge in the growth of the counterfeiting phenomenon (e.g., Gentry et al., 2001; Ang et al., 2001). As a direct result of these arguments, quite a few research have focused on identifying important factors that influence consumers to choose counterfeits (e.g., Phau et al. 2001; Gentry et al. 2006; Wee et al. 1995; Harvey and Walls 2003; Eisend and Schuchert-Güler, 2006).

At first glance, it seems that consumers purchase counterfeit products primarily due to their low price. This would imply that counterfeits are primarily attractive to low income
consumers. However, although they can afford the genuine brands, high income consumers in well-developed countries also purchase counterfeits (Gentry, Putrevu, and Shultz 2006; Prendergast, Chuen, and Phau 2002). Empirical research that investigated the determinants of counterfeit purchases indicated antecedents other than the financial motive as possible explanations for the conscious purchase of counterfeits. In addition, many established theories have been applied to investigate consumers’ behavior, such as the theory of reasoned action (Chang 1998; Christensen and Eining 1991; Woolley and Eining 2006), the theory of planned behavior (Chang 1998; d’Astous, Colbert, and Montpetit 2005), the expected utility theory or deterrence theory (Peace, Galletta, and Thong 2003), the equity theory (Glass and Wood 1996), Bandura’s social cognitive theory (Kuo and Hsu 2001), and theories of ethical decision making (Thong and Yap 1998; Wagner and Sanders 2001).

Eisend and Schuchert-Güler (2006) carried out an extensive literature review on consumers’ motives for their intentions to purchase counterfeit goods. According to them, extant research has investigated a large variety of counterfeit products, e.g., CDs, VCDs, software, shirts, designer shoes, wallets, handbags, watches, jewelry, perfume, sunglasses, accessories, apparel, books, pain relievers, auto parts, cameras, and TVs. They mostly fall under what Shultz and Saporito (1996) describe as low-cost products that are easy to manufacture and sell quickly. As far as methodology is concerned, most studies are based on quantitative designs, while only a few studies apply a qualitative approach (Gentry et al. 2001). According to Eisend and Schuchert-Güler (2006), the identified determinants can be grouped into four categories (as shown in Figure 2):
(1) Product variables and price, for example, product type, price levels (Albers-Miller 1999), expected performance of the product (Cordell, Vongtada and Kieschnick 1996), physical appearance, design, durability, brand status, popularity (Prendergast et al. 2002; Bloch et al. 1993; Wee et al. 1995), perceived fashion content, physical appearance, image, durability (Wee et al. 1995), failure rate of counterfeits (Chakraborty et al. 1997), expected performance of the product, branding for low investment-at-risk products (Cordell, Wongtada, and Kieschnick 1996), and the real monetary price of the authentic goods (Harvey and Walls 2003).

(2) Vendor characteristics, for example, store reputation (Block et al. 1993), perceived shopping environments (Leisen and Nill 2001), and retailer prestige regarding high investment-at-risk products (Cordell, Wongtada, and Kieschnick 1996).

(3) Social and cultural context variables, for example, cultural differences in black markets (Harvey and Walls 2003), social influences (Ang et al. 2001), peer pressure (Albers Miller 1999), anti-piracy campaigns (Schlegelmilch and Stöttinger 1999), social influences such as informative and normative susceptibility (Wang et al. 2005), the perceived magnitude of the consequence, the perceived social consensus, and perceived proximity (Chiou, Huang, and Lee 2005).

(4) Demographics and psychographic variables, for example, country-of-origin (Chakraborty, Allred, and Bristol 1996; Chakraborty et al. 1997), value consciousness, integrity, personal gratification, age, education, income (Ang et al. 2001; Cheung and Prendergast 2006; Kwong et al. 2003; Wang et al. 2005), ethnocentrism (Chakraborty, Allred, and Bristol 1996; Moores and Chang 2006), self-image (Bloch et al. 1993), past
purchase experience (Kwong et al. 2003; Tom et al. 1998), readiness to take a risk (Wang et al. 2005; Tan 2002; Penz and Stöttinger 2005; Wee et al. 1995), fashion, involvement, ethical predisposition (Tan 2002; Penz and Stöttinger 2005), price consciousness, access to counterfeits (Penz and Stöttinger 2005), collectivism, novelty seeking (Wang et al. 2005; Wee et al. 1995), and materialism (Wee et al. 1995).

Figure 2. Framework summarizing the main categories of antecedents, moderators, and consequences of the volitional purchase of counterfeit products. Source: Eisend and Schuchert-Güler (2006)

These non-price determinants provide interesting data that companies can apply in their protection activities. These activities are aimed at challenging the counterfeiters’ price-based offers, since the price is not an issue that manufacturers of original brands can
address without risking financial losses or a depreciation of the brand image. Even though much research has been done on the demand side, efficient enforcement against counterfeiters remains the seller’s responsibility, i.e. the individual firms (Globerman, 1988). Consequently, this research focuses on these firms’ confronting of counterfeiting.

The literature on companies’ strategies against counterfeiters is addressed in the following section.

Researchers have developed various models for combating counterfeiting. Liu et al. (2005) provided industrial administration offices with a ‘newsvendor’ model with which inventory managers can be monitored and commercial cheating can be prevented. Commercial cheating refers to inventory managers’ practice of ordering counterfeit and low-quality products at greatly differing set-up costs and selling them as genuine products. Liu et al.’s article recommends a combination of random examination and different punishment levels to limit commercial cheating. Chaudhry and Walsh (1996) present a model that depicts the process that firms employ to evaluate an entry strategy decision with regard to the target market’s counterfeit environment.

The marketing strategies proposed to counter the growing problem of counterfeiting range from differentiating products, emphasizing quality and appearance, showing consumers how to differentiate between a genuine product and a fake one, and creating a prestigious image of purchasing a genuine product. Emphasizing the possible embarrassment that a consumer could experience when found to have purchased a counterfeit product has also been suggested (Wee et al., 1995; Delener, 2000; Harvey, 1987; Harvey and Ronkainen, 1985). Other suggested measures are: to provide products
that can be uniquely identified and to cleverly package and mark products, for instance, special spouts to prevent the refilling of bottles. Firms can also use holograms, apply hidden chemical fingerprints and other hidden markers (Harvey and Ronkainen 1985; Delener 2000; Chaudhry and Walsh 1996), withdraw from certain markets (Harvey and Ronkainen 1985), develop better relations with the distribution channels (Olsen and Granzin 1993), monitor and provide channel members with financial incentives to reject counterfeits (Harvey 1987), lobby the government for stronger anti-counterfeiting laws (Harvey and Ronkainen 1985; Brooks and Gellman 1993), form anti-counterfeiting coalitions with other firms (Delener 2000), and establish resources to search for counterfeit products in consumer markets (Harvey 1987; Harvey and Ronkainen 1985).

In addition, some literature on IP infringement also provides insights into anti-counterfeit strategies. Yang et al. (2004) provide an anti-piracy strategy model, which includes proactive approaches, means of networking, and defensive weapons. Even though the paper deals mostly with IP abuse and the strategies mostly apply to multinationals in China, some approaches are helpful for companies battling counterfeiting.

**RESEARCH GAP**

There is a significant research gap in respect of counterfeiting. This gap is mainly due to three reasons. First, many researchers have questioned the effectiveness of the current approaches towards counterfeiting (e.g., Thurow 1997; Vaidhyanathan 2001). In fast-moving technology-intensive industries, legal remedies tend to be too slow and too costly to regulate complex technological developments and their associated intellectual property
and ownership rights (Deakin and Wilkinson 1998). Furthermore, researchers have argued that the whole approach of defending IPR is simplistic since it applies the same rule to all types of products in all types of industries (Thurow 1997). For example, developing countries’ need for low-cost pharmaceuticals is not equivalent to their need for low-cost CDs. Any system that treats such needs equally, as our current system does, is neither a good nor a viable system (Thurow, 1997; Vaidhyanathan, 2001).

Second, despite the large body of research on consumers’ motives for purchasing counterfeit goods, deceptive and non-deceptive counterfeit goods have hardly caught researchers’ attention in respect of applying different strategies to counter the specific motive. Consumers are either aware, suspicious, or unaware that a purchased product is counterfeit. Accordingly, strategies that the seller can implement to prevent aware and unaware consumers have different focuses. Current research rarely addresses this issue and applies the same strategies to prevent all types of consumers from buying counterfeit products.

Third, on an international scale, these successful cooperative efforts are almost always aimed at companies in western countries, although the counterfeiting industry mostly flourishes in developing countries, such as China (Bush et al., 2001). Subsequently, companies that are located in China need to react quickly, as the above-mentioned research was conducted in developed countries and the recommendations have a limited effect in the Chinese legal environment. To date, national and international companies located in developing countries have no specific anti-counterfeiting strategies.
CONCLUSION

In this research, the author presented a discussion of knowledge sharing, knowledge sharing tools, and knowledge protection against counterfeiting that was based on a review, interpretation, and synthesis of a broad range of relevant literature. Several general conclusions could be drawn from the work.

The literature review revealed the complexity and multi-faceted nature of knowledge sharing. Different knowledge and taxonomy perspectives of determinants that employees can use to engage in knowledge sharing were reviewed and discussed. Special attention was paid to the relationship between knowledge seekers and providers since this relationship can eliminate some determinants, which is necessary when knowledge seekers and providers have multiple relationships. Thus, no single or optimum model can be developed of the antecedents of organizational knowledge sharing. Various relationships in organizations need to be explored to effectively deal with the diversity of the antecedents’ types and attributes.

Drawing on the various IT tools and facilities that organizations provide, informal and formal knowledge sharing tools play a variety of roles in support of organizational knowledge sharing. This paper’s literature review section presented specific examples of how these tools support knowledge sharing. By drawing on various and flexible IT capabilities, it is important to note that current knowledge sharing tools can lead to various forms of support, which extends beyond the traditional storage and retrieval of
coded knowledge. However, not all of these tools have been applied by employees and, consequently, the reasons for employees’ preferences remain unexplored.

The author presented research questions regarding the protection of organizational key knowledge and of counterfeiting. These questions could form the basis of future research.

Knowledge sharing, knowledge sharing tools, and the protection of key knowledge are popular topics in several fields of study, including strategic management and organizational theory, as well as information systems. Consequently, it is important that researchers are aware of, understand, and build upon the already significant work of large extant literatures.

This will provide the diversity of perspectives and approaches that the study of such a multifaceted and complex phenomenon requires. The author argues that, in large global firms in hypercompetitive environments, organizations’ knowledge will be interlaced with knowledge management strategies – which include the related sharing cultures and tools – as well as with their knowledge protection strategies. This is based on the observation that, in these firms, knowledge sharing processes span time and geographic distance. The combination of this time and distance span and the need for very short cycle times for product/service development, innovation, and for reacting to competitors’ imitation, necessitates strategies to promote knowledge sharing and protect knowledge. Consequently, the author believes that the role of strategies that promote knowledge sharing and impede competitors’ imitations of organizational knowledge ought to receive considerable scholarly attention and become a focal point of inquiry. The author trusts
that the ideas, discussion, and research issues set forth in this paper will stimulate interest and future work in the knowledge management area.
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HOW MUCH DO I TELL MY BOSS?

KNOWLEDGE SHARING BETWEEN HIERARCHICAL LEVELS IN CHINA

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ABSTRACT

This study examines the antecedents of knowledge sharing between supervisors and subordinates in China. We hypothesize that the amount of knowledge shared by employees with their supervisors is determined by the subordinates’ characteristics and their interpersonal relationships within organizations. Findings from a study at a Chinese medium-sized company (N=860) revealed that the amount of knowledge shared between subordinates and supervisors was positively correlated with affective commitment and affect-based trust and negatively with power distance. The relationship between affective commitment and the knowledge shared with supervisors was moderated negatively by power distance.

Key words: knowledge sharing; China; supervisor; trust; power distance; affective commitment
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INTRODUCTION

Knowledge is regarded as the strategically most important resource (e.g., Grant 1996; Zander and Kogut 1995). Knowledge sharing is therefore a major challenge for organizations (O’Dell and Grayson 1998; Geppert and Clark 2003), since organization’s ability to facilitate sharing and utilizing knowledge is regarded as critical for organizational effectiveness (e.g., Bock and Kim 2002; Kogut and Zander 1996; Nonaka 1994; Nonaka and Takeuchi 1995; Nonaka, von Krogh and Voelpel 2006; Tsai 2001; von Krogh, Ichijo and Nonaka 2000).

Within this research tradition, subordinates’ knowledge sharing with their supervisors has gained special importance due to the rapid increase in employees’ responsibility and autonomy in modern teamwork-oriented organizational settings (Bennis and Townsend 1997; Kirkman and Rosen 1999; Strauss 1963; Lam, Huang and Snape 2007). Prior studies on knowledge sharing in general have identified a multitude of influential characteristics that specify the relationship between knowledge providers and seekers. Strong ties (Wellman and Wortley 1990), co-location (Allen 1977; Kraut, Egido and Galegher 1990), demographic similarity (Pelled 1996), status similarity (Cohen and Zhou 1991), and a history of prior relationship (Krackhardt 1992) have all been found to influence the amount of knowledge shared. However, several aspects, which have not been considered in horizontal knowledge sharing, need to be examined when considering hierarchical knowledge sharing. The inherent tension between workers and their supervisors over who owns and controls knowledge may affect workers’ willingness to share their knowledge (Storey and Barnett 2000). Currie and Kerrin (2003), for example,
point out that employees’ knowledge sharing comprises not only normative, but also political characteristics. In this context, subordinates may be reluctant to disclose their knowledge to supervisors for reasons such as loss of power, disputes regarding property rights, change of political status, and job security.

Due to these specifics in the hierarchical relationship between supervisors and subordinates, theories on horizontal knowledge sharing in organizations cannot properly explain the vertical sharing behavior between hierarchical levels. There is an urgent need to examine the phenomenon of knowledge sharing between hierarchies and, especially, the driving forces that lead subordinates to share knowledge with their supervisors. We start addressing this issue by comparing the difference between knowledge sharing within hierarchies and from subordinates to supervisors; we thereafter identify the specificity of hierarchical knowledge sharing in the People’s Republic China (PRC), and expand our hypotheses based on this analysis. We subsequently test our hypotheses with survey data from the field. The data, statistical method, and variables are described in detail in the methodology section, which is followed by the results, discussion, and conclusion.

THEORY AND HYPOTHESES

KNOWLEDGE SHARING WITHIN AND BETWEEN HIERARCHICAL LEVELS

Consistent with prior research, we adopt a broad definition of knowledge as an organized body of information, data, intelligence, or advice (Huber 1991). In this sense, in our research, knowledge sharing with supervisors refers to the process of sharing subordinates’ work-related information, data, experience and suggestions with
supervisors. This sharing behavior is, consequently, a discretionary activity that originates from subordinates.

Increasing empirical evidence from horizontal knowledge sharing points to the importance of individual and individual-related factors as critical to knowledge processes (e.g., Andrews and Delahaye 2000; Quinn, Anderson and Finkelstein 1996), and have identified antecedents on three important domains: the organizational level, interpersonal level, and knowledge itself. Researchers from the field of strategy, organizational learning (e.g., Kogut and Zander 1996; Nonaka and Takeuchi 1995), information technology (IT), and organizational design (e.g., Alavi and Leidner 2001; Pentland 1995) have examined organizations as systems that enable knowledge exchange. On the interpersonal level, organizational behavior and psychology researchers have studied interpersonal issues, such as individual characteristics, coworker characteristics, and supervisors’ influence on knowledge management (e.g., Bartol and Srivastava 2002; Moreland and Myaskovsky 2000; Stasser and Titus 2003). Finally, work tasks, which are mostly associated with different types of knowledge, have also been intensively examined for their effects on knowledge sharing results (Daft and Macintosh 1981; Haas and Hansen 2007).

Different from horizontal knowledge sharing, the transfer of knowledge from subordinates to supervisors comprises several perspectives that have not yet been examined. Many researchers point out that a loss of power due to knowledge contribution is a barrier to knowledge sharing (Gray 2001; Thibaut and Kelley 1986). Consequently, the determinants of knowledge contribution behavior is complicated when the knowledge
contributor is more disadvantaged in terms of power than the knowledge provider. Power
distance plays an important role in employees’ behavioral outcomes in a hierarchical
relationship (Hofstede 1980). Power distance refers to the degree to which individuals
feel authorities should be respected and shown deference (Earley and Gibson 1998). We
postulate that power distance orientation, which concerns the extent to which employees
perceive their status relative to that of their supervisors and behave accordingly, will
influence the amount of knowledge shared by subordinates with supervisors, and may
also restrain other determinants. This would be specifically distinct in those countries
with a high power distance, such as in the People’s Republic of China (PRC).

The PRC is a country in which personal relationships play an important role (Pearce
2001) and which particularly emphasizes harmony, interpersonal relationships, and group
loyalty (Hui and Tan, 1996). In China, “personalism” (Redding 1990) or a relationship
with people fosters a stronger linkage with behavioral outcomes within organizations
than it does in other societies (Chen, Tsui and Farh 2002; Hui, Lee and Rousseau 2004).
Many studies have discovered that employees in the PRC are more inclined to consider
employment as a relationship with specific members of their organization, particularly
with their supervisors (Pearce 2001; Hui, Lee and Rousseau 2004). For example, leader
member exchange (LMX) in China has been found to play a greater role in organizational
citizenship behavior than perceived organizational support (Becker, Billings, Eveleth and
Gilbert 1996; Chen and Francesco 2000). In the PRC, the vertical link between a
supervisor and subordinate is specifically more likely to be emotional and employees
consider employment a relationship with supervisors instead of organizations.
Employees with a high power distance accept hierarchal structures and paternalistic leadership, often obeying orders without questioning and seldom taking the initiative to approach their supervisors (Chen and Fahr 2001). Factors that have been identified as determinants of horizontal knowledge sharing may therefore fail to explain hierarchical knowledge sharing in the PRC. For example, openness to experience has been identified as having a positive correlation with knowledge sharing, because the individual’s curiosity and originality could lead to the seeking behavior of other people’s insights (Cabrera et al. 2006). However, this seeking behavior of employees with a high power distance could be hindered in a relationship in which power is unequally distributed.

Another distinction of knowledge transfer from subordinates to supervisors is the rationale for knowledge sharing. Besides the motives found in horizontal knowledge sharing, subordinates also share their knowledge with supervisors with the expectation of obtaining work-related resources from their supervisors, such as advancement, compensation, supervision, a work contract, or more work duties. For example, Law and colleagues (Law, Wong, Wang and Wang 2000) have ascertained that supervisor-subordinate Guanxi in the PRC affects the supervisor’s administrative decisions, such as job assignment and promotion.

A further unique feature of the knowledge transfer from subordinates to supervisors is the influence emerging from the relationship between subordinates and their colleagues. For example, Sherony and Green (2002) have revealed that the interaction between subordinates and other coworkers has a strong impact on the subordinates’ knowledge
exchange with their supervisors. Especially in China, co-worker relationship plays an important role in organizational context.

Chinese have a stronger sense of responsibility for and obligation toward those who are close to them than Westerners do (Wong, Wong and Ngo 2002). Emotional bonds with team members could increase employees’ loyalty to and feeling of responsibility for their co-workers. Employees in the PRC are motivated to cooperate with their co-workers to complete their work. Employees’ feeling of responsibility for other team members regarding completing work could help increase their feeling of responsibility for the organization as a whole, which is conceptualized as their supervisors in the PRC. Consequently, their interaction with co-workers could impact the knowledge shared with their supervisors and, therefore, one of our research foci.

In the following section, we focus on the effects of co-worker relationships and power distance, which highlight the distinction between horizontal and hierarchical knowledge sharing. Furthermore, affective commitment will be investigated regarding its impact on knowledge shared with supervisors and its mutual effects with power distance on knowledge transfer to supervisors.

**Affective Commitment of Employees**

Affective commitment refers to the extent to which workers identify with the goals of their organization and intend to pursue those goals to the best of their ability (e.g., Mowday, Steers and Porter 1979). Employees with high affective commitment are likely to attend work regularly, perform tasks to the best of their ability, and exert extra effort to
help others (Meyer and Allen 1991). Consequently, affective commitment (AC) could contribute to employees’ knowledge sharing with their supervisors. Instead of normative commitment and continuous commitment, which actually refer to anticipated turnover behavior, AC has been chosen as another of this paper’s foci, because it represents employees’ actual attitude towards their organizations (Solinger, Van Olffen and Roe 2008). It is also a key indicator of their work integration (Meyer, Stanley, Herscovitch and Topolnytsky 2002; Mowday, Porter and Steers 1982) and the most validated dimension of organizational commitment (Cohen 2003; Allen and Meyer 1996; Meyer et al. 2002).

Employees develop affective commitment to a firm to the extent that it allows them to achieve important goals and to satisfy their primary needs (Angle and Perry 1981; Meyer and Allen, 1997). Since it is positively related to individuals’ willingness to exert extra effort at their workplace (Meyer and Allen 1997) and readiness to help others (Meyer et al. 2002; Shore and Wayne 1993), affective commitment is consequently expected to be linked to the willingness to contribute and receive knowledge (Van den Hooff and Van Weenen 2004). However, studies on the effects of organizational commitment on horizontal knowledge sharing have only found it to be associated with intention to share knowledge and many have failed to find its link to actual sharing behavior. Cabrera et al. (2006), for example, have found a positive association between organizational commitment and willingness to share knowledge horizontally. However, they could not predict its association with actual knowledge sharing behavior when other organizational and system variables are included. Jarvenpaa and Staples (2000) have also discovered
that both organizational commitment and knowledge sharing propensity are positively associated with beliefs about the organizational ownership of knowledge.

Employees with strong AC believe their values match those of their employer and feel emotionally attached to and identify with their organizations. They consider themselves responsible for ensuring that the organization’s goals are achieved and therefore actively communicate and cooperate with their supervisors to contribute to this goal. In addition to this responsible attitude, employees with strong AC feel they have been treated well by their employer in terms of, for example, safe conditions and fair compensation. This feeling of being treated well results in affective attachments to and favorable behavior in respect of the employer (e.g., Riketta 2002; Shore and Wayne 1993). Supervisors are employees’ direct link to their employers and the direct recipient of employees’ demonstrations of affective attachment to their employers. This could include employees voluntarily informing their supervisor of key knowledge they have accumulated, their active involvement in solving problems, and their participation in decision-making in respect of the organization’s goals.

**Hypothesis 1 (H1). Employees who have a higher affective commitment (AC) share more knowledge with their supervisors.**

**AFFECT-BASED TRUST**

Trust has been chosen as one of the foci in this study because it has not only been recognized by researchers from various disciplines as the key indicator of a number of important benefits for organizations (e.g., Dirks and Ferrin 2001), but it also differs in
collectivist and individualist societies. The degree to which employees trust in-group members more than out-group members is greater in the PRC than in western countries (Huff and Kelley 2003). If trust exists, people are more willing to share useful knowledge horizontally (Andrews and Delahay 2000; Penley and Hawkins 1985; Tsai and Ghoshal 1998), as well as to listen to and absorb others’ knowledge (Carley 1991; Mayer et al. 1995). By reducing conflicts and the need to verify information, trust also contributes to making knowledge transfer less costly (Currall and Judge 1995; Zaheer et al. 1998).

Many researchers point out that trust has a multi-faceted nature (e.g., Lane 1998; Lewicki and Bunker 1996; Lewis and Weigert 1985). McAllister (1995), for example, distinguishes between cognition-based trust and affect-based trust. Trust is cognition-based in that individuals choose whom they will trust in which respects and under what circumstances. They base the choice on what they take to be ‘good reasons,’ which constitute evidence of trust-worthiness (Lewis and Wiegert 1985). Affect-based trust is the confidence one places in another on the basis of feelings generated by the level of care and concern someone demonstrates (Johnson-George and Swap 1982; Rempel et al. 1985). The essence of affect-based trust is the reliance on others, which is based on emotions. Consequently, affect-based trust will be another of this paper’s foci.

Group members provide one another with social support and feelings of personal worth (Sherif and Sherif 1964). Similarly, in groups that are cohesive, stable, and effective, members have well-developed exchanges leading to feelings of loyalty and trust (Jacobs 1970). Consequently, Dooley and Fryxell (1999) reveal that affect-based trust promotes the full processing of information within groups. Sherony and Green (2002) argue that
the relationship among the team members is affected by the degree to which members feel involved in the team and their work. With affect-based trust, employees feel that they are integrated into the team and involved in the teamwork. Consequently, they can contribute a great deal of their knowledge to the team members, including their supervisors. Moreover, employees who have emotional bonds with team members perceive that a group is working toward a common goal, which reduces conflicts and biased speculations, especially when employees have task disagreements with their supervisors. Affect-based trust tends to reduce potential conflicts with supervisors, which definitely promotes knowledge sharing from subordinates to their supervisors.

As long as risk is concerned with knowledge sharing with supervisors, affect-based trust is likely to shape employees’ perceived risk of sharing their knowledge. Employees may withdraw from a knowledge exchange if they feel they can benefit more from hoarding their knowledge rather than by sharing it (Davenport and Prusak 1998). In this respect, emotional attachment may imbue employees with the desire to assist their colleagues, including their supervisors, instead of seeking power for themselves. Especially in the PRC, this emotional attachment could lead to a stronger sense of responsibility and obligation towards the team as a whole (Wong, Wong and Ngo 2002). Consequently, employees with affect-based trust may share what they know with their supervisors.

*Hypothesis 2 (H2). Employees who have more affect-based trust in their colleagues share more knowledge with their supervisors.*

**Power Distance**

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Power distance (PD) is defined as the extent to which an individual accepts the unequal distribution of power in institutions and organizations (Clugston et al. 2000: 9). It has been studied both at the individual level in the management literature (Dorfman and Howell 1988; Earley and Erez 1997; Farh, Hackett and Liang 2007) and at the societal level (Hofstede 1980). We explore the impact of power distance on individuals, as many studies have found that power distance’s effects on individuals vary greatly and that these differences have direct effects on many outcomes (Farh, Hackett and Liang 2007; Clugston et al. 2000; Kirkman and Shapiro 2001).

Employees with a low power distance orientation are likely to have strong personal connection with authorities and have a better understanding of authorities with whom they deal (Tyler et al. 1996). Consequently, they are inclined to frequently communicate with their supervisor and share knowledge. Hofstede (1991) argues that when power distance is low, employees perceive little emotional distance between their supervisors and themselves. Hence, they interact with their supervisors, solicit information, and offer advice. Conversely, employees with a high power distance are hesitant to confront their bosses with disagreement, questions, or input, and are more inclined to accept top-down styles of management. They may feel that even if they were to opt for upward confrontation, the higher-status supervisor may discount their ideas, regarding these as from people with less ability and competence (e.g., Silver, Cohen and Crutchfield 1994). The status characteristics theory (Berger et al. 1977) predicts that lower-status members are unlikely to voice their own ideas, alternative suggestions or opinions, and are even reluctant to disagree with the alternatives proposed by the person with higher status (Van
der Vegt, Van de Vliert and Huang 2005; Silver, Cohen and Crutchfield 1994). In essence, a high power distance may be manifested by employee behavior reflecting deference to authority and obedience (Yang et al. 2007). Consequently, there is little communication between such supervisors and subordinates, and employees will not approach their supervisors to exchange knowledge. In addition, the disclosure of key technical information is especially risky for lower-level employees, as they have few means of building a power basis other than with their highly specialized knowledge, which makes them strategically important within firms. In such cases, knowledge sharing with supervisors is blocked.

*Hypothesis 3 (H3). Employees with a higher power distance (PD) share less knowledge with their supervisors.*

**The Moderating Effect of Power Distance**

Kim and Mauborgne (1998) and Culnan and Armstrong (1999) argue that the rules of social exchange govern knowledge sharing. Social exchange theory argues that people collaborate to gain desired resources through social reciprocity (Tyler 1999). Individuals participate in social exchanges to maintain future relationships, the balance of power and image in a society. Power distance’s effect is contrary to that of social exchange theory (Brockner et al. 2001; Lam et al. 2002; Lee et al. 2000). Subordinates with a high power distance are less likely to rely on the reciprocity norm than their counterparts with a lower power distance with respect to their knowledge contributions due to their strong
deference to authority. Similarly, power distance impacts also on the effects of AC and affect-based trust in regards to the knowledge transfer from subordinates to supervisors.

Employees may be highly committed or high in affect-based trust. Nevertheless, if they do not overcome the barrier between their supervisors and themselves, they are inclined to work hard but do not pass their knowledge on to their supervisors. Employees with a high power distance rely on autocratic or majority rule decision making and are reluctant to trust one another (Hofstede 1991, 2001). However, if employees are high in affective commitment or affect-based trust and, simultaneously, low in power distance, knowledge sharing with their supervisors will be maximized. Figure 1 shows our research model with the five hypotheses.

Hypothesis 4 (H4). Individual power distance moderates the relationship between AC and knowledge sharing with supervisors, such that AC is more strongly related to knowledge sharing with supervisors when PD is low.

Hypothesis 5 (H5). Individual power distance moderates the relationship between affect-based trust and knowledge sharing with supervisors, such that affect-based trust is more strongly related to knowledge sharing with supervisors when PD is low.

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METHOD

SAMPLE AND PROCEDURE

Samples were drawn from a medium-sized, private-owned company located in China with about 2000 employees. The company is located in central China and has little influence of western working style and values. In addition, the company was setup as a private-owned company from the beginning, which make it somewhat free of government influence. Furthermore, the company structure makes it ideal to examine hierarchical knowledge sharing. The employees work in small groups of an average of four to five people.

First, the research began with 12 interviews with company employees and managers. The goal of this first step of the qualitative research was to ascertain the general information regarding knowledge sharing. Following this initial phase, we set up the questionnaire and translated it into Chinese. We then showed the questionnaire to some native Chinese speakers both within and outside the chosen company and adapted some sentences and words in keeping with the Chinese culture. This adaptation approach is recommended by Tsui, Nifadkar and Ou (2007) and Farh, Cannella and Lee (2006) to ensure construct validity. Third, a translation and back-translation procedure (Brislin 1980) was applied to ensure that the Chinese version and the English version were equivalent. Fourth, a pilot study was conducted with 25 people before the questionnaire was sent to selected departments in the organization.
For anonymity’s sake and especially to elicit honest answer from the employees, we sent out the printed 1100 questionnaires randomly to employees. In addition, we received strong support from the company’s executive management. Together with the management, we emphasized that the employees’ participation was highly important for the improvement of the company as well as for the research. The employees were informed that they had one week to fill out the questionnaire. Some of the questionnaires could not be used for data analysis due to too much missing data. Ultimately, 860 surveys were used for the final data analysis, giving a response rate of 78%. No pattern could be established regarding non-response bias.

The participants were mostly females (57.8%), middle-aged (41% were between 36 and 45 years of age) and most (70%) had more than 10 years’ tenure in the company. The sample included managers (23%), clerical staff (73%), others (2%), while the remaining 2% did not answer this question.

**Measures**

*Affective Commitment.* We applied the eight-item, 7-point Likert-type scale on AC developed by Allen and Meyer (1990). A sample item from the scale is: “I would be very happy to spend the rest of my career with this organization.” In our study, Cronbach’s alpha for this scale was 0.75. The scale anchors were “strongly disagree,” “disagree,” “slightly disagree,” “not sure,” “slightly agree,” “agree,” and “strongly agree.”
Power Distance. To measure power distance at the individual level, we adopted the six-item measurement developed by Dorfman and Howell (1988), which was also used in the study by Farh et al. (2007). In our study, the Cronbach’s alpha for this scale was 0.68.

Affect-based Trust. We adapted the scale from McAllister’s (1995) to measure affect-based trust (3 items), based on their high loadings in the original publication’s factor analysis (0.89, 0.82, 0.81 for affect-based trust). The original questionnaire by McAllister contained 25 items designed to measure behavioral responses associated with trusting or distrusting peers. The respondents reported on the extent to which they agreed that certain actions described their behavior toward a specific peer on a 7-point scale. Examples are: “I can talk freely to this individual about difficulties I am having at work and know that (s)he will want to listen.” We wanted to measure a particular person’s general trust with regard to his or her team members, which included co-workers and supervisors. We replaced “this individual” in the questionnaire with “the people with whom I work.” In our study, Cronbach’s alpha for affect-based trust was 0.64.

Knowledge Sharing with Supervisors. To assess employees’ knowledge sharing with their supervisors, we adapted the four-item knowledge sharing scale by Faraj and Sproull (2000), initially measuring individual perceptions of the extent of knowledge sharing with team members. We replaced “team members” with “my supervisor” in the questionnaire that we used, which is an established procedure to adapt scales to specific purposes (e.g., Eisenberger et al. 2002; Hutchison; 1997; Rhoades et al. 2001). In this study, Cronbach’s alpha was 0.68 for this scale.
Control variables. We controlled for several factors to rule out alternative explanations for the findings (Becker 2005). First we controlled for social desirability (Crowne and Marlowe 1960), which might have an impact on the respondents’ answering behavior in this setting in which the respondents’ relationships with their supervisors is analyzed. We included an 8-item version of the social desirability scale by Crowne and Marlowe (1964), which is also suggested by many researchers (Strahan and Gerbasi 1972; Greenwald and Satow 1970). The construct items were scattered in the survey (Podsakoff, Mackenzie, Lee and Podsakoff 2003; Spector 2006). Second, gender, age (5 categories), tenure within the company, tenure in the current position, education, the business unit (8 categories), and career level (4 levels) comprised our primary demographic control variables. Third, we controlled task characteristics of knowledge sharing. Task has been recognized as one of the determinants to knowledge sharing (Straub and Karahanna 1998; Kanawattanachai and Yoo 2007). Especially task interdependence (Jarvenpaa and Staples 2000), task analyzability, and task variety (Daft and Macintosh 1981) have been closely associated with use of information media and processed information. We asked the experts in the organization to evaluate task interdependence, task analyzability, and task variety in eight departments with respects to three career levels. The three task characteristics in eight departments on three different career levels (3 x 8 x 3 = 72 questions) were evaluated with 7-point Likert scales. We did not evaluate the top executive level regarding task characteristics due to an insufficient number of questionnaires received. We asked 10 experts from the company to assess the task characteristics, of which nine could be used for analysis. The overall intra-class
correlation coefficient (ICC) for task characteristics was 0.69, in which task analyzability was 0.59, task variety 0.85, and task interdependence 0.38.

**Data Analyses**

We first created two dummy variables for gender in the data analysis. For a guarantee of anonymity, the option was given in the questionnaire for participants to omit certain of the demographic variable questions in the questionnaire, which could have led to a disclosure of identity. The downside of this procedure was a relatively low percentage of usable data in respect of some demographic variables. We have 4.2% missing data on gender and 14.1% of the participants indicated that they did not want to disclose their gender. Consequently, two dummies were created. In addition, eight dummy variables for different departments were entered in the regression model. We then applied the expectation maximization (EM) algorithm (Dempster et al. 1977) to deal with our low number of missing values, which produces less bias than list-wise deletion (Graham and Donaldson 1993; Malhotra 1987; Muthen, Kaplan and Hollis 1987) or pair-wise deletion (Muthen et al., 1987). Thereafter, we mean-centered the dependent variables before applying regression analysis to test moderation effects (Aiken and West 1991; Echambadi and Hess 2007).

In this study, individual respondents were nested in work teams (Bliese and Hanges 2004; Kozlowski and Klein 2000). The structure is hierarchically nested such that there may exist homogeneity within the colleagues, who have the same supervisor. This may lead to underestimated standard errors and the likelihood of finding erroneously significant
parameters in regression models. Based on a recommendation by Thomas and Heck (2001), we first calculated the design effect (DEFF) (Kish 1965) of the dependable variable and the effective sample size in order to account for non-independence in the data. The design effect is defined as:

$$DEFF = 1 + (\text{average number of persons in a team} - 1) \times ICC,$$

where ICC (intra-class correlation coefficient; Shrout and Fleiss 1979; McGraw and Wong 1996) captures the amount of variance attributable to group membership. We obtained ICC values from comparable studies on knowledge sharing within teams. There is no agreed-upon guideline on the cut-off value for acceptable ICCs; consequently, we adopted the ICC value by Faraj and Sproull (2000), from whom we also adapted the knowledge sharing scale for our dependable variable. The ICC was 0.32. Thereafter, we calculated the average group size based on the organizational structure and the study’s response rate – an average of 4.5 persons in a team in this study. Subsequently, we calculated the DEFF value. Based on the calculated design effect, we adjusted the standardized error in the regression model according to the following equation:

$$SE_{\text{ComplexSample}} = SE_{\text{SimpleRandomSample}} \times \sqrt{DEFF}.$$

Afterwards, the new $t$ ratios were calculated based on these DEFF-adjusted standard errors (for details, see Thomas and Heck 2001). Consequently, our effective sample size is 490 instead of 860 participants.

RESULTS
DESCRIPTIVE STATISTICS

Table 1 presents the individual-level descriptive statistics and zero-order correlations. Note that the correlation matrix does not account for the fact that individual-level relationships might be affected by the non-independent nature of the data. Table 2 presents the results of three regression models in which the dependent variable is knowledge sharing with supervisors. Model 1 contains all the control variables and exhibits an adjusted R-square of 0.10. In model 2, the hypothesized direct effects are added to the model. The adjusted R-square of this model increases to 0.30 (F=12.7; p<0.001). In model 3 (F = 12.21; p < 0.001), the interactions were included and the adjusted R-square rose to 0.29.

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INSERT TABLE 1 ABOUT HERE

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INSERT TABLE 2 ABOUT HERE

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MAIN EFFECTS OF AC, PD AND AFFECT-BASED TRUST (H1, H2 AND H3)

AC had a highly significant, positive effect on knowledge sharing with supervisors (b=0.37, p<0.001). Thus, H1 is fully supported. Affect-based trust had a significantly
positive effect (b=0.11, p<0.05), which supports H2. PD had a significantly negative
effect with a standardized beta of -0.11 (p<0.05). Therefore, H3 is also supported.

**Moderating Effects of PD and Cognition-based Trust (H4, and H5)**

Model 3 in Table 2 shows the moderating effects of power distance. More specifically, in
support of H4, it shows that power distance is significantly moderated in the predicted
direction (b=−0.13, p<0.05). The interaction term’s significant negative effect confirmed
our hypothesis 4 that the relationship between AC and knowledge sharing with
supervisors is low rather than high if the power distance is high. The moderating effect of
power distance on the relationship between affect-based trust and knowledge sharing
with supervisors was not significant (b=0.08); consequently, our data failed to support
H5.

To further clarify the interaction effects of power distance, we examined separate simple
slopes depicting the relationships between AC and knowledge sharing with supervisors as
well as power distance. Separate plots were drawn for individuals whose scores on the
moderator were one standard deviation below the mean, at the mean, and one standard
deviation above the mean (Aiken and West 1991).

Figure 2 presents the interaction effect in respect of power distance and AC on
knowledge sharing with supervisors. The graph shows that the slopes (betas) of power
distance. The beta was 0.21 (p<0.001) for the low power distance group and 0.12
(p<0.001) for the high power distance group.
DISCUSSION

The objective of this study was to investigate knowledge sharing between hierarchical levels in a Chinese organizational context, and test the key determinants of upwards knowledge sharing from subordinates to supervisors. As pointed out before, hierarchical relationships have not yet been analyzed regarding knowledge sharing and few theoretical perspectives can provide a comprehensive explanation of knowledge transfer by means of vertical processes. Given the importance of understanding the phenomena of employees’ knowledge sharing with their supervisors, it is essential for researchers to consider how existing theories on horizontal knowledge sharing help us understand these issues and whether we might need to create new theories or modify existing ones to better understand them.

THEORETICAL IMPLICATIONS

This work contributes to the extant literature in several ways. First, consistent with previous research showing that organizational commitment results in openness to knowledge sharing (Cabrera et al. 2006; Jarvenpaa and Staples 2000; Van den Hooff and Van Weenen 2004), and that the intention to share knowledge leads to actual sharing behavior (Bock and Kim 2002), this study provides further evidence of AC’s decisive
effect on knowledge sharing with supervisors in China. Employees’ emotional attachment to organizations influences the amount of knowledge shared with supervisors directly and strongly. This is due to employees realizing that they will be sharing their knowledge in an environment where doing so is appreciated and where their knowledge will actually be used, thus eventually benefitting their organization (Hall 2001; Van den Hooff and Van Weenen 2004). As the link between employers and employers, supervisors are the direct recipient of employees’ demonstrations of affective attachment to their employers. This phenomenon is particularly prevalent in the Chinese organizational context as employees relate more to their direct supervisors than to the organization (Hui, Lee and Rousseau 2004). They consequently show their reciprocity and favorable behavior to their direct supervisors.

Our second contribution lies in extending our understanding of the Chinese organizational context and identifying co-worker relationships’ effects on hierarchical knowledge sharing. In line with previous theories that interpersonal trust is associated with horizontal knowledge transfers (Kanawattanachai and Yoo 2007; Szulanski et al 2004), our results suggest that affect-based trust in team members leads to upward knowledge sharing with supervisors as well. By suggesting that trust influences how people interpret and/or evaluate information provided by others (Dirks and Ferrin 2002; Jarvenpaa et al. 2004), our findings are also consistent with the social motivation theory perspective (Geen 1991) as well as with the leader-member exchange theory, which suggest that LMX is also determined by co-worker exchange (Sherony and Green 2002). This finding is significant for leadership studies, particularly in the Chinese
organizational context. Trust in team members is also decisive for knowledge-sharing behavior with supervisors.

The third theoretical contribution of this study lies in demonstrating that knowledge sharing within a hierarchical relationship is predicted by understanding how individuals accept the unequal distribution of power within firms and how this power distance interacts with other decisive variables. In line with the previous theory that employees with a high power distance would be reluctant to directly seek performance feedback from their supervisors (Sully de Luque and Sommers 2000; Morrison, Chen and Salgado 2004), we have also identified the negative direct effect of power distance on knowledge sharing with supervisors. Our results also support researchers who suggest that power, as a human basic value, transcends other specific actions and situations (Schwartz 1992, 2006). Power guides the selection of actions and determines whether sharing is worthwhile or should be avoided. Power distance’s negative moderating effect on AC and knowledge sharing with supervisors was premised by previous research on power distance, which found that social exchange theory explanations for employee attitudes and behaviors are less applicable to individuals with a high power distance (Brockner et al. 2001; Lam et al. 2002; Lee et al. 2000). Employees with a low power distance and high AC have a personalized relationship with supervisors and a psychological attachment to the company. Consequently, they are likely to voice their opinions and engage in knowledge exchange with their supervisors. These findings suggest that even though employees are obligated to report to and communicate with their supervisors, power distance plays an important role in determining how much they share with them.
We did not find support for the interaction of affect-based trust and power distance. Consequently, H5 could not be supported. Judging from the result, the interaction of employees’ perception of power distribution in the company and their relationship with colleagues doesn’t impact the knowledge shared with supervisors. An interesting finding to this was that this moderation effect was present before we adjust the new $t$ ratios according to the DEFF adjusted standard errors. Thus, the failure for supporting H5 could be because the effect of the sample size is not large enough.

**PRACTICAL IMPLICATIONS AND FURTHER RESEARCH**

Several practical implications can be drawn from our study. Our findings suggest that the amount of knowledge shared with supervisors is influenced by employees’ perception of their status in the hierarchy, their emotional attachment to organizations, and their emotional bonds with team members. Affective commitment could be improved by showing support for and care in respect of employees, recognizing their values and goals, consistently highlighting their and company’s common goals and future, and other steps that enable employees to perceive that they are supported and taken care of by the company. Simultaneously, it is advisable to widespread the norm of organizational ownership of information (Jarvenpaa and Staples 2001). This norm implies that an information outcome of work – such as an idea, process, invention, document, or computer program that an employee creates or acquires at work or by using organizational resources – actually belongs to the employer rather than to the employee. Companies emphasize that knowledge acquired and created on the job is a “public” good.
and it follows that employees should make it public to their fellows employees and especially their supervisors.

Another practical implication is based on our finding that the extent to which employees share their knowledge with supervisors is influenced by their power distance. Specifically, our results suggest that organizations should create a flat and direct communication style within a company. Managers should be concerned with ways of sharing knowledge with their subordinates with a high power distance. One alternative strategy is to emphasize employees’ duty to accept work role responsibilities and to maximize knowledge sharing with their supervisors in the interest of maintaining social harmony. It should be highlighted that their contribution to knowledge sharing is of great interest to the organization and their supervisors. The success of such an approach was evidenced during our data collection. Together with the management team, we conveyed the message that the employees’ participation would be of great help to the company and would be highly appreciated by the management team. In addition to the high response rate to our questionnaire, many suggestions for the company were also given by employees in the survey.

Finally, it is also important for organizations to build affect-based trust between employees and to promote trust within teams. A trust-building process between teams has been suggested by many researchers (e.g., Jassawalla and Sashittal 1999). We therefore want to underline that in a society with a high power distance, the supervisor plays an important role in trust building between team members. Supervisors’ emphasis of team
harmony could greatly reduce the conflict within teams, while their initiatives to promote affect-based trust could have a strong influence.

**LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH**

This study has a number of limitations that future research might address. To begin with, we have used a cross-sectional analysis to assess all the variables. Consequently, we could not isolate all the conditions that might occur in real organizational settings. A longitudinal research study would, consequently, reduce dependence on temporal dynamic relationships. We also note that in an organizational context, strategic decision making may be more complex than was captured here. Employees may face greater risks when sharing knowledge versus withholding it. In some organizations, both sharing valuable knowledge and admitting to needing information may be perceived as risky (Borgatti and Cross 2003, McEvily et al. 2003). Future research could examine the influence of these risk levels with regard to employees’ decision to share knowledge with their supervisors. This perspective could be extended to investigating the different knowledge exchange channels, namely informal and formal channels and, subsequently, weighing the risks and benefits that employees perceive as associated with applying these different knowledge-sharing channels.

Furthermore, to guarantee absolute anonymity, we were unable to design the study with matched self-ratings to other sources, for example, peer ratings or information from personnel records. This might lead to common-method variance that could threaten the validity of the results (Podsakoff et al. 2003). We therefore adopted Podsakoff and
colleagues’ (Podsakoff et al. 2003) procedural remedies, such as separating the dependent and independent variables, allowing the respondents’ answers to be anonymous, and assuring the respondents that there are no correct or wrong answers (for details also see Spector 2006). The study could have been improved if data from additional sources had been used to supplement the self-ratings. Future research might assess each concept in a more process-oriented way and have ratings from different sources. This could be extended with an investigation of dyadic knowledge sharing in a supervisor-subordinate relationship and examining whether upward and downward knowledge transfers have different determinants.

Finally, some Cronbach’s alpha in our study were below .70, a rule of thumb for construct reliability. Cultural or other factors could have led to these scales not working that well in our research settings. This could also be due to some constructs having relative small numbers of items, resulting in relatively moderate coefficients (Cronbach 1951; Voss, Stem and Fotopoulos 2000). However, we regarded it as a limitation of our research and encourage further research to overcome this. In addition, the study was conducted in only one company and thus one industry; hence, the study could be influenced by organizational or industrial specifics. Therefore, future research could investigate the conditions under which these findings can be generalized to knowledge workers in other organizational culture settings.

CONCLUSION
The results from this study add to the growing literature on knowledge sharing and utilization by providing insight into knowledge sharing within a hierarchical relationship. In particular, by applying various existing theories on organizational commitment, interpersonal trust, and power distance on the individual level, our findings constitute a contribution to the development of an integrative, systematic model predicting knowledge sharing by subordinates. We encourage researchers to continue utilizing a comprehensive approach to develop a more complex understanding of hierarchical knowledge sharing and, ultimately, utilization.

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Strahan, R., K.C. Gerbasi. 1972. Short, homogeneous versions of the Marlowe-Crowne 


Zhou, J., J.J. Martocchio. 2001. Chinese and american managers’ compensation award decisions:
|   | M   | SD   | 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  |
|---|-----|------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | Age | 2.65 | 0.89 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2 | Tenure | 4.43 | 1.06 | 0.64** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 3 | Education | 4.96 | 1.49 | 0.43** | 0.60** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 4 | Position | 3.71 | 0.54 | -0.31** | -0.17** | 0.02 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 5 | Male | 0.58 | 0.49 | 0.13** | 0.09** | 0.03 | -0.16** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 6 | Female | 0.24 | 0.43 | -0.11** | -0.03 | -0.03 | 0.08* | -0.66** |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7 | Social desirability | 19.58 | 2.79 | 0.06 | 0.02 | 0.01 | -0.06 | 0.02 | 0.01 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 8 | Marketing Dpt. | 0.00 | 0.05 | -0.01 | -0.04 | -0.01 | -0.02 | -0.06 | 0.09* | -0.03 |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 9 | Operation Dpt. | 0.02 | 0.14 | 0.05 | 0.01 | -0.04 | -0.08* | -0.05 | 0.06 | -0.01 | -0.01 |     |     |     |     |     |     |     |     |     |     |     |
| 10 | Engineer Dpt. | 0.04 | 0.21 | -0.06 | -0.08* | -0.02 | -0.01 | -0.02 | 0.06 | 0.07* | -0.01 | -0.03 |     |     |     |     |     |     |     |     |     |     |
| 11 | Accounting Dpt. | 0.01 | 0.08 | -0.02 | -0.03 | 0.01 | 0.01 | -0.09** | 0.14** | 0.05 | -0.01 | -0.02 |     |     |     |     |     |     |     |     |     |
| 12 | Administration Dpt. | 0.06 | 0.24 | 0.11** | 0.09** | -0.01 | -0.14** | 0.01 | -0.04 | 0.04 | -0.01 | -0.04 | -0.06 | -0.02 |     |     |     |     |     |     |     |     |
| 13 | R&D Dpt. | 0.00 | 0.07 | 0.01 | 0.02 | 0.00 | -0.06 | 0.02 | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 | -0.02 |     |     |     |     |     |     |     |
| 14 | Production Dpt. | 0.51 | 0.50 | -0.13** | -0.08* | 0.01 | 0.12** | 0.09** | 0.00 | -0.11** | -0.05 | -0.14** | -0.22** | -0.08* | -0.27** | -0.07* |     |     |     |     |     |     |
| 15 | IT Department | 0.00 | 0.06 | -0.07 | -0.08* | -0.04 | 0.03 | 0.01 | 0.01 | 0.07 | 0.00 | -0.01 | -0.01 | 0.00 | -0.02 |     |     |     |     |     |     |     |
| 16 | Task Analyzability | 5.36 | 0.44 | -0.17** | -0.11** | 0.03 | 0.32** | 0.02 | -0.01 | -0.06 | -0.25** | -0.36** | -0.05 | -0.06 | -0.76** | -0.13** | 0.55** | 0.00 |     |     |     |
| 17 | Task Routine | 5.23 | 0.35 | -0.11** | -0.05 | 0.05 | 0.28** | 0.03 | -0.04 | -0.06 | -0.29** | -0.54** | -0.32** | 0.10** | -0.42** | 0.56** | -0.08* | 0.84** |     |     |     |
| 18 | Task Interdependency | 5.39 | 0.33 | -0.02 | 0.02 | 0.03 | -0.06 | 0.08* | -0.08* | -0.09* | -0.20** | -0.20** | -0.53** | -0.26** | -0.55** | 0.07* | 0.62** | -0.11** | 0.70** | 0.67** |     |
| 19 | KS with supervisors | 20.89 | 4.11 | 0.02 | -0.01 | -0.08* | 0.12** | 0.00 | 0.22** | 0.04 | 0.03 | 0.01 | -0.02 | 0.09** | 0.04 | -0.02 | -0.06 | -0.11** | -0.08* | -0.02 |     |     |
| 20 | Power Distance | 18.98 | 5.86 | 0.15** | 0.07* | 0.03 | -0.11** | 0.05 | -0.08* | 0.02 | 0.04 | 0.04 | -0.05 | 0.06 | 0.09** | -0.07* | 0.05 | -0.09** | -0.09** | -0.02 | -0.07* |     |
| 21 | Affective commitment | 40.66 | 7.29 | 0.23** | 0.17** | 0.02 | -0.20** | 0.11** | 0.03 | 0.24** | 0.04 | 0.01 | -0.02 | 0.04 | 0.13** | 0.02 | -0.15** | -0.02 | -0.17** | -0.12** | 0.48** | 0.08* |     |
| 22 | Affect-based trust | 16.08 | 2.86 | 0.12** | 0.14** | 0.03 | -0.05 | 0.06 | 0.04 | 0.22** | 0.02 | 0.02 | 0.00 | 0.05 | 0.07 | 0.06 | -0.05 | -0.02 | -0.09** | -0.06 | 0.34** | -0.04 | 0.38** |     |

Note: N = 860; M = mean; SD = standard deviation; *: p < 0.05 2-tailed, **: p < 0.01 2-tailed, ***: p < 0.001 (2-tailed).

Female is dummy variable: 1 = female, 0 = other. Male is dummy variable: 1 = male, 0 = other. All department related variables are dummy variables: 1 = identified department e.g. R&D department, 0 = other.
Table 2 Results of Regression Analyses for H1-H5
DV= Knowledge sharing with supervisors

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<th>Model 2</th>
<th>Model 3</th>
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Step 2

| PD                      | -0.10*  | -0.10*  |
| AC                      | 0.41*** | 0.40*** |
| Affect-based Trust      | 0.16*** | 0.17*** |

Step 3

| AC * PD                 | -0.10*  |        |
| PD * affect-based Trust |        | 0.04   |

| R-square                | 0.109   | 0.315   | 0.324   |
| Adj. R-square           | 0.090   | 0.298   | 0.305   |
| F                       | 5.73*** | 18.33***| 17.38***|
| df                      | (18, 841)| (21, 838)| (23, 826)|
| Valid N                 | 860     | 860     | 860     |

Notes. ***p<0.001; **p<0.01; *p<0.05, All VIFs<2.6
Figure 1: Research Model

Affective commitment

Power distance

Employee’s knowledge sharing with supervisors

Affect-based trust

H1

H2

H3

H4

H5
Figure 2 The Moderating Effect of PD on the Relationship between AC and Knowledge Sharing with Supervisors
Instrument Items used in the questionnaire

All scale measures except specially mentioned are based on seven-Likert scales, using “strongly disagree,” “disagree,” “slightly disagree,” “not sure,” “slightly agree,” “agree,” and “strongly agree” anchors.

Knowledge Sharing With Supervisors (adapted from Faraj and Sproull 2000)

1. My supervisor and I share our special knowledge and expertise with each other.

2. If my supervisor or I have some special knowledge about how to perform the task, neither of us is likely to tell the other one about it.

3. There is virtually no exchange of information, knowledge, or sharing of skills between my supervisor and me.

4. My supervisor and I often freely provide each other with hard-to-find knowledge or specialized skills.

Affective Commitment (Allen and Meyer 1990)

With respect to your company…

1. I would be very happy to spend the rest of my career with this organization.

2. I enjoy discussing my organization with people outside it.

3. I really feel as if this organization's problems are my own.
4. I think that I could easily become as attached to another organization as I am to this one.

5. I do not feel like 'part of the family' at my organization.

6. I do not feel 'emotionally attached' to this organization.

7. This organization has a great deal of personal meaning for me.

8. I do not feel a strong sense of belonging to my organization.

**Power Distance** (Dorfman and Howell 1988)

1. Managers should make most decisions without consulting subordinates.

2. It is frequently necessary for a manager to use authority and power when dealing with subordinates.

3. Managers should seldom ask for the opinions of employees.

4. Managers should avoid off-the-job social contacts with employees.

5. Employees should not disagree with management decisions,

6. Managers should not delegate important tasks to employees.

**Affect-Based Trust** (McAllister’s 1995)

1. My coworkers and I have a sharing relationship. We freely share out ideas, feelings and hopes.
2. I can talk freely about difficulties I am having at work and know that they will want to listen.

3. My coworkers and I would both feel a sense of loss if one of us was transferred and we could no longer work together.

**Social Desirability** (Crowne and Marlowe 1964). (The "honest" responses are marked 'R'. Such items earn a score of 1 for 'Yes' and 3 for "No'. The same answers for the other items earn scores of 3 and 1 respectively. "?" or "Not sure" or no answer is scored 2 on all occasions.)

1. Have there been occasions when you took advantage of someone? R

2. Have you sometimes taken unfair advantage of another person? R

3. Are you always willing to admit when you make a mistake?

4. Are you quick to admit making a mistake?

5. Do you sometimes try to get even rather than forgive and forget? R

6. Do you sometimes feel resentful when you don't get your own way? R

7. Are you always courteous, even to people who are disagreeable?

8. Are you always a good listener, no matter whom you are talking to?

**Chinese Translations**
Anchors: 非常不同意，不同意，略为不同意，不知道，略为同意，同意，非常同意

Knowledge Sharing With Supervisors（adapted from Faraj and Sproull 2000）

KS_1. 我的上司和我经常相互交流专业知识（技术、经验、信息）和专长。

KS_2. 如果我或我的上司有一些该如何工作的特别技巧，我们都不会告诉另外一个。

KS_3. 事实上我和我的上司从不交换信息，经验，技术等。

KS_4. 我和我的上司经常自由地互相提供很难寻求的知识（技术、经验、信息）或者特殊的技巧。

Affective Commitment（Allen and Meyer 1990）

OC_1. 我很高兴在这个公司度过我的剩余职业生涯。

OC_2. 我喜欢与其他人（非公司员工）讨论我的公司。

OC_3. 我感觉公司的问题好像真是我自己的。

OC_4. 我想我能很快的喜欢上其它的公司，就象这个一样。
OC_5. 在公司里我没感觉像“家庭的一部份”。

OC_6. 我对公司没有“感情投入”。

OC_7. 公司对我有很多个人意义。

OC_8. 我没有属于我公司的强烈感觉。

**Power Distance** (Dorfman and Howell 1988)

PD_1. 大多数情况下经理应该不用和他们的下属商议而作出决定。

PD_2. 当与下属打交道时，经理时常使用权威是必要的。

PD_3. 经理应该很少询问职员的意见。

PD_4. 经理应该避免与职员在非工作的社交场合接触。

PD_5. 职员应该全部接受管理层的决定。

PD_6. 经理不应该委任给职员重要任务。

**Affect-Based Trust** (McAllister’s 1995)

Tr_1. 我和我的同事经常一起交流我们的见解、心情和希望。
Tr_2. 我能畅所欲言地对我的同事讨论我工作上的问题，并且知道他们愿意听。

Tr_3. 如果我与我的同事不能在一起工作，我们都会有失落感。

Social Desirability (Crowne and Marlowe 1964). (The "honest" responses are marked 'R'. Such items earn a score of 1 for 'Yes' and 3 for "No". The same answers for the other items earn scores of 3 and 1 respectively. "?" or "Not sure" or no answer is scored 2 on all occasions.)

SD_1. 你曾经占过别人的便宜吗?

SD_2. 你曾经不公平地占另一个人的便利吗?

SD_3. 有时你总想得到而不是宽恕或遗忘吗?

SD_4. 当你不能用自己的方式的时候，你会觉得不满吗?

SD_5. 当你犯错误时你总是愿意承认错误吗?

SD_6. 你总是很快承认犯错误吗?

SD_7. 即使你面对那些不为人喜欢的人，你总是很有礼貌吗?

SD_8. 你总是一个很好的听众吗，无论谁在说?
Antecedents of Employee’s Preference for Knowledge Sharing Tools

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ABSTRACT

This study examines individual antecedents of employees’ preference for formal or informal knowledge sharing tools. We propose that the preference for different tools is determined by the combined effects of willingness to share knowledge, trust, and role breadth self-efficacy (RBSE). The findings of the empirical study, which was conducted at a medium-sized Chinese company (N=860), revealed that willingness to seek knowledge was related to the usage of both formal and informal tools. Furthermore, the willingness to give knowledge was significantly related to the usage of formal tools. RBSE had a significantly positive impact on both formal and informal knowledge sharing tools’ usage, while its effects on formal tools’ usage were stronger than those on informal tools. Affect-based trust had a significantly positive impact on the usage of informal knowledge sharing, which was also stronger than its impact on formal tools’ usage. Cognition-based trust positively moderated the relationship between willingness to seek knowledge and the usage of formal tools, and the relationship between willingness to share knowledge and informal tools’ usage.

Keywords: knowledge sharing tools; trust; role breadth self-efficacy
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INTRODUCTION

Knowledge is considered the most strategically important resource (e.g., Grant 1996; Zander and Kogut 1995) as the 21st century unfolds. In particular, an organization’s capacity to share knowledge among its employees and apply that shared knowledge is regarded a vital source of competitive advantage in many industries (e.g., Kogut and Zander 1992; Nonaka 1994; Nonaka and Takeuchi 1995; Teece, Pisano and Shuen 1997; Nonaka, Von Krogh and Voelpel 2006). Consequently, companies have devoted substantial resources to knowledge management systems in order to facilitate improved knowledge exchange within the organization, and exploit existing accumulated knowledge (Allen, James and Gamlen 2007). However, despite vast investments, technological databases are often underutilized and fail to meet expectations (Bryan and Joyce 2005). Early research dating to Pelz and Andrews (1966), Mintzberg (1973), and Allen (1977) indicates that people would rather obtain information from other people than from documents. More recently, this same tendency was even found in respect of people with good access to the Internet and their firm’s extensive intranet. In their empirical study, Cross and Sproull (2004), for example, found that managers receive information from other people far more frequently than from impersonal sources, such as their PC archives, Internet or databases.

Research has revealed that many managers fail to effectively support and ultimately exploit the informal exchange of knowledge assets within their organizations (Krackhardt and Hansen 1993; Hansen, Nohria, and Tierney 1999; Cross and Parker 2004). Even though extant research identified a variety of antecedents of the concomitant usage of
computer-mediated communication (CMC), for example, the environment’s characteristics, the involved individuals’ previous experience, and the methods used to acquire and process information (Daft and Weick 1984; Rice, Grant, Schmitz and Torobin 1990), it also points out various limitation mechanisms in studies on knowledge sharing and utilization processes.

First, little systematic attention has been paid to the conditions that determine the specific tools preferred by a specific group of employees for the purpose of knowledge sharing. Although most extant knowledge sharing research focuses on CMC, recent knowledge management systems are well beyond mere CMC, since many new communication channels have been developed. Together with old channels, they have been systematically structured to cater for organizations’ needs. Second, there are no coherent, integrated, theoretical frameworks of the determinants that could clarify recipients’ and providers’ differing motives for utilizing knowledge sharing tools. Previous findings may be incomplete, since explanatory properties that have a positive or negative effect on one group’s outcomes, such as the recipients, may have the opposite or no effect on providers’ outcomes.

This paper aims at first determining the antecedents of knowledge seekers and providers’ use frequency of different knowledge sharing mechanisms. Second, it aims at uncovering the rationale for the differences between various mechanisms’ use frequency. In the following, we first investigate formal and informal knowledge sharing tools. Next, we draw upon motivational factors such as trust, willingness to knowledge sharing, and role breadth self-efficacy, and examine their different impacts on the usage of formal and
informal knowledge sharing tools. Thereafter, based on previous theories on knowledge management, this study’s hypotheses are developed. The data, statistical methods, and variables are described in the method section, which is followed by the study’s results, a discussion of these, and conclusion.

THEORETICAL BACKGROUND AND HYPOTHESES

INFORMAL AND FORMAL KNOWLEDGE SHARING SYSTEMS

Formal knowledge sharing systems provide explicit instructions that help guide knowledge exchange processes among employees (Okhuysen 2001; Pavitt 1993 1994). They are well-defined management systems and structures (Burns and Stalker 1961), prescribed and forcibly generated by management in accordance with the corporate strategy and mission (Chandler 1962). These formal tools are intended to structure the knowledge exchange process so that more knowledge is revealed and effectively combined (Okhuysen and Eisenhardt 2002). Formal knowledge sharing systems include simple formal interventions, such as basic instructions on how to share information, providing information on meetings, and training (Henry 1995, Okhuysen 2001), as well as more complex tools, such as electronic knowledge databases and various group work methods (e.g., Nominal Group Technique and the Delphi Technique) (Bartunek and Murnighan 1984; Dalkey 1968).

Formal knowledge sharing tools improve knowledge exchange by providing specific behavioral directives (Pavitt 1993 1994) and enabling quick and easy identification of the experts within an organization. Such tools are effective for extensive knowledge transfer
in large global companies (Davenport and Prusak 1998), although they can be detrimental when the characteristics of the environment are not met (Green 1975, Price 1985). Formal tools have been used in a variety of settings in which knowledge integration is relevant, including idea generation (Diehl and Stroebe 1987), strategic decision making (Cook and Hammond 1982; Schweiger and Finger 1984; Schwenk and Cosier 1993), and problem solving (Guzzo 1982).

Burns and Stalker (1961) have pointed out that using informal structure is the processes by which individuals communicate on issues that are not directly laid down and governed by management (Burns and Stalker 1961). They are usually unsanctioned and can be described as un-governed organic structures that connect a potentially unbounded group of individuals (Mintzberg 1973). Moreover, knowledge exchange is purely the result of knowledge seekers’ and providers’ personal initiatives (Cross and Parker 2004). Consequently, informal knowledge sharing tools can be unscheduled meetings, conversations, and after work social events, which promote socialization and personal networking.

**WILLINGNESS TO SHARE AND SEEK KNOWLEDGE**

It is known that conscientiousness has a remarkable capacity to predict performance in a variety of work settings (Salgado 2000). Bock and Kim (2002) have found that willingness to engage in knowledge exchange leads to actual knowledge sharing behavior. However, the study by Cabrera and colleagues (2006) suggests that willingness is not related to sharing behavior. In order to test the link between willingness to share knowledge and the actual usage of knowledge sharing tools, we selected willingness to
give and seek knowledge as one of this study’s observations. Cabrera and colleagues (2006) define openness to knowledge sharing as an individual’s likelihood to engage in knowledge sharing. People who are very open to knowledge sharing are inclined to request knowledge and to respond to knowledge requests.

Researchers have identified many antecedents to a willingness to share knowledge, such as organizational commitment, openness to experience, job autonomy, and organizational climate (e.g., Matzler, Renzl, Mooradian, and Von Krogh 2006; Cabrera et al. 2006). Some studies have approached openness to knowledge sharing by applying the Theory of Reasoned Action (Ajzen and Fishbein 1980). These studies have found that absorptive capacity and channel richness (Kwok and Gao 2005), organizational climate, anticipated reciprocal relationships, and a sense of self-worth (Bock et al. 2005) could lead to a willingness to share knowledge.

The common ground of previous research on willingness to share knowledge is that it regards this willingness as a single subject with only one phase. Hansen, Mors, and Lovas (2005) suggest investigating knowledge sharing in different phases, for example, knowledge seeking and providing. They furthermore suggest that the properties that have a positive or negative effect on outcomes in a specific phase, such as knowledge transfer, may have the opposite or no effect on the outcomes in other phases. Consequently, in this research we investigate the different functions of willingness to seek and give knowledge.

According to the Theory of Reasoned Action (TRA), people’s specific actions are determined by their behavioral intention to perform that action (Fishbein and Ajzen 1972). TRA is based on the premise that humans are rational and that the behaviors being
explored are under volitional control (Fishbein and Middlestadt 1997). Many studies have successfully tested this theory by providing evidence of the link between attitudes and perceived norms, intentions, and behavior (Kim and Hunter 1993). According to behavior intention theories, employees who intend to seek knowledge via either formal or informal knowledge sharing tools may engage in actual seeking behavior through both types of tools. Alternatively, willingness to give knowledge may lead to the usage of both types of tools in order to provide the requested knowledge. Consequently, this study’s first set of hypotheses postulate:

Hypothesis 1 (H1). Employees who are more willing to seek knowledge are more inclined to use formal and informal knowledge sharing tools.

Hypothesis 2 (H2). Employees who are more willing to provide knowledge are more inclined to use formal and informal knowledge sharing tools.

**Role Breadth Self-efficacy and Knowledge Sharing Tools**

Formal knowledge sharing tools differ from informal tools in that they sometimes require employees to publicly articulate their opinions. This leads to the assumption that role breadth self-efficacy plays a decisive role in determining whether employees will choose formal tools. Parker (1998) defined Role Breadth Self-efficacy (RBSE) as employees' perceived capability to carry out a broader and more proactive set of work tasks that extends beyond prescribed technical requirements. RBSE has a positive impact on performance, since high levels of self-efficacy enable the effective regulation of human behavior through a range of cognitive, motivational, and affective decisional processes.
(Bandura 1997; Stajkovic and Luthans 1998). Consequently, RBSE contributes to knowledge exchange (Cabrera, Collins and Salgado 2006) in various ways. Therefore, we also observe the different impacts of RBSE on knowledge seekers and providers.

Individuals who feel capable of performing particular tasks tend to carry them out more effectively (Barling and Beattie 1983), persist at them (Lent, Brown and Larkin 1987), cope more effectively with change (Hill, Smith and Mann 1987), choose more difficult goals (Locke and Latham 1990), and adopt more efficient task strategies (Wood, George-Falvy and Debowksi 2001). RBSE gives potential knowledge providers a sense of confidence that they understand the requested topic and that they can contribute to the knowledge exchange process. Consequently, RBSE enables prospective knowledge seekers to actively search for required knowledge, and to believe that they can comprehend and apply the knowledge supplied. Moreover, they believe that their knowledge can help to solve job-related problems (Constant, Sproull and Kiesler 1996), improve work efficiency (Ba, Stallaert and Whinston 2001), and bring about a change for the better in their organizations (Kollock 1999; Wasko and Faraj 2000). This belief can serve as a self-motivational force for employees with RBSE to request knowledge via both formal and informal knowledge sharing tools. Therefore, the following hypothesis is proposed:

**Hypothesis 3a (H3a). Employees who have a higher degree of RBSE are more inclined to use formal and informal knowledge sharing tools.**

The usage of formal knowledge tools exposes employees to other colleagues, including those who are unfamiliar with them, and requires a clear and structured articulation of
ideas. In addition, questions and challenges should be expected during the knowledge exchange process. Employees with a high degree of RBSE recognize that, with their skills, they can publicly participate in successful knowledge exchanges (Bandura 1986). Conversely, employees with a low degree of RBSE may feel that they do not have the ability to publicly exchange knowledge. They may feel that they are not able to express themselves in a structured and convincing way in official situations. Consequently, instead of formal knowledge sharing tools, employees with a low degree of RBSE prefer informal tools.

Hypothesis 3b (H3b). Employees who have a higher degree of RBSE use formal knowledge sharing tools more often than informal ones.

IMPACT OF AFFECT-BASED TRUST ON USAGE OF KNOWLEDGE SHARING TOOLS

Employees’ interpersonal relationships are important in deciding whether to request knowledge or to respond to knowledge requests. Many researchers have confirmed that interpersonal trust facilitates knowledge sharing in a variety of settings (e.g., Jarvenpaa and Leidner 1999, Jarvenpaa, Knoll and Leidner 1998, Moreland and Myaskovsky 2000), and that it influences knowledge seekers and providers in different ways (e.g., Quigley, Tesluk, Locke and Bartol 2007). In this research, we explore the impacts of two different types of trust on formal and informal knowledge sharing tools and the discrepancy between these impacts.
Research on trust has been approached from a wide variety of perspectives. Three of the most prominent perspectives of trust focus on (1) a perception or attribution based on individual qualities or characteristics, (2) risk-taking behavior, and (3) willingness to engage in such behavior (Bigley and Pearce 1998). Of the three, the first has been the most dominant (Bigley and Pearce 1998). This stream of research has primarily focused on the various personal characteristics that determine an individual’s trustworthiness and how those characteristics affect risk-taking behaviors and outcomes in exchange relationships (Dooley and Fryxell 1999). Moreover, many researchers point out that trust has a multi-faceted nature (e.g., Lane 1998; Lewicki and Bunker 1996; Lewis and Weigert 1985), since the characteristics that elicit risk-taking behaviors may depend on the specific relationship context (Bigley and Pearce 1998). Following this line of reasoning, McAllister (1995) distinguishes between cognition-based trust and affect-based trust. Trust is cognition-based in that individuals choose whom they will trust, in which respects, and under what circumstances (Lewis and Wiegert 1985, pp: 970). Affect-based trust is the confidence individuals have in one another on the basis of the feelings that are generated by their levels of concern (Johnson-George and Swap 1982; Rempel, Holmes and Zanna 1985). The essence of affect-based trust is individuals’ reliance on one another. As emotional connections deepen, individuals may be willing to take more risks, consequently going beyond what is justified by the available knowledge. This emotion-driven element of trust makes the relationship less transparent to the objective risk assessments as prescribed by economists (Johnson and Grayson 2005).

Dooley and Fryxell (1999) discovered that individuals who share affect-based trust are more willing to voice divergent opinion. Affect-based trust may therefore help to create a
climate in which individuals feel safer to express their different points of view. With affect-based trust, fears of reprisals or possible scapegoating are mitigated. Consequently, the attribution of affect-based trust to colleagues promotes the fuller processing of information, especially when there is disagreement, and reduces conflicts and biased speculations. In addition, Dooley and Fryxell’s findings (1999) suggest that the levels of perceived affect-based trust determine whether dissent within a group will lead to a positive or negative decision quality. Moreover, employees may distance themselves from a knowledge exchange if they sense that hoarding knowledge is more beneficial than sharing it (Davenport and Prusak 1998). In this respect, researchers point out that a loss of power due to knowledge contribution is a barrier to knowledge sharing (Gray 2001; Thibaut and Kelley 1986). If employees have an emotional connection with their colleagues, they are more likely to apply all possible knowledge sharing tools in order to benefit them. This line of argument leads to the following hypothesis:

**Hypothesis 4a (H4a). Employees who have a higher affect-based trust towards their colleagues use both formal and informal knowledge sharing tools more often.**

Furthermore, affect-based trust is likely to alter the way in which an employee perceives risk due to his or her lack of certain knowledge. Employees reveal their weakness and run the risk of being disadvantaged when they indicate that they lack certain knowledge. They then become dependent on knowledge providers’ benevolence. Affect-based trust – the emotional connection – makes employees willing to show this vulnerability and to communicate openly (Gibb 1964). However, employees may prefer to show their
vulnerability and benevolence to those whom they trust through the use of informal tools rather than to all their colleagues through the use of formal tools.

Hypothesis 4b (H4b). Employees who have a higher affect-based trust towards their colleagues use informal knowledge sharing tools more often than formal ones.

THE MODERATING EFFECT OF COGNITION-BASED TRUST

Past research on trust in organizational settings suggests that competence and responsibility are central elements of cognition-based trust (Butler 1991; Cook and Wall 1980). Individuals who are perceived as competent and responsible receive high cognition-based trust. Identified antecedents of cognition-based trust are reliable role performance and the evaluated person’s professional credentials (McAllister 1995; Rousseau, Sitkin, Burt and Camerer 1998). Cognition-based trust was salient in previous work on the knowledge sharing process. For example, Eisenstat (1990) found that incompetence within teams reduced information sharing. Similarly, Zand (1972) and Boss (1978) identified both team member ability and support as critical aspects with which to elicit the trusting behaviors of information sharing.

Employees tend to believe that colleagues who they perceive as reliable and competent are more likely to provide useful assistance (Borgatti and Cross 2003; Hinds, Carley, Krackhardt and Wholey 2000; Chua, Ingram and Morris 2008). Consequently, employees presume that their colleagues are worth listening to and learning from when they turn to them for knowledge exchange. When employees do not intend to share knowledge with colleagues, even if they have a high degree of cognition-based trust, they will not use any
knowledge sharing tools, either to search for knowledge or to answer knowledge requests. When employees are willing to share knowledge, cognition-based trust will strengthen their usage of both formal and informal tools, since employees realize that they are subsequently more likely to obtain useful support. Conversely, without cognition-based trust, colleagues may be viewed as less likely to provide valuable knowledge, which may result in less knowledge being sought after, even if the same level of willingness to share knowledge is maintained. Therefore, we propose the following hypothesis:

**Hypothesis 5 (H5).** Employees’ level of cognition-based trust in their colleagues moderates the positive relationship between willingness to seek knowledge and the usage of formal and informal knowledge sharing tools so that the higher the cognition-based trust is, the stronger the relationship will be.

At the same level of willingness to give knowledge, employees with high cognition-based trust may respond to more requests for knowledge through any tools, as they would consider their colleagues knowledgeable and capable of understanding the knowledge they receive. Without cognition-based trust, employees do not consider knowledge seekers to possess the professional credentials to accurately understand the knowledge that they are given. Under this condition, and given the same level of willingness to share knowledge, they may respond less to a knowledge search. Therefore, we hypothesize:

**Hypothesis 6 (H6).** The level of employees’ cognition-based trust in their colleagues will moderate the relationship between willingness to share knowledge and
the usage of formal and informal knowledge sharing tools so that the former relationship will be more strongly related to the latter relationship if cognition-based trust is high.

As shown in Figure 1, we have summarized this study’s hypotheses in two research models. Figure 1a shows the direct and moderating effects on formal and informal tools’ usage, and Figure 1b illustrates the differences between these effects on formal and informal tools’ usage.

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INSERT FIGURE 1 ABOUT HERE

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METHOD

SAMPLE AND PROCEDURE

The following research methodological process was applied. First, we conducted 12 unstructured interviews with employees and managers of a medium-sized, privately owned company located in central China to identify possible knowledge sharing tools within the company. The company belongs to the chemical sector and has about 2000 employees. Second, we designed a structured questionnaire after consulting with subject experts from the company. Third, the English scales were translated into Chinese by applying a translation and back-translation procedure (Brislin 1980) to ensure that both
versions are identical in terms of content and question framing. During the translation process, we adapted some sentences and words to comply with their local meaning. This approach was recommended by Tsui, Nifadkar, and Ou (2007) as well as Farh, Cannella, and Lee (2006) to ensure construct validity. Fourth, the questionnaire was pre-tested with 25 native Chinese speakers to improve its description specificity. Based on their feedback, the wording was revised.

Finally, 1100 printed questionnaires were sent to employees in the company, and of the replied surveys, 860 could be used for data analysis, making the response rate 78%. The participants were mostly females (57.8%), middle-aged (41% were 36–45 years of age), and mostly (70%) had more than 10 years’ tenure in the company. The sample included managers (23%), clerical staff (73%), and others (2%), while the remaining 2% did not answer this question.

**Measures**

*Usage of formal and informal knowledge sharing tools.* Through the interviews with managers and other employees, we identified four formal and four informal knowledge sharing tools. The four formal tools are “attending a meeting to review and discuss problems and brainstorm solutions,” “attending training courses held by the company to get job relevant skills,” “sharing written documents (reports, manuals, or procedures) with colleagues to solve problems at work,” and “formally searching for an expert in the company to solve work-related problems or receiving request to help somebody to find the solution.” The four informal tools are “visiting or being visited by other colleagues with the specific purpose of learning how a particular improvement or work is done,”
“discussions with colleagues in the company to provide ideas and solve problems,”
“sharing knowledge with colleagues informally, e.g., at lunch, dinner or some other
social situations,” and “joining specific Internet forums to search for or answer work-
related questions.” Based on this information, we used 7-point Likert-type scales to
measure how often employees use each specific sharing tool. This is a formative scale,
which is an explanatory combination of its indicators (Fornell and Bookstein 1982).
Consequently, the normal scale characteristics such as Cronbach’s alpha do not make
sense here.

Willingness to share and seek knowledge. From Cabrera and colleagues’ (2006)
original scale, we used a three-item, 7-point Likert-type scale to measure employees’
willingness to share knowledge, and a three-item, 7-point Likert-type scale to measure
their willingness to seek it. In this study, Cronbach’s alpha for willingness to give
knowledge was 0.67, and willingness to seek was 0.82.

RBSE. We used a 7-point, Likert-type scale with 5 items developed by Parker
(1998) to measure RBSE. In the study at hand, Cronbach’s alpha for this scale was 0.81.

Affect-based trust and cognition-based trust. We adapted McAllister’s (1995)
trust scale, which contains 25 items designed to measure behavioral responses associated
with trusting or distrusting peers. Based on high loadings in the original publication’s
factor analysis (0.89, 0.82, 0.81 for affect-based trust and 0.90, 0.86, 0.81 for cognition-
based trust), three items were applied to measure affect-based trust and three items to
measure cognition-based trust. On a seven-point scale, the respondents indicated the
extent to which they agreed that certain actions described their behavior towards a
specific peer. Examples of the questions are: “I can talk freely to this individual about difficulties I am having at work and know that (s)he will want to listen,” and “This person approaches his/her job with professionalism and dedication.” We aimed at measuring an individual’s general trust towards all of his or her colleagues. To gain a more general measure of trust at the workplace, we replaced “this individual” in the questionnaire with “the people with whom I work.” In this study, Cronbach’s alpha for affect-based trust was 0.64, and 0.71 for cognition-based trust.

Control variables. This study controlled for several factors in order to rule out alternative explanations for the findings (Becker 2005). First, we controlled for social desirability (Crowne and Marlowe 1960), which might have had an impact on the respondents’ answering behavior in the type of setting in which the respondents’ relationships with their supervisors were analyzed. We included an 8-item version of the scale on social desirability by Crowne and Marlowe (1964). Second, gender, age (5 categories), tenure in the company, tenure in the current position, education, business unit (8 categories), and career level (4 levels) comprised this study’s primary demographic control variables. Third, in keeping with previous research, we supposed that Affective commitment (AC) could influence our result because AC is thought to be linked to willingness to share and receive knowledge (Van den Hooft and Van Weenen 2004; Cabrera et al. 2006). Consequently, we controlled for employees’ affective commitment. We measured AC by applying an eight-item, 7-point Likert-type scale developed by Allen and Meyer (1990). In this study, Cronbach’s alpha for this scale was 0.75.
In addition, we created two dummy variables for gender in the data analysis. As a guarantee of anonymity, we gave the respondents the option not to answer some demographic variables that might have led to a disclosure of their identity. This resulted in a relatively high percentage of missing values in respect of some demographic variables. There are 4.2% missing data regarding gender, and 14.1% of the respondents indicated that they did not want to disclose their gender. The two generated dummies solved the relatively high percentage of unknown gender. We applied an expectation maximization algorithm (Dempster et al. 1977) to deal with the low number of missing values, which produces less bias than list-wise deletion (Graham and Donaldson 1993; Malhotra 1987; Muthen et al. 1987) or pair-wise deletion (Muthen et al. 1987).

First we mean-centered variables for moderation effects (Aiken and West 1991; Echambadi and Hess 2007), and applied regressions to test direct effects. Furthermore, within-subjects design (Judd et al. 1996, Judd et al. 2001) was used to test the different effects of the independent variable on the two dependable variables (i.e. Hypotheses 3b and 4b). In within-subjects design, the independent variable is tested in different situations, so that the comparison between situations can be made within each of the subjects (Judd et al. 2001).

RESULTS

DESCRIPTIVE STATISTICS

--------------------------------------------
Table 1 presents the individual-level descriptive statistics and zero-order correlations. Table 2 gives the results of eight regression models, in which the dependent variable for models 1-3 is the usage of formal knowledge sharing tools, while it is the usage of informal knowledge sharing tools for models 4-6, and difference between the usage of informal and formal tools for models 7 and 8. Judd and colleagues’ (2001) within-subjects design was applied to models 7 and 8. Models 1, 4, and 7 contained all the control variables, while direct effects were separately added to models 2, 5, and 8 for different dependable variables. Model 3 and 6 separately tested the interactions between formal and informal tools’ usage.

**Main Effects of Willingness to Seek and Give Knowledge, Affect-Based Trust, and RBSE (H1, H2, H3A, H4A)**

Willingness to seek knowledge had a significantly positive effect on the usage of formal knowledge sharing tools ($b=0.13$, $p<0.001$), as well as on informal knowledge sharing
tools’ usage (b=0.16, p<0.001), which fully supported H1. With regard to H2, this study’s data revealed that willingness to give knowledge had a significantly positive effect (b=0.10, p<0.01) on the usage of formal knowledge sharing tools; however, it revealed an insignificant effect on informal knowledge sharing tools’ usage (b=0.05, p>0.10). Thus, H2 was not fully supported. RBSE had a significantly positive effect on the usage of formal knowledge sharing tools (b=0.29, p<0.001), and on informal knowledge sharing tools’ usage (b=0.21, p<0.001), which confirmed H3a. The relationship between affect-based trust and formal knowledge sharing tools’ usage was not significant (b=0.04, p>0.10), while affect-based trust had a significantly positive effect on the usage of informal knowledge sharing tools (b=0.17, p<0.001). Consequently, H4a was not fully supported.

MODERATING EFFECTS OF COGNITION-BASED TRUST (H5 AND H6)

Models 3 and 6 illustrate the moderating effects of cognition-based trust. More specifically, in support of H5a, it shows that the relationship between willingness to seek knowledge and the usage of formal knowledge sharing tools was significantly moderated in the predicted direction (b=0.10, p<0.01). However, the moderating effect of cognition-based trust on the relationship between willingness to seek knowledge and usage of informal knowledge was not significant (b=0.02, p>0.10). Consequently, hypothesis 5a was not fully supported. H6a was supported by the significant moderating effect on the relationship between willingness to give knowledge and usage of informal knowledge sharing tools (b=0.08, p<0.05). Nevertheless, it was rejected as a result of the non-significance of the moderating effect on the relationship between willingness to give
knowledge and formal knowledge sharing tools’ usage ($b=0.01$, $p>0.10$). Therefore, H6a was not fully supported.

To further clarify the interactive effects of cognition-based trust, we examined separate simple slopes, depicting the relationships between willingness to seek knowledge and the usage of formal knowledge sharing tools. Separate plots were drawn for individuals whose moderator scores were one standard deviation below the mean, at the mean, and one standard deviation above the mean (Aiken and West 1991).

Figure 2 illustrates the moderating effect of cognition-based trust on the relationship between willingness to seek knowledge and formal knowledge sharing tools’ usage. The graph shows that, in respect of cognition-based trust, the slopes (betas) were all positive. The betas were smaller in respect of the low power distance group ($b=0.13$, $p<0.01$) and larger in respect of the high power distance group ($b=0.42$, $p<0.01$).
As shown in Model 3, the moderating effect of cognition-based trust on the relationship between willingness to seek knowledge and the usage of formal knowledge sharing tools was significantly positive (b=0.10, p<0.01). Figure 3 illustrates this interaction when cognition-based trust is low (b=0.01, p<0.01), medium (b=0.13, p<0.005), and high (b=0.25, p<0.01).

**THE EFFECT OF DISCREPANCY ON FORMAL AND INFORMAL KNOWLEDGE SHARING TOOLS (H3b, H4b)**

Models 7 and 8 illustrate the different impacts of each dependent variable’s effect on formal and informal knowledge sharing tools’ usage. More specifically, in support of H3b, it shows that RBSE has a significantly negative relationship with the difference between the usage of informal and formal knowledge sharing tools (b=-0.14, p<0.001). The negative beta indicates that the relationship between RBSE and the usage of informal tools is significantly lower than the relationship between RBSE and formal tools’ usage, which fully supports H3b. With regard to H4b, affect-based trust had a significantly positive effect on the difference between the usage of informal and formal knowledge sharing tools (b=0.15, p<0.001), which fully supports H4b.
DISCUSSION

SUMMARY OF FINDINGS

This study is aimed at uncovering the antecedents and rationale of different knowledge sharing tools’ usage frequency. It illustrates that RBSE, affect-based trust, and willingness to seek and give knowledge had a direct impact on the usage of formal and informal knowledge sharing tools. In particular, RBSE was related to both formal and informal knowledge sharing tools’ the usage, while the strength of the two links differs. RBSE led to a higher usage of formal knowledge sharing tools than informal tools. In addition, affect-based trust had a significantly positive effect on the usage of informal tools. However, it had an insignificant effect on formal tools’ usage. The positive effect was further validated by the strong positive relationship between affect-based trust and the difference between the usage of informal and formal tools, which indicated that affect-based trust was a better predictor of informal tools than of formal tools. The last group of direct effects was the willingness to seek and give knowledge. Willingness to seek knowledge was significantly related to formal and informal knowledge sharing tools’ usage. Nevertheless, willingness to give knowledge only accounted for formal knowledge sharing tools’ usage and had no effect on informal tools. In addition, we found that cognition-based trust had a moderation effect, moderating the relationship between willingness to seek knowledge and formal knowledge tools’ usage, as well as the relationship between willingness to give knowledge and the usage of informal tools.

THEORETICAL CONTRIBUTION
This study contributes to the extant literature in several ways. First, consistent with previous research, which states that willingness to share knowledge leads to actual knowledge exchange behavior (Cabrera et al. 2006; Bock et al. 2005), this study provides further evidence of willingness’s decisive effect on the selection of formal and informal knowledge sharing tools. In addition, the study differentiated between potential knowledge seekers’ and providers’ preference for formal or informal tools. The results illustrated that willingness to seek and to give knowledge strengthens formal tools’ usage. Formal knowledge sharing tools provide an extensive range, which reduces the time and effort required to identify the required knowledge’s potential resources. Moreover, if colleagues are regarded as competent, employees are even willing to search for knowledge via formal tools. However, we failed to prove the moderating effect of cognition-based trust on the relationship between willingness to seek knowledge and informal tools’ usage. Possible reasons for this are that potential knowledge seekers prefer informal tools to enhance their emotional attachment to their knowledge providers. In this sense, cognition-based trust could not influence the strength of potential seekers’ preference for informal tools. As far as potential knowledge providers are concerned, we failed to confirm that they would use informal knowledge sharing tools. In addition to the strong relationship between potential knowledge providers, the usage of formal tools indicated that such tools are applied when employees are open to providing knowledge. A potential explanation for this is that employees generally consider formal organizational systems better and stronger than informal ones (Reif et al. 1973).

Although RBSE plays a central role in knowledge sharing (Cabrera et al. 2006), its impact on employees’ preference for formal or informal knowledge sharing tools has not
been directly examined in the literature. This study’s second contribution involves a comparison between RBSE’s effects on usage of formal and informal tools to deepen the findings and ascertain the effects of RBSE on employees’ preference for specific knowledge sharing tools. In line with previous theories that RBSE leads to proactive problem solving (Parker et al 2006), this study’s results suggest that RBSE leads to a more frequent usage of both formal and informal knowledge sharing tools. In addition, we found a stronger link between RBSE and formal knowledge sharing tools’ usage than with the usage of informal tools. Formal knowledge sharing tools offer a vast distribution range and opportunities for an extensive, large-scale knowledge exchange (Davenport and Prusak 1998). Furthermore, formal organization systems are generally perceived as more efficient than informal systems (Reif et al. 1973). Consequently, the sharing of knowledge through formal tools enables employees to understand that this type of knowledge exchange is broader in range and that it has stronger effects than an exchange with informal tools. Owing to formal tools’ significant effects, employees with a high degree of RBSE prefer them to informal tools. This study’s results are consistent with those of Bock and Kim (2002), who ascertained that RBSE is a major self-motivational source for knowledge sharing and that an individual’s judgment of his or her contribution to an organization’s performance has a positive influence on knowledge sharing.

In line with previous research that trust is associated with knowledge transfer (Kanawattanachai and Yoo 2007; Szulanski et al. 2004), this study’s third theoretical contribution lies in demonstrating that affect-based trust results in a higher usage of informal knowledge sharing tools. In addition, this study identified that affect-based trust predicts a preference for informal knowledge sharing tools. Affect-based trust is based on
relationships in which individuals care about one another, value the intrinsic virtue of their relationships, and believe that these sentiments are reciprocated (McAllister 1995; Pennings and Woiceshyn 1987). Consequently, they should prefer informal sharing tools that are built on socialization and a personal network.

We could not confirm that affect-based trust led to the usage of informal knowledge sharing tools. This is possibly due to affect-based trust’s characteristics. Employees with affect-based trust make emotional investments in trust relationships, and want to contribute to these relationships (Rempel et al. 1985; Lewis and Weigert 1985). Nevertheless, this will not happen via formal knowledge sharing tools, since they will not expose themselves to other employees, only to their trustees.

**PRACTICAL IMPLICATIONS**

Several practical implications can be drawn from this study. Our findings suggest that a sense of personal competence and confidence are significant for a person to engage in both kinds of knowledge sharing tools. Extant research on role breadth self-efficacy (e.g., Parker 2006) has identified several ways of enhancing employees' self-efficacy. Building a highly self-efficacious staff begins with recruiting and selecting employees who are proactive, have a strong cognitive aptitude, and are intrinsically motivated. In addition, there are several interventions that could help develop current employees’ self-efficacy. Self-efficacy may also be affected by work designs that enhance autonomy and participation in decision making. Parker (1998) reported some evidence of a positive link between job enrichment and role-breadth self-efficacy. Job enrichment creates a sense of control over the work environment and motivates people to exercise their full potential,
thus offering employees more opportunities to experience success. Subsequently, it validates perceptions of personal efficacy (Gist and Mitchell 1992).

Another practical implication that is based on this study’s findings, is that willingness to share knowledge results in both formal and informal tools’ usage. In particular, this study’s results suggest that organizations should create conditions that promote intentions to share knowledge. Extant research has identified many antecedents of this topic, for example, motivation (e.g., Argote and Ingram 2000; Alavi and Leidner 2001; Hansen 1999), rewards and incentives (e.g., Kalman et al. 2002; Quigley et al. 2007), anticipated reciprocal relationships (Bock et al. 2005), organizational climate (Bock et al. 2005), and perceptions of knowledge management systems (Cabrera et al. 2006).

Finally, it is also important that organizations build both affect-based and cognition-based trust between employees. The building process could be facilitated by engaging in trustworthy actions, such as being honest, and following through with commitments (Jassawalla and Sashittal 1999). Organizations should create opportunities for employees to get to know one another personally, such as social events and workshops. Such actions have to be supported by a healthy moral climate and role modeling by senior managers. These actions are exemplified by, for example, the fairness of performance appraisals and related systems (Bartol and Srivastava 2002; Ferrin and Dirks 2003).

**Limitations and Directions for Future Research**

This study has a number of limitations that future research could address. We used a cross-sectional analysis to assess all the variables. Furthermore, employees self-rated
their use of formal and informal knowledge sharing tools. A different source, such as peer rating, would have strengthened this research and avoided common-method variance (Podsakoff et al. 2003). We could not obtain peer ratings for the individual respondents as the survey was sent out randomly. The study would have been further strengthened if data from additional sources had been used to supplement the self-ratings. Future research might assess self-ratings in a more process-oriented way and have ratings from different sources.

We emphasize that, in an organizational context, strategic decision making may be more complex than captured in this study. Employees may face other, individual difficulties and disadvantages when using formal or informal tools than the ones mentioned in this research. Future research could examine these difficulties and investigate the extent to which they hinder the use of different knowledge sharing tools. A longitudinal research study would also reduce dependency on temporal dynamic relationships. Furthermore, a longitudinal research would also show whether the learning effect related to different knowledge sharing tools’ usage changes over time if a specific effort is made.

CONCLUSION

This paper aimed at uncovering key determinants of different knowledge sharing tools’ usage. We concluded by pointing out employees’ rationale for using formal and informal knowledge sharing tools, specifying in respect of knowledge seekers and providers. The findings show that RBSE has a stronger correlation with formal knowledge sharing tools than informal ones, and affect-based trust has a weaker correlation with formal than
informal tools. This study’s findings contribute to the development of an integrative, systematic model that predicts knowledge sharing tools’ usage. Furthermore, our results guide managers to promote the usage of knowledge sharing tools among employees and point out further research directions regarding predicting employees’ choice of knowledge sharing tools.
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APPENDIX
|   | Mean | Std. Deviation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|------|---------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | Usage of formal tools | 15.20 | 4.78 | | | | | | | | | | | | | |
| 2 | Usage of informal tools | 15.21 | 4.26 | 0.71** | | | | | | | | | | | | |
| 3 | Difference between informal and formal tools | 0.00 | 0.76 | -0.38** 0.38** | | | | | | | | | | | | |
| 4 | Willingness to give | 17.52 | 2.42 | 0.34** 0.29** -0.068* | | | | | | | | | | | | |
| 5 | Willingness to seek | 16.92 | 2.83 | 0.38** 0.39** 0.01 0.42** | | | | | | | | | | | | |
| 6 | Affect-based trust | 16.08 | 2.86 | 0.31** 0.36** 0.06 0.41** 0.41** | | | | | | | | | | | | |
| 7 | Cognition-based Trust | 15.92 | 3.09 | 0.17** 0.24** 0.09** 0.26** 0.24** 0.45** | | | | | | | | | | | | |
| 8 | Role breadth self-efficacy | 25.23 | 5.16 | 0.45** 0.38** -0.10** 0.39** 0.47** 0.43** 0.19** | | | | | | | | | | | | |
| 9 | Affect commitment | 40.66 | 7.29 | 0.31** 0.24** -0.10** 0.31** 0.37** 0.38** 0.22** 0.47** | | | | | | | | | | | | |
| 10 | Age | 2.66 | 2.26 | 0.05 -0.04 -0.12** 0.02 0.02 0.11** -0.07* 0.16** 0.22** | | | | | | | | | | | | |
| 11 | Tenure | 4.42 | 1.08 | -0.05 -0.05 -0.13** 0.08* 0.01 0.13** -0.10** 0.12** 0.16** 0.63** | | | | | | | | | | | | |
| 12 | Education | 4.95 | 1.53 | -0.02 -0.09* -0.09* 0.03 -0.06 0.03 -0.03 0.00 0.02 0.43** 0.60** | | | | | | | | | | | | |
| 13 | Dummy male | 0.60 | 0.49 | 0.18** 0.15** 0.00 0.06 0.06 0.06 0.03 0.05 0.10** 0.14** 0.09* 0.03 | | | | | | | | | | | | |
| 14 | Dummy female | 0.25 | 0.43 | -0.07* -0.05 0.02 0.00 0.03 0.04 0.01 0.08* 0.03 -0.11** -0.04 -0.03 -0.71** | | | | | | | | | | | | |
| 15 | Social desirability | 19.58 | 2.79 | 0.23** 0.21** -0.02 0.20** 0.25** 0.28** 0.19** 0.26** 0.24** 0.26** 0.06 0.03 0.01 0.01 | | | | | | | | | | | | |

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
### Table 2 Regression Models

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<th>DV: usage of informal tools</th>
<th>DV: difference between usage of informal and formal tools</th>
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<td>0.08*</td>
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**Notes:**
- ***p<0.001; **p<0.01; *p<0.05, all VIFs < 2.6
- Valid N is 860 for all models.
Figure 1: Research Models

[Diagram of research models with nodes labeled as: Willingness to seek knowledge, Willingness to give knowledge, RBSE, Affect-based trust, Cognition-based trust, Usage of formal tools/usage of informal tools, RBSE, Affect-based trust, Difference between informal and formal tools usage. The diagram includes hypotheses H1, H2, H3a, H4a, H5, H6, H3b, and H4b.]
Figure 2 The moderation effect of cognition-based trust on the relationship between willingness to seek knowledge and usage of formal knowledge sharing tools.
Figure 3 The moderating effect of cognition-based trust on the relationship between willingness to give knowledge and usage of informal knowledge sharing tools.
Instrument Items used in the questionnaire

All scale measures except specially mentioned are based on seven-Likert scales, using “strongly disagree,” “disagree,” “slightly disagree,” “not sure,” “slightly agree,” “agree,” and “strongly agree” anchors.

Usage of Formal Tools

1. Attending a meeting to review and discuss problems and brainstorm solutions

2. Attending training courses held by the company to get job relevant skills

3. Sharing written documents (reports, manuals, or procedures) with colleagues to solve problems at work

4. Formally searching for an expert in the company to solve work-related problems or receiving request to help somebody to find the solution

Informal Knowledge Sharing Tools

KS_1. Visiting or being visited by other colleagues with the specific purpose of learning how a particular improvement or work is done

KS_2. Discussions with colleagues in the company to provide ideas and solve problems

KS_3. Sharing knowledge with colleagues informally, e.g., at lunch, dinner or some other social situations
KS_4. Joining specific internet forums to search for or answer work-related questions

**Willingness to share and seek knowledge** (Cabrera et al. 2006)

**Share:**

1. Anytime I have valuable information related to my work, I do whatever is in my hand to make it available to other people who I think could be interested.

2. When information is requested about some work I have done or in my area of expertise, I do not hesitate to fully provide the interested person with all the information that I have.

3. I participate actively in one or several forums or work groups within IBM providing my ideas and helping others find solutions to their problems.

4. I am too busy with my own work to be able to help others find solutions to their problems (reversed scored)

**Seek:**

1. I often search through the information tools I have available for information and experiences which may be valuable for the work I am doing.

2. I try to stay updated by exploring all the information I can find through the information systems I have available.

3. I often publish requests for advice and information that can help me in my work.
4. I do not have time to search through the sources I have within IBM for information or experiences other people may have had (Reversed scored).

**RBSE** (Parker 1998)

1. I feel confident making suggestions to management about the way to improve the working of my section.

2. I feel confident contributing to discussions about the company's strategy.

3. I feel confident presenting information to a group of colleagues.

4. I feel confident visiting people from other departments to suggest doing things differently.

5. I feel confident contacting people outside the company (e.g. suppliers, customers) to discuss problems.

**Affect-Based Trust** (McAllister’s 1995)

1. My coworkers and I have a sharing relationship. We freely share out ideas, feelings and hopes.

2. I can talk freely about difficulties I am having at work and know that they will want to listen.

3. My coworkers and I would both feel a sense of loss if one of us was transferred and we could no longer work together.
Cognition-Based Trust (McAllister’s 1995)

1. My coworkers approaches their job with professionalism and dedication.

2. Given my coworkers’ track record, I see no reason to doubt their competence and preparation for the job

3. I can rely on my coworkers not to make my job more difficult by careless work

Social Desirability (Crowne and Marlowe 1964). (The "honest" responses are marked 'R'. Such items earn a score of 1 for 'Yes' and 3 for "No'. The same answers for the other items earn scores of 3 and 1 respectively. "?" or "Not sure" or no answer is scored 2 on all occasions.)

1. Have there been occasions when you took advantage of someone? R

2. Have you sometimes taken unfair advantage of another person? R

3. Are you always willing to admit when you make a mistake?

4. Are you quick to admit making a mistake?

5. Do you sometimes try to get even rather than forgive and forget? R

6. Do you sometimes feel resentful when you don't get you own way? R

7. Are you always courteous, even to people who are disagreeable?

8. Are you always a good listener, no matter whom you are talking to?
**Chinese Translations**

非常不同意，不同意，略为不同意，不知道，略为同意，同意，非常同意

**Usage of Formal Tools**

KS_1. 参加一些讨论问题并且集体研讨解决方法的会议。

KS_2. 参加公司的技术培训。

KS_3. 与同事交流书面文件（报告、工作心得或工作日记等）解决问题。

KS_4. 在公司中寻求专家帮助解决工作中的问题。

**Informal Knowledge Sharing Tools**

KS_5. 参观学习其他同事的工作方法，或者被参观学习。

KS_6. 和同事一起讨论，并且解决问题。

KS_7. 在非正式场合（比如吃饭时）与同事交流知识、信息、经验、技术，帮助解决问题或者寻求帮助。

KS_8. 到网上论坛寻找与工作相关的答案或者解决别人的疑问。
Willingness to share and seek knowledge (Cabrera et al. 2006)

Share:

Open_1. 我会全力以赴地把我有价值的工作信息提供给对其感兴趣的同事。

Open_2. 当有同事问我有关我在行儿的事情，我会毫不犹豫地、不留余力地帮助他们。

Open_3. 在公司里我积极地参与讨论，提供我的意见并且帮助其他同事解决问题。

Open_4. 我自己的工作已经很忙，几乎没有时间帮助其他同事解决问题。

Seek:

Open_5. 我时常搜寻我所有的信息渠道，寻找对于我现在的工作有用的信息和经验。

Open_6. 我经常搜索最新资讯来保持在信息上不落后。

Open_7. 我时常寻找对工作有帮助的建议或信息。
Open_8. 我没有时间在公司里搜寻其他同事的可能已经有的信息和经验。

RBSE (Parker 1998)

RBSE_1. 我可以很自信地向我的领导建议关于改进我所在部门的工作。

RBSE_2. 我自信我在讨论有关公司策略的时候有所帮助。

RBSE_3. 当我对很多同事介绍信息的时候我很自信。

RBSE_4. 当我在其它部门建议他们不同的做事方法时，我很自信。

RBSE_5. 当我联系公司以外的人(例如供应商,客户)讨论问题时，我很自信。

Affect-Based Trust (McAllister’s 1995)

Tr_1. 我和我的同事经常一起交流我们的见解、心情和希望。

Tr_2. 我能畅所欲言地对我的同事讨论我工作上的问题，并且知道他们愿意听。

Tr_3. 如果我和我的同事不能在一起工作，我们都会有失落感。

Cognition-Based Trust (McAllister’s 1995)

Tr_1. 我的同事非常专业，也很投入。
Tr_2. 据以往纪录，我没有理由怀疑我同事的能力。

Tr_3. 我的同事不会因为他们的粗心而增加我的工作困难度。

Social Desirability (Crowne and Marlowe 1964). (The "honest" responses are marked 'R'. Such items earn a score of 1 for 'Yes' and 3 for 'No'. The same answers for the other items earn scores of 3 and 1 respectively. "?” or "Not sure" or no answer is scored 2 on all occasions.)

SD_1. 你曾经的占过别人的便宜吗？

SD_2. 你曾经不公平的占另一个人的便利吗？

SD_3. 有时你总想得到而不是宽恕或遗忘么？

SD_4. 当你不能用自己的方式的时候,你会觉得不满吗？

SD_5. 当你犯错误时你总是愿意承认错误吗？

SD_6. 你总是很快承认犯错误吗？

SD_7. 即使你面对那些不为人喜欢的人，你总是很有礼貌吗？

SD_8. 你总是一个很好的听众吗，无论谁在说？
STRATEGIC MODELS AGAINST COUNTERFEITERS

– WITH PARTICULAR FOCUS ON CHINA

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ABSTRACT

For most of the international companies active in the Chinese market, the development of proper anti-counterfeit strategies has become a critical issue within this competitive environment. Based on the previous theories, this paper suggests first a threat analysis model and a comprehensive anti-counterfeit strategy model aimed at helping companies to understand different sources of threats within the unique Chinese environment, to examine and improve their existing corporate strategies against counterfeiting, and, lastly, to develop and introduce new and effective approaches against counterfeiting. The model includes five different strategic perspectives: the marketing, channel, defensive, relationship and surveillance perspectives. Various examples are used to illustrate each of the strategies.

Keywords:

Counterfeit; threat analysis; anti-counterfeit strategies
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INTRODUCTION

Counterfeiting has spread throughout the world and developed into an economic problem of international significance. In addition, this global economy for illicit goods is massive and is growing. The number of counterfeit items seized at European Union borders has increased by more than 1,000%, rising to more than $103 million in 2004 from $10 million in 1998. At US borders, seizures of counterfeit goods have more than doubled between 2001 and 2006 (Guiterrez et al., 2006). The question we ask here is how companies should react to the enormous number of counterfeit products.

Counterfeiting continues to flourish because multinational marketing has created a strong demand for well-known brands throughout the world (Bush et al., 1989). Technological advances also enable counterfeiters rapidly and easily to produce brand-name products (Harvey and Ronkainen, 1985) in commercial quantities, sometimes even approaching the original quality. Furthermore, counterfeiting operations are highly coordinated and, as a result of globalization, counterfeit products are distributed in an increasing number of markets. The German customs office in Hamburg found 117 containers of falsified branded articles to the value of approximately $512 million in November 2006. These articles had been shipped from different ports in Asia to Hamburg and were intended for the retail trade in Austria, Hungary, Italy, etc. (Manager-Magazine, 2006).

The damage done by counterfeiting is significant. Infringed companies suffer direct damage, which includes the loss of sales/profits, a shrinking market share, diminished reputation, and the loss of goodwill. The erosion of brand equity could occur if
consumers were to become aware that some portion of a brand’s available stock is actually counterfeit (Wilke, 1999). Furthermore, the sale, manufacture, and distribution of counterfeit goods rob economies of tax revenues, discourage innovation, and impede economic growth, which ultimately result in a loss of employment opportunities and decreased investment levels.

Another trend relates to the increase in substandard and dangerous counterfeit goods that could endanger public health and pose safety risks. The tainted milk powder scandal in China has, for example, caused over 3000,000 infants ill from milk powder contaminated with melamine, an industrial chemical used to make plastics and fertilizer (BBC, 2009). These counterfeits are present in most industries.

Despite the seriousness of and the worldwide outcry against counterfeit products, only limited research has been done on the subject. The literature reveals a specific lack of research on corporate strategies aimed at combating counterfeiting. Taking a corporate perspective, this paper therefore aims to develop a comprehensive framework that could help companies to first understand the different sources of such threats, to thereafter examine and improve their existing strategies against counterfeiting and, finally, to develop and introduce new and effective approaches. China has been selected as the focus country of this paper due to its huge contribution to this illicit global business.

This paper is structured as follows: building on an extensive literature review, the paper provides a list of available approaches that have been recommended against counterfeiting and/or intellectual property (IP) infringement. This is followed by the
introduction of a model to help companies analyze the threat of counterfeit products. From this theoretical model, corporate strategies are derived with the help of illustrative cases. In conclusion, the paper discusses the managerial implications that have been deduced, as well as future research directions.

LITERATURE REVIEW

Although counterfeiting has kept the media busy for a long time, academic research into this area is insufficient. In general, the research on counterfeiting as an obstacle has been conducted from three angles: from the buyer’s side to prevent consumers from buying counterfeit products, from the seller’s side to offer suggestion on various tactics to impede copying, and from the regulatory side to call for appropriate regulation against counterfeiting on a national and international level. Nevertheless, efficient enforcement seems to remain the seller’s task, i.e. the task of individual firms (Globerman, 1988). The strategies that these firms employ to counteract counterfeiting are therefore the focus of this paper.

Researchers have unearthed various ways of battling counterfeiting. Liu et al. (2005) have provided a ‘newsvendor’ model for industrial administration offices by which inventory managers can be monitored and commercial cheating can be prevented. Commercial cheating refers to inventory managers’ practice of ordering counterfeit and low-quality products at greatly differing set-up costs and selling them as genuine products. The article recommends a combination of random examination and different punishment levels to limit commercial cheating. Chaudhry and Walsh (1996) present a
model that depicts the process that firms employ to evaluate an entry strategy decision with regard to the target market’s counterfeit environment.

The measures that have been proposed to counter the growing problem of counterfeiting range from differentiating products, emphasising quality and appearance, showing consumers how to differentiate between a genuine product and a fake, to creating a prestigious image evoked by purchasing a genuine product. Emphasising the possible embarrassment that a consumer could suffer when found to have purchased a counterfeit product has also been suggested (Wee et al., 1995; Delener, 2000; Harvey, 1987; Harvey and Ronkainen, 1985). Other suggested measures are: providing a product with a unique identification, the clever packaging and marking of products, including special spouts to prevent the refilling of bottles, the use of holograms, hidden chemical fingerprints, and other hidden markers (Colvin, 1999; Harvey and Ronkainen, 1985; Delener, 2000; Chaudhry and Walsh, 1996), withdrawal from particular markets (Harvey and Ronkainen, 1985), developing better relations with the distribution channel (Olsen and Granzin, 1993), monitoring and providing channel members with financial incentives to reject counterfeits (Harvey, 1987), lobbying government for stronger anti-counterfeiting laws (Harvey and Ronkainen, 1985; Brooks and Gellman, 1993), forming anti-counterfeiting coalitions with other firms (Delener, 2000), and establishing resources to search for counterfeit products in consumer markets (Harvey, 1987; Harvey and Ronkainen, 1985).

On an international scale, however, these successful cooperative efforts are almost always actions suggested exclusively for companies in western countries, although the
counterfeiting industry mostly flourishes in developing countries such as China (Bush et al., 2001). Companies located in China therefore need to react quickly, as the above-mentioned research has been conducted in developed countries and the recommendations have a limited effect in the Chinese environment. As yet, there are no specific anti-counterfeit strategies for international and national companies located in China.

A small part of the literature focuses on legislative procedures. Harvey and Ronkainen (1985) and Harvey (1987) suggest that companies should initiate litigation to protect their own sales, the consumer and society’s goodwill. The detailed prosecution actions suggested are an asset freeze (Brooks and Gellman, 1993), the pursuance and prosecution of offenders (Harvey, 1987), and seeking damages and fines through the courts (Brooks and Gellman, 1993). Unusually, Harvey and Ronkainen (1985) and Delener (2000) suggest a hands-off strategy. In other words, no attempt being made to prosecute counterfeiters, as consumers might switch to other brands if it becomes known that a particular brand product has been faked.

Some researches approach counterfeiting from the business strategy imitation perspective. Imitation of a successful strategy has been closely associated with replication of products included in the particular strategy, and vice versa (Nelson and Winter, 1982; Reed and DeFillippi, 1990). Causal ambiguity (Lippman and Rumelt, 1982; Reed and DeFillippi, 1990) and complexity theory (Rivkin, 2000) have therefore been intensively investigated as deterrents to imitation. The researchers contend that causal ambiguity and complexity can successfully prevent imitation by making the production process complicated or ambiguous for outsiders, so that copycats will not have enough
information to replicate the products. These contributions do not, however, indicate the extent of the causal ambiguity and complexity. It could, in fact, be tremendously expensive for companies to increase these levels, as this will increase costs exponentially.

In addition, some literature on IP infringement also provides hints on anti-counterfeit strategies. Yang et al. (2004) provide an anti-piracy strategy model, which includes proactive approaches, means of networking and defensive weapons. Even though the paper deals mostly with IP abuse, and the strategies are mostly for multinationals in China, some approaches are helpful for companies fighting counterfeiting.

Based on the literature on counterfeiting and IP protection, the following table (Table 1) classifies the different strategies and approaches into five groups.

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Insert Table 1 about here

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THREAT ANALYSIS MODEL

Anti-counterfeit strategies are long-term actions designed to safeguard companies’ products from counterfeitters. These actions are mostly extensively-planned and well-rehearsed in practice. As deduced from the literature review, the various anti-counterfeit
approaches target different objectives. Moreover, their effects and outcomes are distinct, while their costs and the time required are also divergent. Consequently, suitable strategies will differ from company to company. Which anti-counterfeit strategies companies should implement and when they should do so are two questions that this paper endeavors to answer.

The scale and various categories of the counterfeit threat also differ from company to company. A threat analysis is therefore essential. Only when companies are fully aware of the concrete threats that they face, can they design individualized and efficient anti-counterfeit strategies.

The following section presents a threat analysis model that highlights the main damage done by different types of counterfeit products. Thereafter the strategies that could counteract each threat are introduced.

The term ‘counterfeiting’ refers to the unauthorised act of producing and passing off duplicates of authentic products, whose trademarks are owned by another party, for business purposes. Copyrights and patents can only be pirated whereas trademarks can only be counterfeited (Paradise, 1999). There are three different types of counterfeiting. The counterfeit goods most often encountered are those that imitate a legitimate product’s legal trademark, copy the packaging and duplicate the products, e.g. fake Lacoste T-shirts. The counterfeiting business has, however, evolved and counterfeit products differ widely with regard to quality. There are counterfeit Lacoste T-shirts whose quality approaches that of the original and which are consequently sold at the same time in a
mixed batch with the originals or at a price approaching that of the original. Conversely, there are also badly-made fake T-shirts sold for 1 USD on the street. The second type of counterfeiting is to copy the same packaging or trademark, but to change completely the original product’s style, replacing it with a new design, colour or material and other details, e.g. a mobile cover shaped like a Ferrari, an 8-GB Sony memory stick, which Sony has not as yet produced. The third type of counterfeiting is to apply a trademark or use packaging resembling that of the original product deliberately to confuse consumers, e.g., a coffee bar with the same green colour and logo as those of Starbucks.

More important for the analysis is the rationale on the part of the customer to seek and purchase a fake product. Deceptive counterfeiting occurs when the consumer believes that she/he is buying a particular brand of a product, produced by a particular manufacturer, which in fact turns out to be a product of some other marketer (Eisend and Schuchert-Güler 2006). In the case of non-deceptive counterfeiting, the buyer recognizes that the product is not authentic according to specific information cues such as price, purchase location, or materials used (Chakraborty et al. 1997; Gentry et al. 2006). Similarly, cognitive psychologists have identified these two types of consumers as conscious and unconscious consumers (Bargh, 2002). This distinction has been adapted and refers to consumers’ knowledge of counterfeited products. Conscious consumers are those who knowingly buy counterfeit products, while unconscious consumers are not aware that the product is a fake when purchasing it. Conscious consumers are able to distinguish counterfeits from brand-name goods through close inspection, or because the legitimate producers can effectively indicate their product’s authenticity. Unconscious
consumers cannot readily observe the quality of the goods that they purchase, nor can
they easily distinguish fakes from authentic products. Examples of markets in which
substantial numbers of copies are believed to be successfully passed off as authentic
brand-name goods include those for automotive parts, consumer electronic products
(such as computers and stereo equipment), pharmaceuticals, fertilisers, and medical
devices (Grossman and Shapiro, 1988).

This distinction helps organizations to examine in detail the threat of faked products,
while the purchase action of conscious and unconscious consumers posts different threats
to organizations. For example, previous research has shown that non-deceptive
counterfeits, which are bought by conscious consumers, pose little or no health or safety
risk to the public and the buyer, and have apparently little demonstrable impact on
genuine brands (Nia and Zaichkowsky 2000). They may even help to build brand
awareness (Shultz and Saporito 1996) and to increase the snob value for both originals
and counterfeits (Barnett 2005). Under some circumstances, they can even lead to
benefits for society, e.g. when necessary expensive products such as particular drugs
become affordable to poor people (Ben-Shahar and Assaf 2004; Green and Smith 2002;
Wilke and Zaichkowsky 1999). As a result, so long as the conscious consumer would not
be potential consumer of original products, and organizations’ sales and market share will
not be eroded, there is no urgent need for organizations to invest significantly into anti-
counterfeit battles. However, most of the time, this is not the case. In the case that the
similarity of counterfeit goods is close to original products, organizations suffer the most.
When consumers purchase the counterfeit products consciously the manufacturer of the
branded good may lose current revenues as buyers purchase the counterfeit rather than their own good. When the purchase happens under the unconscious condition, organizations may lose future revenues because consumers experience a lower quality and move to competitor products. This, furthermore, undermines the brand name and brand image, resulting in a lower future profit stream and a lower stock market value. In the case that the similarity of faked products is far from the original products, as above mentioned, organizations will not suffer and on the contrary sometimes will benefit from the faked products. The buyer would, anyway, not have purchased the branded good, because they could not afford it, and accordingly there is no loss of revenue for the brand manufacturer. Based on the classification of consumers and counterfeit products’ similarity to the original product, we composed our threat analysis model (Figure 1) in perspective of companies manufacturing original goods.

The closer fakes are to the original products in terms of appearance and function, the higher the price they can fetch. The model, discussed in more detail in the following section, includes four kinds of threats, representing the differing damage that companies can suffer. For each of the threats a relevant countering strategy is also provided.
**THREAT I “I AM CHEATED”**

As pointed out before, counterfeit products differ with regard to quality. Threat I represents those counterfeit products that are similar to the original products, and are sold as legitimate products. Threat I not only leads to legitimate companies losing profits, but also damages their image through the counterfeits’ poor function. Unconscious consumers then blame legitimate companies for the products’ dysfunction or low quality, unaware that they are actually counterfeits. Moreover, a company’s image is still damaged even if the unconscious consumer does become aware of the counterfeits, as it is blamed for its inability to stop copycats. Threat I is mostly faced by companies producing automotive parts, consumer electronic products, such as computers and stereo equipment, pharmaceuticals, fertilisers, cosmetics and medical devices.

Relevant strategies to thwart Threat I are aimed at reminding consumers of the difference between counterfeit and genuine goods and strictly controlling the supply channel and distribution. Strategies to counter Threat I therefore include product solutions, customer relationship improvement, distribution channel management and supplier management.

**TI - 1 Product Solutions**

McCarthy’s marketing mix (McCarthy, 1960) has been adapted here to make four ‘P’ anti-counterfeit strategies (price discrimination, place discrimination, product solutions and public awareness promotion), which approach counterfeit problems from a marketing perspective. Product solutions aim to make it more difficult for copycats to produce counterfeit products through added extras to products and/or packaging. Overt and covert
technology measures are integrated into the product in order to make it more difficult to imitate.

Applying technology to product packaging is aimed at generating better traceable identification. Technical identification applied to packaging allows consumers, distributors, retailers, and owners easily to identify authentic products easily. These include individually-numbered security labels, anti-tamper foil labels, taglio printing, and holograms (Yang et al., 2004). Companies tend to use a combination of labeling techniques. Consumers can spot some of the authentication techniques very easily – which has been deliberately planned – but not, as they are intended for inspection by firms and other authoritative bodies.

Anheuser-Busch Companies Inc. applied a product solution after counterfeiters were refilling old Bud bottles, which has since kept counterfeiting at a low level (Balfour et al., 2005). The company started to use expensive imported foil, which was very hard to find in China, as packaging on the bottles. It furthermore added a temperature-sensitive label on the foil that turned red when cold. Even if copycats were to refill the used Bud bottles, they will not be able to find similar foil for packaging and cannot replicate the temperature-sensitive label. Consumers can thus immediately spot the fakes. The company regarded the extra expenditure on the packaging as a good investment.

Technical identification is an effective way of restricting pirated goods from entering official channels. Licensees can no longer overrun the production of authentic products, as only a limited number of authentic labels are supplied. It has also become easier for
companies, distributors, retailers, and consumers to spot an authentic product. While this strategy is effective against less-proficient pirates, however, it will fail in respect of more sophisticated counterfeiters with the expertise to replicate authentic marks or labeling. Consequently, companies need to constantly anticipate counterfeiters by raising the technical barriers to counterfeiting. This will undoubtedly increase the costs that companies already bear for technical solutions.

**T1 - 2 Customer Relationship Improvement**

This strategy aims at educating consumers to identify genuine products and where they can be bought, improving customer relationships, and promoting the company image when counterfeit goods come to light. According to Lai and Zaichkowsky (1999), the major predictor of unconscious consumers’ choice of an imitator brand is their inability to identify the original brand. Consequently, education plays an essential role in preventing unconscious consumers from buying fakes. Sales departments and marketing departments all have a role to play in this strategy. The sales team can be helpful in terms of face-to-face instruction in recognition of counterfeits, while marketing has a role to play in educating the public on counterfeits, particularly via the organization website or promotion campaigns. This strategy helps to increase consumers’ knowledge of legitimate products, increases their ability to identify counterfeits, and strengthens the relationship between customers and companies. This is not only a product strategy, but it also makes legitimate products more distinguishable from counterfeits and more recognizable to consumers.
Finally, organizations should not only have an in-place strategy to prevent counterfeiting of their products, but should also have an effective, viable response strategy. It is essential for public relations departments to ensure that their organizations respond quickly and effectively to reports of counterfeiting and that their organizations’ anti-counterfeiting efforts are reported in a positive light. A prompt and effective response is crucial to ensure a positive company image and good public relations. The basics of a prompt response include alerting the appropriate authorities, issuing public warnings, and contacting partners in the supply chain.

**TI – 3 Distribution Channel Management**

The distribution network is considered the key element in the marketing of counterfeit products (Harvey and Ronkainen; 1985), and distributors are the crux in the struggle to inhibit counterfeiting. They are often in the best position to receive information regarding the source of fake products because they are the last stage in the commercial channel. Distribution channel management’s objectives should be to prevent distributors from sourcing counterfeit products, and to provide them with incentives to report counterfeit products when these are detected.

Some distributors order both genuine and counterfeit products to reduce their costs by selling them at a genuine product’s price. Liu et al. (2005) provide a newsvendor model with which a government could monitor and limit this commercial cheating. As far as individual organizations are concerned, careful tracking through the distribution channel,
strict reporting and identification systems, and frequent distributor contacts should help companies to lessen the chances of counterfeiters accessing distributors’ inventories.

Another effective maneuver is to draw up strict contracts that compel distributors to purchase a particular product either directly from the manufacturer or from approved wholesalers. This type of contract is employed by the international pharmaceutical company Johnson & Johnson (J&J). It requires its distributors to sign a contract that prevents them from buying the company's drugs and medical devices from any source other than itself. These contracts also give J&J investigators the right to perform random audits and warehouse inspections to check for products not sourced directly from J&J. Companies refusing to agree with the terms of the contract, or those found to be distributing unauthorized goods, have their contracts terminated immediately. J&J has greatly increased the security of its distribution channel, and prevented distributors from turning to the "secondary" market to buy drugs.

In addition, the distributors are in the best position to physically screen physically for fakes. They can also inform final users about the dangers of counterfeiting, and advise them on how to identify fakes in the market-place. Consequently, the distributors’ cooperation is essential in the fight against counterfeiting. Olsen and Granzin (1992) developed a model that depicts the influence of a distributor's perceptions and beliefs on willingness to combat counterfeiting. The perceived importance of the problem and the distributor’s internalization of responsibility play a major role in the network of influences leading to willingness to help. With the assistance of their distributors,
companies can prevent counterfeit products from entering their distribution channel and can quickly detect the source of counterfeit products when they do appear.

**TI – 4 Supplier Management**

Suppliers could potentially become counterfeiters, or be a source for counterfeiters, as they have sufficient knowledge about companies such as their logos and packaging. Sometimes suppliers do become counterfeiters during or after a contractual period. During the contractual period, they produce far more products than required and ship the surplus through the back door to the grey market. Simultaneously, they forge their accounts. Some suppliers also continue to produce in secret after a contract has been terminated. Supply chain management is therefore vital if companies are to prevent current or former cooperators from becoming counterfeiters. Supply chain management entails maintaining prudent contracts that include serious penalties for a breach of contract, stringently controlling licensing, setting up a monitoring system that can detect any contract violation early on, keeping a close eye on former suppliers, and maintaining close contact with current suppliers to ensure that they do not become the source of counterfeiting.

Failing to manage suppliers can lead to great financial loss. One of the most representative cases is the recall instigated by Kyocera Wireless Corporation (KWC), a leading global manufacturer of Code Division Multiple Access (CDMA) wireless phones and devices. KWC had to recall a million potentially fraudulent cell-phone batteries produced by a former supplier in China, an exercise that cost the company at least USD 5
These counterfeits featured Kyocera's logo and were designed to be absolutely similar to legitimate KWC-approved batteries. Companies should therefore carefully choose and control their suppliers (Georgi, Batteries Digest).

**THREAT II “I DON’T MIND”**

Customers, who are aware of the difference between fake and original products, nevertheless often choose to purchase fakes. We identify threat II as one of the greatest threats to authentic merchandise. Conscious consumers are probably motivated by a variety of motivations, of which the product’s cost is the driving factor (Lichtenstein et al., 1993; Tom et al., 1998; Bloch et al., 1993; Albers-Miller, 1999). Counterfeit products are cheaper than originals, and the consumer’s low expectations regarding the product’s function may make it acceptable. Moreover, some consumers are willing to pay more for counterfeits than for generic merchandise of similar quality (Grossman and Shapiro, 1988), which allows counterfeiting to thrive. Legitimate companies suffer mostly from the loss of profit, the shrinking of their market share, and damage to their image due to their inability to combat counterfeiters. Strategies in this area include various approaches to discourage the purchase of counterfeits and tactics to deal with them, including public awareness campaigns, price discrimination, place discrimination, and cooptation and prosecution strategies.

**TII – 1 Promotion of Public Awareness**
This strategy aims to increase public awareness of counterfeit products, promote good will and improve customer relationships. Consumers' willingness to purchase counterfeit products is positively related to product performance expectations and negatively related to attitudes toward lawfulness (Cordell et al., 1996). When the product performance expectation is high and lawfulness is low, the purchase of counterfeit products occurs. In addition, an economic scale effect occurs with regard to the purchase of illegal goods: a buyer is most willing to buy an illicit product when others are also buying it (Albers-Miller, 1999). It is therefore essential that companies implement different approaches to raise public awareness and prevent them from purchasing such goods.

Customers and the public should be informed of the potential risk of prosecution, the danger of using fakes, and the possible embarrassment of being found to have purchased counterfeits. They should moreover also be motivated to report counterfeiting whenever and wherever detected, and incentives should be given to those who do so. Organisations could consequently gradually generate a culture in which the public will only buy genuine products and in which the use of counterfeit products will be something shameful. Such an approach would also illustrate companies’ determination to fight counterfeiting, which would threaten counterfeiters. The effect of this strategy will be long-lasting and generate significant advantages for organisations. It could, however, be time-consuming, costly and the result difficult to measure.

Besides advertisement, lawsuits, visits, interviews, etc. can also be used to gain effective public attention. Five international fashion brands, Gucci, Chanel, Burberry, Prada and Louis Vuitton have jointly sued the Silk Market, a famous market in China whose sales
of counterfeit foreign brands are valued at about USD 181,000 per year. The lawsuit has aroused a public debate in China and the international media broadcast the hearing worldwide. Even though the five companies eventually received compensation of approximately USD 2,000 each, the effect of this lawsuit on counterfeiters and consumers was enormous. This success has clearly indicated that neither the government nor legitimate companies will tolerate counterfeits.

TII – 2 Price Discrimination

This strategy comprises lowering products’ prices, which is aimed at narrowing the price gap between authentic and fake products, thus discouraging the conscious consumer from purchasing counterfeits. Many researchers (Lichtenstein et al., 1993; Tome et al., 1998; Bloch et al., 1993; Albers-Miller, 1999) have established that price is the only reason for that most consumers buy fakes. In addition, price is also the only reason that most people tolerate others buying fakes (Dodge et al., 1996). These products’ low prices gives conscious consumers the feeling that they have purchased a ‘bargain,’ whether this is real or imagined. Some consumers desire the sense of style or status conveyed by the product or by the perceived product function acquired at a ‘bargain’ price. A decrease in these products’s prices and the narrowing of the price gap between counterfeit and authentic products make the genuine product more attractive to conscious consumers, thus removing the incentive to purchase counterfeits. According to research commissioned by the Australian Toy Association in 2003, around 18% of Australians would knowingly purchase pirated goods if they were slightly cheaper than the original product, a percentage that increases to about 40% if the pirated goods were 75% cheaper, and to
almost 50% if the products were free (ACG, 2003). Coca Cola China has successfully adopted this solution (Yang et al., 2004), and adopted a low pricing strategy for its Cola drinks.

TII – 3 Place Discrimination

Besides registering trademarks and patents locally, organizations should reduce opportunities for competitors to steal key technology and brand names. This can be done by carefully selecting the products and technologies to be sold, or by ceasing to manufacture in places where counterfeiting is not tackled. Producers are also recommended to produce product parts in separate geographic locations, thus protecting their key competency. Place discrimination allows organizations to prevent the leakage of their key technology, consequently reducing the possibility of their products being faked. The disadvantage of this strategy is that certain business opportunities will be lost if organizations withdraw certain products from China, and the cost of production coordination increases if organizations’ production occurs in different countries.

Some pharmaceutical companies, for example, withhold their most innovative, high-margin drugs from the Chinese market, and introduce only lower-margin products that have few or no patent rights (Dietz et al., 2005a). This helps them to safeguard their state-of-the-art technologies, which are the products of very high R&D investments, by avoiding the counterfeiting of their products. Another large equipment manufacturer designs and develops hardware in China, but produces the related software abroad (Dietz et al., 2005a). The software, with its source code hidden, is delivered ready to be plugged
into the system by Chinese engineers. By separating the functions and keeping the technological details secret, the manufacturer significantly reduces the possibility of technology leakage and the chance of it being faked.

**THREAT III “I WANT IT”**

Threat III presumes that consumers are purposely buying badly-made fakes, or products that the legitimate companies have never manufactured. Companies facing Threat III include those producing cosmetics, fashions, household objects, etc. Strategies against this type of counterfeiting include public-awareness promotion, price discrimination, a cooptation strategy, prosecution, and a hands-off strategy. Compared with Threat II, this threat engenders a hands-off strategy, does not adopt a place discrimination strategy, as the fake products only use the same packaging or brand, not necessarily replicating the product itself. Companies therefore do not intervene if counterfeit activities are detected, as the costs of prosecuting would far outweigh any benefits such as sales and a threat to the company image. In addition, Nia and Zaichkowsky (2000) established that 70% of their survey respondents find that the value, satisfactoriness, and status of the original luxury brand names are not decreased by the counterfeits that are widely available, nor did this negatively affect their intention to purchase the original luxury brands.

**THREAT IV “I DON’T KNOW”**

Threat IV presumes that unconscious consumers purchase counterfeits with little similarity to the original products. This can happen in small villages far from the city, where people do not have enough information on or knowledge of the brand. They cannot
distinguish original brands nor have any information on what a certain brand produces. Efficient strategies for this area are product solutions and customer relationship improvement. Legitimate products should be publicised and consumers informed about them. As it is relatively difficult, however, to approach people who are far from cities in China, anti-counterfeit strategies should be undertaken circumspectly, as they could be very costly.

ANTI-COUNTERFEIT STRATEGY MODEL

Apart from the strategies recommended above, we also suggest reactive and supporting strategies to help winning the battle against counterfeiters. As presented in Figure 2, the anti-counterfeit strategy model indicates the possible combination of each strategies.

REACTIVE STRATEGIES

Reactive strategies help companies cope efficiently with counterfeit activities. They aim at punishing those who are involved in counterfeit activities. They can, moreover, enlarge a company’s capacity if a cooptation strategy is applied.

RD – 1 Cooptation Strategy
Under certain circumstances, it could be strategically valuable for companies to take over those participating in the manufacture of counterfeit products. This strategy is called a cooptation strategy. Organizations approach counterfeiters and incorporate them as a legitimate part of their organization system, for example, as manufacturers, distributor (Shultz and Saporito, 1996; Green and Smith, 2002) and/or licensees. However, many preliminary conditions need to be met for a cooptation strategy to be successful. First of all, the quality and/or capability of those who participate in counterfeit activities should be relatively similar to those of the legitimate organizations. Second, cooption of illegal parties presupposes that an organization has sufficient economic resources to do so and intend to enlarge its business group through mergers and/or acquisitions of illegal producers (Yang et al., 2004). Ultimately, a cooptation strategy creates a win-win situation: whatever the result, all parties can benefit from the strategy. Researchers have further suggested that negotiations should be undertaken with counterfeiters to make them part of a firm’s legitimate channels of distribution. Yang et al. (2004) recommend that be undertaken if the legitimate organization has sufficient financial means.

One of Metaldyne’s European subsidiaries was threatened with bankruptcy by a Chinese counterfeiter. The fake product looked exactly like the authentic one, having the same packaging, the same laser etching on the cardboard box, and even had the same misspelled word in the instructions. Metaldyne's tests indicated that one of the counterfeit product’s parts was surprisingly close in quality to the original product. The quality of the knock-off was so good that Metaldyne wanted the imitator to help introduce a second tier of value-priced parts in China that could be sold around the world. The company’s
strategy was based on the following issues: It was seeking joint-venture partners in China, the quality of the bogus product was high, labour costs in China are significantly lower than those in Europe, and it wanted to offer a line of low-priced aftermarket components. The cooptation strategy offered the company the opportunity to find a partner in China (Johnson, 2004).

**RD – 2 Prosecution Strategy**

It is essential that companies make efforts to sue and destroy counterfeiters by making counterfeit activity punishable by legislation. This will prevent brand images from being damaged by fakes and show a strong willingness to counteract counterfeiting activities. The prosecution targets can be the counterfeit product producers, distributors, sellers and retail companies that provide a place where counterfeits can be sold. Once a counterfeiting practice has been discovered, the suggested procedure is to trace it backwards through the channel of distribution in order to target as many participants as possible. Thereafter related government agencies, such as the industrial and commercial bureaus, public security organs, prosecuting bodies and people's courts, should be informed. In addition, joint action plans can be launched together with these agencies. Besides the institutions mentioned, policemen, customers and the China Association for Quality Promotion (CAQP) can be contacted to undertake joint action, depending on the scale, purpose and target of the action.

The CAQP is a famous association comprising government bodies, media, economists, scientists and companies with brand-name products. It has many complaint centres that
collect information from the public. Suspected individuals, companies, and sometimes even related local authorities, are then secretly investigated by CAQP employees. The results are later revealed in television programmes. Since its set-up in 1992, the CAQP has disclosed enormous counterfeiting activities through various media that most Chinese trust implicitly. The CAQP promotes public supervision, educates the public on how to detect fakes, reveals counterfeit products and identifies counterfeiters, middlemen, etc., thus exposing entire illegal parties. The CAQP should always be contacted to help companies owing to its experience with investigations, its powerful media and positive public image.

**SUPPORTING STRATEGIES**

Supporting strategies facilitate other strategies and create economic scale effects. They are divided into two groups: a relationship perspective and a surveillance perspective. A relationship perspective facilitates other strategies by improving the relationship within the business circle. The surveillance perspective strengthens the anti-counterfeiting intensity by obtaining external help. The following section elaborates on each of these perspectives.

**Relationship Perspective (SR)**

It is more efficient and productive to apply external assistants to combat counterfeiters, especially in respect of international companies that are not totally familiar with the Chinese context. Besides the assistance from distributors mentioned above, companies
should also include stakeholders such as their employees, partner companies and local
governments.

**SR – 1.** Employee relationships. Employees play an essential role in fighting
counterfeiting, and good human resource management will prevent the leakage of trade
secrets and product know-how through staff. An employee relationship strategy is aimed
at strengthening the legal contract with employees, promoting employee loyalty and
undertaking other measures to prevent key knowledge from being leaked internally.
Some organisations separate business functions to keep certain knowledge within a
certain department (Ichniowski and Shaw, 1997). Other organisations reinforce company
secret protection awareness by requiring the signing of a non-competitive clause, which
prevents employees from serving competitors for some time after leaving. Some
exceptional performers screen all job candidates for high ethical standards (Dietz et al.,
2005).

**SR – 2.** Government relationships. The relationship with the government is of significant
importance for organisations to prevent and defeat counterfeiters. There are various
means of ensuring a close relationship with the relevant government administration and
agencies, such as constant contact and information exchange, joint training in respect of
legal actions and mutually undertaken raids or injunctions. It is critical for companies
first to figure out which governmental agencies will be helpful to them. There are local,
regional and national level agencies such as the government, industrial and commercial
bureaux, public security bodies, prosecuting bodies, people's courts, trademark offices,
policemen, customers and the CAQP. Whichever agencies companies choose to target, a long-term relationship is recommended.

Microsoft China is a very good example of cooperation with the government. Microsoft has trained government officials and established training institutes to increase knowledge and awareness of IP in China, and exert long-term external pressure on the government to tighten the legal prosecution of piracy (Yang et al., 2004).

**SR – 3.** Relationship with other aggrieved companies. A relationship with other aggrieved companies aims at establishing a network of other ‘brand-name’ firms operating in China in order to take collective measures to exert joint pressure on pirates and on relevant organisations to take administrative actions (Yang et al., 2004). Such a relationship could include seminars with these aggrieved companies to exchange anti-counterfeit experiences, to discuss the problems encountered and search for solutions. Such a partnership allows the companies to improve their knowledge of anti-counterfeiting and to plan joint actions to overcome counterfeits. Collective actions also strengthen companies’ pressure on governments. External pressure on governments together with domestic and international institutions, such as the International Anti-Counterfeiting Coalition and the Global Anti-Counterfeiting Group (GACG), can often be forceful and effective. Such a partnership brings significant benefits to small and medium-sized companies in terms of cost-saving and corporate pressure on governments to accelerate their policy-making process.
Manchester United Football Club (MUFC) has been an active member of a network of strongly branded companies such as Levi and Puma. The trademark managers of these companies hold regular meetings to exchange experiences with anti-counterfeiting activities and discuss effective measures that could be taken to solve specific problems (Yang and Sonmez, 2005).

**Surveillance Perspective (SS)**

SS – 1. Employee surveillance. The employee surveillance strategy is dedicated to setting up a group of employees to work as organisation detectives to monitor the market. They are full-time employees who survey the market and endeavour to detect the counterfeit products. Li-Ning Co., China’s number one homegrown athletic footwear and apparel company, has three full-time employees tracking counterfeits. The second layer of this strategy is to organise an investigation team that regularly inspects distributors, suppliers, licensors and the relevant manufacturing bases to prevent overruns and counterfeit products from entering the company’s channel. This strategy helps organisations quickly to detect counterfeit practices and limits damage by exposing counterfeiters right from the start.

Employing professional companies instead of employees to conduct inspections is also recommended, as they can undertake inspections at distant sites, have professional experience, local knowledge, can cover the extensive work, and are familiar with the danger that the job entails. MUFC is an example of a company that employs professional agencies in China. These agents keep a vigilant eye on manufacturing activities, checking
that the manufacturers are licensed and that products being sold are authentic (Yang and Sonmez, 2005).

Microsoft Corporation is another good example in this regard, as it currently employs a worldwide anti-piracy and Internet safety team of 65 lawyers and investigators, who collaborate with law enforcement agencies around the world (De Smedt, 2005).

SS – 2. Government surveillance. The government surveillance strategy aims at obtaining government help against counterfeiters and is based on a government relationship strategy. Surveillance is not possible until a relationship has been established with a government. In addition, all the governmental agencies mentioned in government relationships could be potential surveillance partners for companies. On the basis of their relationship with these organs, companies can undertake joint actions or campaigns against counterfeiters and related parties, or participate in those undertaken by the governmental agencies, thus improving the relationship. Joint action with the government and campaigns against counterfeit products not only emphasise the gravity of the piracy problem for the public, but function as supportive publicity for the brand companies. It is also essential to include third parties apart from governmental agencies, such as the media. The media’s contributions are significant in this regard. They help to bring the counterfeit problem to the government’s attention and expose the extent of the problem, which is especially helpful where the government is reluctant to take action. Secondly, the media make the aggrieved company’s name known, as well as the government’s determination to combat counterfeit products, thus also promoting the brand image after joint action with the government.
Besides the partners that MUFC has in China, the company also co-operates with the Chinese Trademark Office, which sanctions raids on factories manufacturing fake products (Yang and Sonmez, 2005).

DISCUSSION AND MANAGERIAL IMPLICATIONS

While noting the universal predicament that companies face in eradicating counterfeiting, this paper has provided a threat analysis model with which companies can evaluate the threats from counterfeiters. A group of strategies for each threat has been suggested and illuminated with cases. Instead of eradicating the problem completely, these strategies will efficiently decrease the amount of counterfeiting products and minimise the threats. These groups of strategies, based on each threat, can also be categorised in three classifications and five perspectives based on their different functions, as shown in the generic model in Figure 3. Reactive strategies minimise damage once counterfeit activities have been detected. It is, however, crucial to launch proactive strategies to safeguard products from being copied and reduce opportunities for counterfeit activities. They aim to reduce the feasibility of imitating activities, as well as to prevent imitators from accessing the legitimate supply and distribution channels and thus reach the consumers. Simultaneously, the supporting strategies facilitate proactive and active strategies and create economic scale effects.

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Insert Figure 3 about here
Within proactive strategies, two perspectives have been distinguished. The marketing perspective aims to utilise various marketing mechanisms to combat counterfeiting and promote goodwill among the public. The channel perspective provides anti-counterfeit strategies by re-examining and managing channel members, in other words, all the participants in an organisation’s supply chain and distribution channel. Reactive strategies can also be regarded as approaching the counterfeiting issue from a defensive perspective. It aims at undertaking legal actions retrospectively. Supporting strategies can also be characterised as two perspectives – relationship and surveillance – that are interrelated and strengthen each other. The relationship perspective facilitates the other strategies by improving the relationship within the business circle. The surveillance perspective strengthens the anti-counterfeit intensity by obtaining external help.

The generic model of anti-strategies and the threat analysis model complement each other. As pointed out before, these strategies differ with regard to costs, time input, target object, and consequences for companies in different industries. Threat analysis is companies’ entrance ticket to the knowledge house of counterfeiting, understanding their main danger and status quo given large-scale and internationalized counterfeiters. Before the strategies are applied, the generic model serves as a complementary tool with which companies can cross-check and diagnose the remaining strategies that can still be implemented. It thus acts as a blueprint for managers to obtain an overview of anti-counterfeit strategies and helps them to develop tailored protection means. In addition, a company’s market-place, experience in China, and long-term business strategies should
also be taken into consideration in the determination of company-specific anti-counterfeiting strategies. These strategies could, of course also be applied outside China.

Given the importance of the counterfeit issue worldwide, it is hoped that a stream of research will emerge to provide further insights into the results reported in this study and to identify other efficient strategies. Quantitative research is, for example, recommended as it could identify the factors that influence consumers’ purchase in each threat. This does not lie within the remit of this research, but could provide statistical evidence of the reported results.

CONCLUSION

The results from this study add to the growing literature on strategies against counterfeiters by providing insight into different threats that counterfeit product posts, and the corresponding strategies for companies to deal with counterfeiters. In particular, by applying our threat analysis model, organizations could apply a result oriented and cost efficient maneuver against counterfeiters. Our findings constitute a contribution toward the development of an integrative, systematic model against counterfeiting. We encourage researchers to continue utilizing a comprehensive approach to develop a more complex understanding of threats from counterfeiters and, ultimately, approaches against counterfeiters.
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## APPENDIX

Table 1: Anti-counterfeit Approaches in the Literature

<table>
<thead>
<tr>
<th>Targeted at Consumers</th>
<th>Targeted at Host Country Governments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use special packaging and/or labelling</td>
<td>Register trademarks and patents</td>
</tr>
<tr>
<td>Warnings about the risks inherent in counterfeit products</td>
<td>Educate local law enforcement officials</td>
</tr>
<tr>
<td>Provide lists of legitimate channel members</td>
<td>Injunctions against counterfeit goods</td>
</tr>
<tr>
<td>Emphasise the benefits of genuine products, e.g. warranties and after-sales service</td>
<td>Lobby for more stringent laws/enforcement</td>
</tr>
<tr>
<td>Offer site licences</td>
<td>Seek assistance from tax authorities</td>
</tr>
<tr>
<td>Offer reduced prices, related product lines</td>
<td></td>
</tr>
<tr>
<td>Emphasise the possible embarrassment of being found to have purchased counterfeit products</td>
<td></td>
</tr>
<tr>
<td>Awareness: publicise products, distributors/retailers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Targeted at Distribution Channels</th>
<th>Targeted at International Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educate channel members to recognise copycat products</td>
<td>Monitor policy of UN/ECE Advisory Group</td>
</tr>
<tr>
<td>Monitor and investigate distributors /retailers</td>
<td>Participate in IACC actions</td>
</tr>
<tr>
<td>Provide financial incentives to reject counterfeit products</td>
<td>Use the TRIPS of the WTO</td>
</tr>
<tr>
<td>Solicit dealer suggestions to develop tactics</td>
<td>Monitor the actions of the WIPO</td>
</tr>
<tr>
<td>Use tracking devices, such as RFID tags</td>
<td>Participate in multilateral organisations</td>
</tr>
<tr>
<td></td>
<td>Lobby for stronger global IPR protection</td>
</tr>
</tbody>
</table>

| Targeted at Pirates | |
|---------------------| |

225
<table>
<thead>
<tr>
<th>Establish internal enforcement team</th>
<th>Educate employees to recognise copycat products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use a surveillance programme at retail outlets</td>
<td>Use an acquisition and/or joint venture strategy</td>
</tr>
<tr>
<td>Develop a supplier quality assurance programme</td>
<td>Establish factories in lower-cost countries</td>
</tr>
<tr>
<td>Warn counterfeiters of possible legal action</td>
<td>Withdrawal from certain markets</td>
</tr>
<tr>
<td>Cut prices aggressively</td>
<td>Hands-off approach</td>
</tr>
<tr>
<td>Take covert actions</td>
<td>Pursue litigation</td>
</tr>
</tbody>
</table>

Source: Adapted from Chaudhry, Cordell and Zimmerman, 2005
Figure 1: Threat analysis model

- Figure 2: Anti-counterfeit strategy model
Figure 3: Generic model of anti-counterfeit strategies
Proactive strategies

**Marketing perspective**
- Place discrimination
- Price discrimination
- Product solutions
- Promotion

**Channel perspective**
- Supplier management
- Distribution channel management

Reactive strategies

**Defensive perspective**
- Cooptation strategy
- Prosecution strategy
- Hands-off

Supporting strategies

**Relationship perspective**
- Employee relationship
- Government relationship
- Relationship with other aggrieved companies

**Surveillance perspective**
- Employee surveillance
- Government surveillance
DISCUSSIONS AND CONCLUSION

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SUMMARY OF DISSERTATION RESULTS

It is the general objective of this dissertation to synthesize the relevant theories from multiple disciplines on knowledge sharing and knowledge protection that advance our understanding of the factors that facilitate knowledge sharing within firms and of the strategies that impede imitation between firms. The main part of the dissertation consists of three independent studies. In addition to that, introduction and conclusion of the dissertation have been also composed. In the introduction, I began by summarizing the distinction between different knowledge definitions, which are categorized into five perspectives. The views of different perspectives led to different focus of knowledge management and protection. As previous researchers (Davenport and Prusak 1998), I have chosen to view knowledge as an process, focusing on knowledge flow, the process of sharing, and distribution. I then continued the journey to review the extant literature on knowledge sharing, distribution channels within firms and strategies impeding imitation between firms, and concluded with the research gaps in achieving my research goal.

Following the identified research gaps the next three separate studies have been conducted. Figure 1 shows the structure of the dissertation.
The findings from research one (as shown in figure 2) had revealed that power distance, interpersonal trust, and affective commitment have combined effects on knowledge sharing in a hierarchical relationship. Employees’ knowledge sharing with their supervisors could be caused by their high affective commitment ($b=0.41$, $p<0.001$), and/or their high affect-based trust to colleagues in general ($b=0.16$, $p<0.001$). However, when their individual power distance is high, employees’ knowledge sharing with their supervisors could be lowered ($b=-0.1$, $p<0.001$). The positive relationship between affective commitment and knowledge sharing with supervisors was also moderated by employee’s individual power distance in such a way that the relationship between
affective commitment and knowledge sharing with supervisors was strongest when employee’s power distance is lowest (b=-0.1, p<0.05).

Figure 2. Findings from research one.

Findings from the second study (as shown in Figure 3) indicated that employees’ preferences for formal and informal knowledge sharing tools could be predicted by their openness to share knowledge, role breadth self-efficacy (RBSE), and trust. Specifically, RBSE had a significantly positive correlation to usage of both formal and informal knowledge sharing tools; however, the strength of the two links differs. The correlation between RBSE and formal knowledge sharing tools was much stronger than the correlation between RBSE and informal tools. In addition, affect-based trust had a significantly positive correlation with usage of informal tools, but its effect on usage of formal tools was not significant. This effect was further validated by the strong positive correlation between affect-based trust and the difference between usage of informal and formal tools, which indicated that affect-based trust had a stronger correlation with
informal tools than with formal tools. The last group of direct effects was openness to seek and provide knowledge. Openness to seek knowledge was significantly related with usage of formal and informal knowledge sharing tools. Nevertheless, openness to give knowledge only accounted for usage of formal knowledge sharing tools and had no effect on informal tools. The study also identified the moderation effect of cognition-based trust, which moderated the relationship between openness to seek knowledge and usage of formal knowledge tools, and between openness to give knowledge and usage of informal tools. The beta value from regression analysis for the above results have been shown in Figure 3a, 3b, and 3c. All are statistically significant.

Figure 3a. First results of study two
Openness to give knowledge
Openness to seek knowledge
RBSE
Affect_based trust
Cognition_based trust
Usage of informal knowledge sharing tools

Figure 3b. Second results of study two

Figure 3c. Third results of study two.
While noting the universal predicament that companies face in eradicating counterfeiting, study three has provided a threat analysis model (as shown in Figure 4) with which companies can evaluate the threats posted by counterfeiters. A group of strategies for each threat has been suggested and illuminated with examples. Instead of eradicating the problem completely, which causes usually inestimable price to organizations, these strategies efficiently decrease the amount of counterfeiting products and minimize the threats. These groups of strategies, based on each threat, have been categorized into three classifications and five perspectives based on their different functions, as shown in the generic model in Figure 5. Reactive strategies minimize damage once counterfeit activities have been detected. It is, additionally, crucial to launch proactive strategies to safeguard products from being copied and reduce opportunities for counterfeit activities. They aim to reduce the feasibility of imitating activities, as well as to prevent imitators from accessing the legitimate supply and distribution channels and thus reach the consumers. Simultaneously, the supporting strategies facilitate proactive and active strategies and create economic scale effects.
Figure 4. Results of study three.
Within proactive strategies, two perspectives have been distinguished. The marketing perspective aims to utilize various marketing mechanisms to combat counterfeiting and promote goodwill among the public. The channel perspective provides anti-counterfeit strategies by re-examining and managing channel members, in other words, all the participants in an organization’s supply chain and distribution channel. Reactive strategies can also be regarded as approaching the counterfeiting issue from a defensive perspective. It aims at undertaking legal actions retrospectively. Supporting strategies can also be characterized as two perspectives – relationship and surveillance – that are interrelated and strengthen each other. The relationship perspective facilitates the other strategies by improving the relationship within the business circle. The surveillance perspective strengthens the anti-counterfeit intensity by obtaining external help.
DISCUSSION

THEORETICAL IMPLICATIONS

Although knowledge has always been an important factor in organizations, only in the last decade has it been considered the primary source of competitive advantage (Stewart 1997) and critical to the long-term sustainability and success of organizations (Nonaka and Takeuchi 1995). The recognition of knowledge as the key resource of today’s organizations affirms the need for processes that facilitate the sharing and leveraging of individual and collective knowledge (Becerra-Fernandez and Sabherwal 2001; Nonaka, von Krogh and Voelpel 2006). Several observations can be drawn from the three studies mentioned above. The findings presented above provide several theoretical and practical suggestions to management regarding promoting knowledge sharing within firms and knowledge protection between firms.

Although trust plays a central role in knowledge sharing, its constituent elements have seldom been directly examined. The first contribution of this dissertation involves integrating cognition-based and affect-based trust theories to deepen the findings and ascertain cognition and affect-based trust’s different effects on knowledge sharing. In line with previous theories that trust to colleagues is associated with knowledge transfer in the same environment (Kanawattanachai and Yoo 2007; Szulanski et al 2004), the evidence from this dissertation has also shown that trust to colleagues impacts knowledge sharing with supervisors, influences employees’ choices of different knowledge sharing tools. Furthermore, trust has been separated into cognition- and affect-based trust, and their
different effects has been examined. Consistent with the social motivation theory perspective (Geen 1991) in suggesting that trust influences how people interpret and/or evaluate information provided by others (Dirks and Ferrin 2002, Jarvenpaa et al. 2004), findings show the strong impacts of affect-based trust on knowledge sharing with supervisors. Previous research in horizontal knowledge sharing has also identified this direct function of trust on knowledge transfer (Kanawattanachai and Yoo 2007; Szulanski et al 2004). Affect-based trust, as hypnotized, has also been found to impact on employees’ usage of informal knowledge sharing tools. Informal tools, which provide intimate environment, are the choices of employees who are emotionally attached to each other. By applying between subject design it has identified that the correlation between affect-based trust and formal knowledge sharing tools is significantly weaker than the correlation between affect-based trust and informal sharing tools. This has indicated the different impacts of affect-based trust on the choice of formal and informal tools.

Furthermore, another kind of trust, cognition-based trust, in this research has a different effect on knowledge sharing. Similar study has also been done by Levin and Cross (2004), which also separates the impacts of different trust. Findings show that competence-based trust and benevolence-based trust mediate the link between strong ties and the receipt of useful knowledge. Instead of mediating effect, the moderation effect of cognition-based study has been found in this research. Cognition-based trust alone doesn’t ensure the choice of knowledge sharing tools. A socio-emotional trustworthiness will not necessarily develop even with high cognition-based trust (Johnson-George and Swap 1982: 1316). Results from this research show that employees’ relationship with
other colleagues not only impacts the knowledge sharing with supervisors and the choice of tools, and also interacts with other factors influencing knowledge sharing together. The interaction between cognition-based trust and openness to give knowledge determined the choice of informal knowledge sharing tools. When knowledge providers perceive colleagues are competent and have the ability to understand the topic, informal tools could be used because they provide seeker and providers an intimate environment and could lead to a more open and deep knowledge exchange between members who are close with each other. Simultaneously, the interaction between cognition-based trust and openness to seek knowledge impacts on the choice of formal knowledge sharing tools. When employees are willing to seek knowledge, and at the same time they trust their colleagues’ ability and expertise, formal knowledge sharing tools are definitely their choice. The efficient and far reaching formal knowledge sharing tools provide knowledge seekers very good opportunity who trust colleagues’ competence generally.

Secondly, the research has shown that hierarchical knowledge sharing differentiates with horizontal knowledge sharing because of the fundamental effect of power distance. Power distance itself not only has impacts on employees’ knowledge sharing with their supervisors but also moderating other direct effects. Similar to previous theory that employees with a high power distance would be reluctant to directly seek performance feedback from their supervisors (Sully de Luque and Sommers 2000; Morrison, Chen and Salgado 2004), this research has also identified that employees with high power distance are hesitant to share knowledge with their supervisors. In addition to that, the moderating effect of power distance on the relationship between affective commitment and
knowledge sharing with supervisors is also in accordance with theories from Schwartz, who suggests that power, as a human basic value, transcends other specific actions and situations (Schwartz 1992, 2006).

The third contribution of this research lies in demonstrating that the strong impacts of affective commitment on knowledge sharing with supervisors, which demonstrates the similarity of hierarchical knowledge sharing to horizontal knowledge sharing. Consistent with previous research showing that organizational commitment results in employees’ willingness to share knowledge (Cabrera et al. 2006) and with knowledge transfer (Jarvenpaa and Staples 2000; Van den Hooff and Van Weenen 2004), this research has proofed the decisive effect of affective commitment in hierarchical knowledge sharing. Together with previous research, the findings on the strong impact of affective commitment in hierarchical relationship shows that employees’ affiliation with their employers impacts on their knowledge sharing fundamentally, including both horizontal and hierarchical knowledge sharing within organizations.

The fourth contribution of this dissertation broaden our views on current theories on knowledge sharing by providing evidence on the determinants for usage of formal knowledge sharing tools. Consistent with previous theory that employees’ willingness to share knowledge leads to knowledge sharing (Bock et al., 2002) this research has also identified their role in deciding usage of formal knowledge sharing. Employees, who are open to seek knowledge, do use the formal knowledge sharing tools for searching. Employees, who are willing to give knowledge, also apply formal tools to provide their knowledge; while formal tools provide a vast distribution range, long distance and
opportunities for an extensive, large-scale knowledge exchange (Davenport and Prusak 1998). In line with Cabrera and colleagues’ research (Cabrera et al. 2006) that RBSE is a major self-motivational source for knowledge sharing, this research has also identified the impacts of RBSE on usage of formal tools. In addition, by applying between subject design this research has identified that the correlation between RBSE and formal knowledge sharing tools is much higher than the correlation between RBSE and informal tools. This has indicated the stronger impacts of RBSE on choice of formal tools than informal tools.

Determinants for usage of informal tools have also been identified in this research, which consist the fifth theoretical contribution. Determinants for informal knowledge sharing tools are slightly different as those for formal tools. Openness to seek knowledge would lead to usage of informal tools, while employees who need certain knowledge probably turn to friends or close colleagues for help. However, the study failed to support that employees who are open to give knowledge would engage in using informal tools. This could be the reason that informal knowledge sharing tools cannot provide an efficient, accurate and large scale knowledge exchange. By using informal tools may involve certain amounts of knowledge loss or miss-interpretation in that, absent a formal coding of the knowledge, there is no guarantee that the knowledge will be passed accurately from one member to others.

From knowledge protection perspective, this research made its contribution from analytical perspective. A threat-analysis model has been setup from the establishing theories, which helps to identify threats posted by different types of counterfeited good
with quality variety. According to each threat, this research has provided corresponding strategies aiming at minimize the possible threats with moderate company effort. Compared with other research on counterfeit topic, this research has categorized available tactics against counterfeiters into different groups that helping companies to handle particular threats. This enables companies to maximize benefit with moderate effort against counterfeiters.

**PRACTICAL IMPLICATION**

The practical implications of this dissertation can be summarized as followings. This dissertation has identified the decisive influence of interpersonal trust on knowledge sharing with supervisors and employees’ choices of different knowledge sharing tools. Firstly, it is suggested here that managers should enhance interpersonal trust among employees, including both affect-based and cognition-based trust, given their different effects on knowledge sharing. This will not only increase the knowledge shared with their supervisors but also boost their usage of knowledge sharing tools. Secondly, employees’ knowledge sharing with supervisors is not only influenced by the relationship between employees and supervisors, but also by relationship between employees with organizations, and relationships among employees. Here it is argued that employees’ knowledge sharing with supervisors is not only the knowledge sharing between colleagues, but also the communication and the strategic resources exchange between hierarchies. Consequently, when promoting knowledge sharing between employees and supervisors, companies should pay attention to both the those factors that influence employees’ relationship with other colleagues, and aspects that impact on employee-
The findings suggest that a flat and direct communication style in organizations, and increasing employees’ emotional attachment to organizations help to promote knowledge sharing with supervisors. For detailed methods on the implementation refer to the discussion part of study one.

The third practical implication can be drawn for those managers who want to promote the usage of implemented knowledge sharing tools. Here it is argued that except the availability and performance of different knowledge sharing tools that influence employees’ choice of them, employees’ psychological characteristics and their relationship with other colleagues influence also their choices. Through the findings managers could motivate employees of different types to use the knowledge sharing tools that they preferred accordingly. This first helps managers to promote the usage of current knowledge sharing tools by matching employees’ preference. Second, it is argued also that companies can also cultivate employees’ relevant key characteristics to promote the usage of particular knowledge sharing tools.

The fourth practical implication of this dissertation lied in the lessons to fight against counterfeiters. This research recommends moderate efforts for maximal benefit in the battle against counterfeiters. Contrary to some people’s believe, some threats posted by counterfeiters can be neglected, according the threat analysis model of the research. Since the brand image and the purchase intention to original products are not influenced by the flooding cheap, floppy fake products (Nia and Zaichkowsky 2000). Consequently companies should concentrate on the main threats and put most efforts for the maximal return.
LIMITATION AND FURTHER RESEARCH

As usual this research cannot be exceptional from limitations and findings should be interpreted with caution. From the theory viewpoint, this research has applied theories from psychology and management; however, it is far from enough. Even though the first study was basically on knowledge sharing, the complex nature of sharing between hierarchical relationship decides that theories other than those from knowledge sharing could have functionalized. For example, theories from psychology on relationship between supervisor and employees and employee’s feedback seeking, theories on communications, management theories on leader-member exchange, and etc. They may all influence knowledge sharing in hierarchies. Given that this study is the first research on hierarchical knowledge sharing, researchers are encouraged to continue exploring this area and broaden our views on knowledge sharing in hierarchies.

From a methodology point of view, the study may be limited by the common method variance problems that affect any research of this nature. The self-reported measures where employees provided data have been used for both independent and dependent variables for research one and two. Since the variables used in this study were attitudinal and perceptual, it was necessary to assess the perceptions of the respondents. Unfortunately, the research setting that used made it difficult to obtain objective measures of knowledge sharing behavior without threatening the anonymity of the participants. Future research should try to somehow overcome this limitation by using different sources, such as the third part’s rating, for measuring dependent variables.
The sample is restricted to one country and one sector – actually one company – and, consequently it does not provide a basis for testing the generalizability of the findings. Future research conducted in other industries and national environments would provide interesting and complementary information.

From a practical perspective, strategic decision making may be more complex than was captured in this research in an organizational context. Employees may fall in much more complex situations, and some other factors than those examined in the study may decide employees’ decision to share knowledge. For example, they may face greater risks when sharing knowledge than withholding it. In some organizations, both sharing valuable knowledge and admitting to needing information may be perceived as risky (Borgatti and Cross 2003, McEvily et al. 2003). Further research could examine the various risks associated with knowledge sharing with supervisors. To what extend will the employees hold knowledge with their supervisors? What are the reasons for them to hold their knowledge? What are the consequence of their knowledge holding behavior? Is this knowledge holding behavior from employees recognizable to their supervisors or not? To answer these questions helps researchers and practitioners also get a deep insight into the employees’ knowledge sharing with their supervisors.

Future research could also associate the used knowledge sharing tools with the shared content. How do the format of shared knowledge, such as written document or experience and the content, such as sensitive or not sensitive information influence the choice of knowledge sharing tools? Is the choice of knowledge sharing tools related with
knowledge holding strategy? Answering these questions helps to understand thoroughly employees’ choice on different knowledge sharing tools.

CONCLUSIONS

This dissertation aimed to explore the relevant theories on knowledge sharing and protection from multiple disciplines and to advance our understanding of the factors that facilitate knowledge sharing within firms and impede imitation between firms. In order to achieve this goal, three independent studies have been conducted with their explicit aims. More specifically, they intended to explore the key antecedents to hierarchical knowledge sharing within firms, the decisive factors for employees to use different knowledge sharing tools, the different threats posted by counterfeiters that firms are facing and the strategies for each threat accordingly. The findings show that employees’ emotional attachment to organizations and affect-based trust to other colleagues impact strongly on knowledge sharing with supervisors. In addition, trust to other colleagues and employees’ role breadth self-efficacy influence the choice of knowledge sharing tools. The results from this dissertation add to the growing literature on knowledge sharing by providing insight into hierarchical knowledge sharing and usage of knowledge sharing tools, and on knowledge protection by threat analysis that companies are facing from counterfeiters. Researchers are encouraged to continue utilizing a comprehensive approach to develop a more complex understanding of knowledge sharing and knowledge protection.
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Declaration

I hereby declare that this dissertation has been written independently and has not been submitted at another University for the conferral of a Degree.

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