Culture, C2 and information sharing

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Abstract

Despite the fact that the military acknowledges the importance of information sharing during command and control and despite the existence of information technology to enable information sharing, information does not always get shared. Information sharing can be challenging even within one culture, but it becomes more difficult if there are cultural differences involved. This is the case in most military operations, which involve joint and combined cooperation. Therefore, the aim of this article is to develop a framework of factors that influence information sharing via information technology in a cross-cultural context. This article starts by defining what information sharing is. Subsequently the factors influencing the sender's willingness and ability to share information via information technology are described. This results in the construction of a framework. Next, research the impact of cultural differences on information sharing is presented and the implications for the research framework are discussed. The framework of factors that influence information sharing via information technology in a cross-cultural context will be examined empirically in the following phase of the author's PhD study.

1 Introduction

NATO (2001) defines command and control as "the functions of commanders, staffs, and other command and control bodies in maintaining the combat readiness of their forces, preparing operations and directing troops in the performance of their tasks (p. 50)." During command and control, information sharing is important. As Karoly (2001, in Aid, 2006) stated: "information is power. But it is useless when not shared (p. 51)." Currently, both NATO member nations and various other countries are in the process of transforming to become capable of Network Centric Warfare (NATO, SAS-50, 2006). "In essence, Network Centric Warfare (NCW) translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace (Alberts, Garstka & Stein, 2000, p. 2)." Thus, with the advent of NCW, the importance of information sharing will only increase. But despite the fact that information sharing is important, it does not always take place. For example, Joseph Celeski and Major Clifford Day both mentioned information sharing difficulties between US forces during Operation Restore Hope in Somalia. In fact, Major Day attributed US failures in Somalia partially to this lack of intelligence sharing (Bredenkamp, 2003).

The main function of a command and control information system is to share information. NATO (2001) defines it as "an integrated system comprised of doctrine, procedures, organizational structure, personnel, equipment, facilities and communications which provides authorities at all levels with timely and adequate data to plan, direct and control their activities (p. 50)." This definition shows, that the means used to share information (i.e. the command and control information system) comprises many different components. One of these components is equipment. There are different kinds of equipment that can be used to share information, for instance radio, telephone or information technology (i.e. a computer). Information technology concerns "the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information (Wikipedia, 2006)."

This is the kind of equipment that the article will focus on. Despite the fact that the military has information technology to share information with, information sharing does not always happen. Previous research has also found that, though information technology is an enabler, information technology alone is not sufficient to promote the sharing of information (Balthazard & Cooke, 2004; Constant, Sproull & Kiesler, 1996; Davenport & Prusak, 1998; Husted & Michailova, 2002; Jarvenpaa & Staples, 2000).

The first research question of this article is therefore, 'which other factors influence the willingness (and / or the ability) to share information via information technology?'

The second research question is ‘what is the impact of cultural differences on information sharing via information technology?’ A focus on the impact of culture is needed, because most of the military operations involve cooperation between different services (joint) and different countries (combined), each with their own culture and culture not only influences information sharing but it also influences use of information technology as well.
Culture can be defined as “the collective programming of the mind that distinguishes the members of one group or category of people from another” (Hofstede, 2001, p. 9). According to Hofstede (2001), the word culture is usually associated with nations, but it can also be applied to organizations and professions. To provide a richer explanation of the effects of cultural differences on information sharing via information technology, in this article, cultural differences will be assessed at all three levels: professional, organizational and national.
Research by Nisbett, Peng, Choi & Norenzayan (2001) has found cultural differences in preferred style of reasoning. They distinguish between a holistic style, which involves “attending to the entire field and assigning causality to it, making relatively little use of categories and formal logic, and relying on ‘dialectical’ reasoning (p. 291)” versus an analytic style of reasoning, that involves “paying attention primarily to the object and the categories to which it belongs and using rules, including formal logic, to understand its behavior (p. 291).” Thus, culture has an impact on the way people deal with information. In addition, cultural differences have been found to influence the use of information technology. For instance, Helmreich & Merritt (1998) found that national culture influences both preference for automation and opinions regarding its use; pilots from high power distance cultures are both more positive about automation and more likely to use it under all circumstances. Power distance is one of the dimensions of national culture and is defined as “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (Hofstede, 2001, p. 98).” Therefore, it can be concluded that in case of a joint and combined military operation, the problems with information sharing via information technology are likely to be exacerbated due to cultural differences.
Unfortunately, the academic community has paid little attention to information sharing in a cross-cultural context (i.e. national, organizational and / or professional), even though its importance is recognized (Bhagat, Kedia, Harveston & Triandis, 2002; Chow, Harrison, McKinnon & Wu, 1999; Gupta & Govindarajan, 2000; Müller, Spiliopoulou & Lenz, 2005). Therefore, the aim of this article is to establish a framework of factors that influence information sharing via information technology in a cross-cultural context. This will be done by determining which factors influence information sharing via information technology

(research question one) and establishing the impact of cultural differences on information sharing via information technology (research question two). The article starts by giving a definition of information sharing. Next, a framework will be presented in which the factors influencing information sharing via information technology are depicted. Subsequently, the results of previous research on the impact of cultural differences on information sharing via information technology will be shown. Finally, the implications of this research will be discussed, and ideas for future research will be offered.

2 The information sharing process

2.1 Defining information sharing

Prior to describing the information sharing process, it is necessary to define what information is. Within the academic literature, a distinction is made between data, information and knowledge. Unfortunately, there is no general consensus with regard to the definition and the boundaries of these concepts (DeLong & Fahey, 2000). Generally speaking, data are seen as unprocessed (raw), descriptions of 'objects of interest'. Information and knowledge differ from data in the sense that both are seen as instances of processed data. When a distinction is made between the two concepts, information is seen as patterns imbued in data and knowledge is viewed as contextualized information. Therefore, knowledge is often seen as deeper and richer than information. What differentiates the two is the amount of processing or reflection. Many authors use information and knowledge interchangeably (Bhagat, Kedia, Harveston & Triandis, 2002). In this article, no distinction will be made between information and knowledge.

Hansen (1999) defines knowledge sharing among people from different subunits as "a dual problem of searching for (looking for and identifying) and transferring (moving and incorporating) knowledge across organizational subunits (p. 83)." Appleyard (1996) on the other hand, uses a more narrow definition. She defines knowledge sharing as "the transfer of useful know-how or information across company lines (p. 138)." Regarding knowledge transfers, Szulanski (1996) notes that they are seen as "… dyadic exchanges of organizational knowledge between a source and a recipient unit in which the identity of the recipient matters (p. 28)." The success of knowledge transfer has been defined by Kostova (1999) as "the degree of institutionalization of the practice at the recipient unit (p. 311)."

In conclusion, knowledge sharing is viewed as a dyadic exchange between the sender and the recipient and involves both searching and transferring knowledge. This exchange can be conceptualized at three different levels, specifically, the individual level, the unit level and the organizational level. In this article, the focus will be restricted to the individual level and the transferring part of knowledge sharing. Furthermore, as described above, transfer encompasses the internalization of knowledge and is thus, amongst others, influenced by the characteristics of the recipient. This article focuses solely on the characteristics of the sender. In other words, when determining the factors that influence information sharing via information technology during C2 in a cross-cultural context, only the factors with regard to the person sending the information will be reviewed. As a result, the framework will consist

only of factors that influence the willingness and ability of the sender to share information. This is not to say that other factors, such as the characteristics of the recipient, are not important. This focus was chosen because the problem, as mentioned briefly in the introduction, is that during command and control information does not always get shared, despite the fact that it is important to do so. The factors influencing the senders' willingness and ability to share information are presented below.

2.2 Factors pertaining to the sender that influence the willingness and ability of the sender to share information via information technology

Based on previous research by Constant et al. (1994; 1996), Jarvenpaa & Staples (2000) investigated the determinants of the use of collaborative electronic media for information sharing both within and between organizations, with the individual as unit of analysis. Their research model will serve as the foundation of the framework that will be developed in this article. Jarvenpaa & Staples (2000) established that information culture, views of information ownership, propensity to share, task interdependence, computer comfort, perceived characteristics of computer based information and several demographic characteristics were all associated with a person's use of collaborative media to share information.

Information culture

Information culture "represents values and attitudes toward information and what 'to do' and 'not to do' related to information processing, publishing, and communication (p. 132)." Amongst others, it influences "preferences for certain media types or channels (p. 133)." Jarvenpaa & Staples (2000) distinguish two characteristics of information culture. The first is whether the information culture is open, or "the degree to which members can get access to information and information flows without any restriction imposed by the organization or by members of the organization (p. 134)." The second is whether the information culture is organic, referring to a "lack of formal structures and order for processing and sharing information (p. 134)." Contrary to expectations, they found a more structured, hierarchic information culture to be positively associated with the use of collaborative electronic media for information sharing.

Views of information ownership

Organizational ownership of information "relates to whether information and knowledge created by an individual ….are believed to be owned by the organization (Jarvenpaa & Staples, 2001, p. 151)." Research by Constant, Kiesler & Sproull (1994) established that a belief in organizational ownership had a positive effect on sharing information products, but no effect on sharing information expertise. In contrast, Jarvenpaa & Staples (2000) found that sharing information products and expertise were both negatively affected by organizational ownership. However, in their research on antecedents of organizational ownership (Jarvenpaa & Staples, 2001) they argued that the norm of organizational ownership has a positive effect on sharing information products and information expertise. Furthermore, Constant et al. (1994) view ownership as a 'zero-sum game', whereas research findings by Jarvenpaa & Staples (2001) indicated that this is not the case. Summing up, prior research has found an effect of organizational ownership, but results regarding the direction of this effect and whether it holds for both types of information are inconsistent.

Propensity to share

Propensity to share is a form of prosocial attitude that causes a person to "weigh more highly the social and personal good from sharing compared to the cost of sharing (Jarvenpaa & Staples, 2000, p. 135)." It increases the likelihood that the individual assigns organizational ownership rights to their work (Jarvenpaa & Staples, 2001) and increases information sharing (Constant et al., 1994; Jarvenpaa & Staples, 2000). This holds regardless of whether the information is viewed as expertise or as a product and irrespective of whether the sharing occurs internally or with an external party.

Task interdependence

Jarvenpaa & Staples (2000) describe task interdependence as the degree to which "the person's work is dependent on the efforts of other people in and outside of their organization (p. 136)" and posit that in case of interdependent tasks "pure rational self-interest suggest that benefits of reciprocity from communicating and sharing with others are increased (p. 136)." Their research confirmed that task interdependence is positively associated with information sharing (Jarvenpaa & Staples, 2000). But contrary to their expectations, they could not find a relationship between task interdependence and beliefs about organizational ownership (Jarvenpaa & Staples, 2001).

Computer comfort

Computer comfort refers to the individuals' attitude towards computers (Jarvenpaa & Staples, 2000). Based on prior research that found a significant relationship between attitudes and use of computers, Jarvenpaa & Staples (2000) argued that computer comfort, or a positive attitude towards the computer, is positively related to use of collaborative electronic media for information sharing. Their research confirmed this, which led them to conclude that "having adequate computer skills is important to facilitate information sharing and communication in an electronic media environment (Jarvenpaa & Staples, 2000, p. 145)."

Perceived characteristics of computer based information

Perceived characteristics, or perceived usefulness, of computer based information refers to "the degree to which an individual believes that use of computer based information enhances his or her work (Kreamer, Danziger, Dunkle & King, 1993, p. 4)." Perceived usefulness is determined by quality and accessibility. Quality refers to the precision, novelty and timeliness of the information and accessibility concerns both the ease and the amount of time that are needed to obtain information from the computer (Kreamer et al., 1993). Jarvenpaa & Staples (2000) used a short version of the 'perceived usefulness of computer based information (CBI)' scale developed by Kreamer et al. (1993) and established that perceived usefulness of CBI has a positive impact on information sharing via collaborative electronic media.

Demographic characteristics

Several demographic characteristics influence information sharing. Results from Constant et al. (1994) that the amount of work experience and work training is positively related to norms of organizational ownership for an information product and thus has an indirect, positive effect on information sharing. When information is viewed as expertise, the amount of work experience and work training has a direct, positive effect on information sharing. Jarvenpaa & Staples (2001) found that staff type, gender, age, educational level and time in present job influenced beliefs about organizational ownership and information sharing. Except for staff type, the strength of the effect of these characteristics depended on whether the sharing involved an information product or information expertise and whether sharing was internal or not.

In addition to the factors identified by Jarvenpaa & Staples (2000), eight other factors will also be included in the research model. These are the relation between the sender and the recipient, connective efficacy, information self-efficacy, slack (time), organizational

commitment, professional culture, organizational culture and national culture. Based on the research findings by Constant et al. (1994) and Jarvenpaa & Staples (2000; 2001) is proposed that the kind of effect (direct versus indirect) and the strength of the effect of the various factors depends on the kind of information (product versus expertise) and whether information sharing occurs internally or externally. In addition, differences in professional, organizational and national culture could also lead to a difference in significance and relative strength of the factors in the research model.

Relationship between sender and recipient

In their research on information sharing, Constant et al. (1994) and Jarvenpaa & Staples (2000; 2001) manipulated the relationship between the sender and the recipient to measure propensity to share. Based on social exchange theory and the model of reciprocal behavior, they stated that one of the factors that influences the willingness to share information (products) is the past behavior of the recipient. That is, unless the information product is viewed as belonging to the organization, in which case the propensity to share information is unaffected by past behavior of the recipient.

From a reciprocal exchange perspective, past behavior of the recipient is not the only factor influencing the motivation to share. In addition, the anticipated amount of time that the sender and recipient will be working together, or in the words of Müller, Spiliopoulou & Lenz (2005) "the unlimited shadow of the future", also influences whether or not information will be shared. Since the relationship between sender and recipient can influence willingness to share, this factor will be included in the research model.

Connective efficacy

Connective efficacy is another factor that will be added to the research model. It refers to "an expectation that information contributed to the database will reach other members of the collective (Kalman, Monge, Fulk & Heino (2002, p. 125)." Connective efficacy increases the motivation to share information and depends on (1) whether or not the individual thinks the recipient will use the system through which the information is sent and (2) opinions about system connectivity (Kalman et al., 2002). It is proposed that in the military context, there are two additional characteristics that determine connective efficacy. These are (1) the security classification of the information and the security clearance of the involved parties and (2) the interoperability of their respective information systems, referring to whether or not the

information systems are able to exchange information to each other (Aid, 2006; Mitchell, 2006).

Information self-efficacy

Kalman et al. (2002) define information self-efficacy as "the self-perceived value of a contributor's information to other database users (p. 125)." This self-perceived value is based on the individuals' assessment of the information content. Research findings indicated that information self-efficacy did not predict the motivation to share information. This lack of effect was suspected to be, at least partially, attributable to a deficient research instrument (Kalman et al., 2002). Therefore, information self-efficacy will be included in the research model and the research instrument used to measure this factor will be revised.

Time

In their research on exchanging technical advice through a computer network, Constant, Sproull & Kiesler (1996) stated that "Information providers had to have enough slack in their work day so that the [time]… they reported it took them to produce a reply was not viewed as excessive (p. 131)." Since time is reported to be of influence, it will be added to the research model.

Organizational commitment

Both Constant et al. (1994) and Jarvenpaa & Staples (2000) mention the possibility that organizational commitment can influence the effect of organizational ownership. Jarvenpaa & Staples (2000) even point out that "The regard for the organization itself might be seen as the substitute for direct incentives or personal relationships in motivating people to share information (p. 134)." Unfortunately, neither chose to incorporate this factor into their research model. In their research on communication dilemmas in database-mediated collaboration, Kalman et al. (2002) show that organizational commitment does in fact have a positive influence on information sharing. Organizational commitment can be defined as the "identification and involvement with an organization (p. 130)" and consists of "(a) the desire to remain a member of the organization, (b) concern for the organization's welfare, and (c) willingness to extend extra effort on the organization's behalf (Mowday, Steers & Porter, 1979 in Kalman, Monge, Fulk & Heino, 2002, p. 130)." This factor will also be included in this research model.

Professional culture

Research findings by Jarvenpaa & Staples (2001) indicated that staff type influences perceptions of organizational ownership. They believed this was due to "an effect of subculture, suggesting that results might be different by different subcultures (p. 173)." Thus, professional culture will be incorporated into the research model.

Organizational culture and national culture

Regarding future research, Jarvenpaa & Staples (2000) argue that organizational culture should be added to their research model. They cite previous research findings, stating that organizational culture has a significant impact on the adoption of information technologies, the use of the information technologies (specifically, whether or not use of groupware engendered collaboration) and the frequency and bi-directionality of information sharing. Subsequently, Jarvenpaa & Staples (2001) researched if organizational culture relates to perceptions of organizational ownership. They defined organizational culture as "the shared values and attitudes of the members of an organization (p. 156)" and established that two dimensions, solidarity and need for achievement, are significantly related to beliefs of organizational ownership irrespective of whether the sharing takes place internally or externally. A third dimension, democracy, only influenced beliefs of organizational ownership when sharing occurred externally (Jarvenpaa & Staples, 2001).

Additionally, Jarvenpaa & Staples (2000) suggest that national culture should also be included in the model of factors influencing the use of collaborative electronic media for information sharing. To support their advice they mention previous research that found differences in reasons for information sharing. This research will follow Jarvenpaa & Staples' (2000) advice and include both organizational and national culture in the research model.

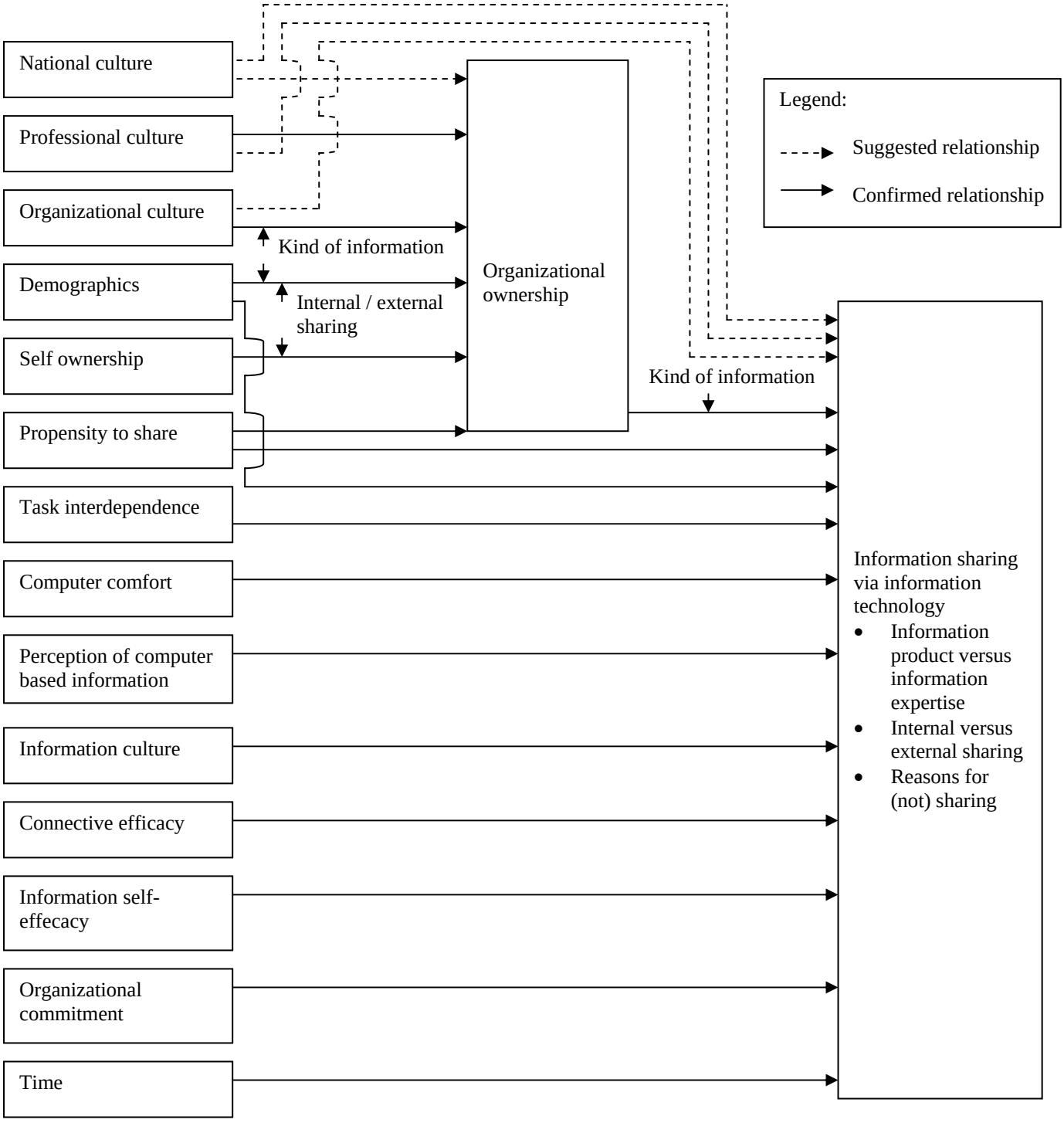

Figure1. Research framework

3 Impact of cultural differences on information sharing via information technology

Following suggestions made by Jarvenpaa & Staples (2000), professional, organizational and national culture have been included in the research model. As mentioned before, culture is "the collective programming of the mind that distinguishes the members of one group or category of people from another (Hofstede, 2001, p. 9)" and applies to professional, organizational and national level.

3.1 National culture

With regard to the effect of national culture Bresman, Birkinshaw and Nobel (1999) state that "while the transfer between departments or between sister units in the same country is far from trivial, it is clear that the problems associated with transfer will increase with geographical and cultural distance (p. 440)."

Hofstede (2001) discerns five dimensions of national culture. First is power distance, defined as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (p. 98)." Second is uncertainty avoidance, referring to "the extent to which the members of a culture feel threatened by uncertain or unknown situations (p. 161)." Individualism constitutes the third dimension and is defined as "a society in which the ties between individuals are loose: everyone is expected to look after him/herself and her/his immediate family only. Collectivism stands for a society in which people form birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty (p. 225)." The fourth dimension is masculinity, which refers to "a society in which social gender roles are clearly distinct: men are supposed to be assertive, tough and focussed on material success; women are supposed to be more modest, tender and concerned with the quality of life. Femininity stands for a society in which social gender roles overlap: both men and women are supposed to be modest, tender and concerned with the quality of life (p. 297)." And fifth is long-term orientation, which refers to "the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift. Its opposite pole, short-term orientation, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations (p. 359)."

Bhagat, Kedia, Harveston & Triandis (2002) developed a theoretical framework describing the cultural variations in the cross-border transfer of organizational knowledge. They distinguished four cultural patterns based on two dimensions of cultural variation, namely individualism – collectivism and verticalness – horizontalness. Their conception of the

former dimension is similar to that of Hofstede (2001). The latter dimension, which is not included in Hofstede's (2001) framework, refers to whether people "…consider their "self" to be different from others in social status, …or…more or less the same as others (p. 209)." Bhagat et al. (2002) argue that individualism influences "how members of a culture process, interpret, and make use of a body of information and knowledge (p. 208)." From this statement, it can be inferred that individualism – collectivism influences information self-efficacy, i.e. the perceived value of information, and information culture. In addition, Bhagat et al. (2002) state that verticalness – horizontalness influences information sharing through its impact on arrangements for information processing. In terms of the research model, this dimension influences information culture.

Müller, Spiliopoulou & Lenz (2005) view knowledge sharing as a public good game and established that national culture influences knowledge sharing through a global knowledge management system in an international company. Prior research indicated that individualism increases free-riding and negatively influences conditional cooperation, therefore they hypothesized and confirmed that individualism has a negative effect on knowledge sharing. In addition, previous research has shown that power distance is related to "the intensity of striving for status, measured by the money participants are willing to sacrifice for that status (p. 7)." Müller et al. (2005) suggested that, since striving for status is positively associated with knowledge sharing, power distance would be positively related to knowledge sharing. Again, their research findings confirmed the hypothesis. Finally, Müller et al. (2005) hypothesized that uncertainty avoidance would negatively influence knowledge sharing, because of uncertainties associated with the reward for knowledge sharing. This hypothesis was not confirmed; there was no significant correlation between uncertainty avoidance and knowledge sharing. In sum, this research showed that national culture has a direct influence on information sharing.

Chow, Harrison, McKinnon & Wu (1999) empirically examined the impact of individualism, the concept of face and power distance on the sharing of information "that carries some tension, conflict or difficulty (p. 562)" for the sender. Individualism and power distance are based on Hofstede's work, whereas the concept of face is not. Though Hofstede (2001) later added the dimension 'long-term orientation', which subsumed the concept of face, to his model. Chow et al. (1999) established that people from a society characterized by collectivism, high concern for face and high power distance were "more likely to ask clarifying questions (p. 571)," less likely to speak up and express a contrary or challenging opinion and equally likely to report a past failure. They also note that "the differences in

factors underlying information sharing …, and their cultural determinants, were revealed only in the qualitative data …. (p. 580).” The qualitative results showed that people in a collectivistic society were motivated to share because of “a sense of collective responsibility (p. 579),” while in an individualistic culture it “was seen to depend on individual differences (such as personality, style and skills) and …individual assertiveness (p. 579).” The latter group also “pointed to the importance of developing an organizational culture of openness … (p. 577)” causing the authors to propose that “in the absence of a perceived collective responsibility to act for the good of the company, the creation of an organizational culture which aligns individual interests with corporate interests is an appropriate response (p. 577).” Second, Chow et al. (1999) established that “sharing information which is potentially personally damaging is constrained by the presence of a superior, though sensitivity to the hierarchy is greater in a society with a high concern for face and a high power distance (p. 579)”. It is interesting to note that, in case of absence of the superior, half of the respondents from the latter society indicated that they were more likely to share information, because they were less concerned for a loss of face. The other half reported that they were less likely to share information, because “the meeting had lost its decision-maker [so] there would be little point (p. 578).” In conclusion, the research by Chow et al. (1999) shows that national culture influences (1) the likelihood of information sharing, (2) that this likelihood is also dependant upon the kind of information and (3) that the reasons given for (not) sharing information were also affected by national culture. In addition they suggest (4) that the relative importance of an organizational culture that supports information sharing also depends on the national culture.

Overall, the research presented in this paragraph showed that national culture both has a direct and an indirect effect on information sharing. Furthermore, as mentioned above, national culture could also affect the importance of organizational culture.

3.2 Organizational culture

Organizational culture can be defined as “a system of shared values and norms that define appropriate attitudes and behaviors for organizational members” (O’Reilly & Chatman, 1996, p. 160 in McKinnon et al., 2003, p. 27). O’Reilly, Chatman & Caldwell (1991) distinguish seven dimensions of organizational culture. Three dimensions concern “norms regarding the completion of work tasks (Sheridan, 1992, p. 1043). These are attention to detail, referring to “an orientation to precision and accuracy (p. 1043),” stability, “describing an organizations norms of predictability and rule orientation (p. 1043)” and innovation, i.e. an “emphasis on

risk taking, responsiveness to new opportunities and being experimental rather than careful (p. 1043).” Two dimensions involve “norms regarding interpersonal relationships (p. 1043).” The first, team orientation, concerns “norms of collaboration and teamwork (p. 1043).” The second, respect for people, regards “norms of fairness and tolerance (p. 1044).” In addition, two dimensions “describe norms regarding individual actions (p. 1044).” They are outcome orientation, involving “organizational norms of high expectations for performance and personal achievement and emphasizing action and results (p. 1044),” and aggressiveness, referring to “norms of competition in an organization (p. 1044).”

DeLong & Fahey (2000) state that “our research in more than 50 companies pursuing knowledge management projects revealed that organizational culture is widely held to be the major barrier to creating and leveraging knowledge assets (p. 113).” They state that organizational culture “shapes assumptions about which knowledge is important (p. 116).” Second, it “defines the relationships between individual and organizational knowledge, determining who is expected to control specific knowledge, as well as who must share it and who can hoard it (p. 113).” Third, it “shapes creation and adoption of new knowledge (p. 123).” And fourth, it “creates a context for social interaction (p. 120).” Regarding this topic, DeLong & Fahey (2002) state that organizational culture should (1) encourage open and frank exchange between levels in the hierarchy, (2) support high levels of interactivity and “promote collaboration between functions and operating units (p. 121),” (3) “explicitly favour knowledge sharing over knowledge acquisition (p. 121)” and (4) “use mistakes as a source of learning (p. 122).” DeLong & Faheys (2000) research thus suggests that organizational culture influences information self-efficacy and information culture.

McKinnon, Harrison, Chow & Wu (2003) empirically examined the influence of organizational culture and person-organization fit on, amongst others, information sharing and organizational commitment. Based on previous research with regard to organizational culture, they hypothesized that “the dimensions of Respect for People, Team Orientation, Innovation, and Stability will be strongly associated with organization commitment … and information sharing, while the dimension of Attention to Detail will be less strongly associated (p. 30).” Due to the lack of prior research, Outcome Orientation and Aggressiveness are treated as “empirical questions (p. 30).” Their results indicated that “emphasis on the organizational culture dimensions of Respect for People, Innovation, and Stability is strongly associated with the outcome variables of organizational commitment …and information sharing…. more moderate associations with the outcome variables are also present for Team Orientation and Outcome Orientation, with weaker associations for Attention to Detail and person-

organization fit (p. 38)." Additionally, McKinnon et al. (2003) hypothesized and confirmed that there would be a positive relationship between person-organization fit and both organizational commitment and information sharing. However "the canonical loading … barely reaches our imposed cut-off of 0.50, supporting Sheridan's (1992) proposition that person-organization fit may be redundant in the presence of the organizational culture dimensions themselves (p. 39)."

As mentioned previously, Jarvenpaa & Staples (2001) established that organizational culture influences beliefs of organizational ownership, though their research used other dimensions than McKinnon et al. (2003) to measure organizational culture.

Summing up, the research presented above implies that organizational culture influences information sharing directly. In addition the findings indicate that organizational culture also affects information sharing indirectly, by influencing organizational commitment, information culture, information self-efficacy and perceptions of information ownership.

3.3 Professional culture

The previous paragraph delineated the effect of organizational culture on information sharing. It did not mention the existence of subcultures, which could lead one to think that organizational culture is uniformly shared throughout the organization. However, Bloor & Dawson (1994) argue that "while it is empirically possible for an organization to exhibit an homogeneous organizational culture, this appears to be the exception rather than the rule, especially in large, complex organizations … (p. 280)." One reason for this diversity is the existence of several distinct professional cultures within an organization. According to Bloor & Dawson (1994), members of a professional culture "share a distinct pattern of values, beliefs, norms, and interpretations for judging the appropriateness of one another's actions (p. 283)." They discern four kinds of subculture. First, an enhancing subculture, characterized by "unquestioning support and advocacy of the 'rightness' of the core assumptions, values and beliefs (p. 286)" of the organizational culture. Second, a deferential subculture "which defers to and yet is remote from the dominant professional group (p. 292)" and thereby is "compatible with the organizational culture (p. 286)." Third, a dissenting subculture "which advocates alternative methods and work practices to achieving the core values of an organization (p. 292)." And fourth, an orthogonal subculture "which whilst containing unique beliefs also supports the existing organizational culture (p. 292)" and acted "as a midway point between the enhancing and dissenting subcultures (p. 286)."

Research by Hofstede (1998) also confirmed that while organizations have an organizational culture, there can also be different subcultures within that organization. Both Bloor & Dawsons' (1994) and Hofstedes (1998) research suggests that professional culture might influence the effect that organizational culture has on information sharing. In addition, subculture can also have an indirect effect on information sharing through perceptions of information ownership, as was established by Jarvenpaa & Staples (2001). Finally, DeLong & Fahey (2000) state that "subcultures often lead their members to define important knowledge differently than other groups in the organization (p. 117)" and present an example that links subculture to differences in knowledge sharing. This suggests that professional culture impacts information culture and information-self efficacy and might even influence information sharing directly.

4 Conclusion

The aim of this article was to establish a framework of factors that influence information sharing via information technology in a cross-cultural context. Following Hansen (1999) information sharing was defined as a dyadic exchange between the sender and the recipient, involving both searching and transfer of information. The focus of this article was restricted to the transferring part of information sharing and then further limited to encompass only the characteristics of the sender at the individual level. Prior research by Jarvenpaa & Staples (2000; 2001) served as the foundation for the framework. They empirically established that information culture, views of information ownership, propensity to share, task interdependence, computer comfort, perceived characteristics of computer based information and several demographic characteristics were all associated with a person's use of collaborative media to share information. Furthermore, their findings indicated that professional culture and organizational culture influenced information sharing indirectly, because they affected views of information ownership. In their research, Jarvenpaa & Staples (2000; 2001) manipulated the relationship between the sender and the recipient to measure propensity to share, arguing that the motivation to share is influenced by this relationship. Therefore, this factor was added to the framework and extended as well; not only the past behavior, of the recipient, but also the length of future cooperation, will be manipulated. Other additions were connective efficacy, information self-efficacy, time, organizational commitment and national culture. A final point regarding information sharing is that the research mentioned in this article suggests that the kind of effect, direct versus indirect, and the strength of the effect of the various factors depends on whether the sharing involves an information product or information expertise and on whether the information is shared internally or externally. In other words, the dependent variable, which is information sharing, should be subdivided into internal sharing of an information product, internal sharing of information expertise, external sharing of an information product and external sharing of information expertise.

After the framework had been created, research on the impact of cultural differences on information sharing via information technology was described. National culture was shown to influence information sharing directly and indirectly. With regard to the indirect effect, it is suggested that national culture affects information self-efficacy, information culture and the relative importance of an organizational culture that supports information sharing. In addition, national culture was also found to impact the reasons given for (not) sharing information. Organizational culture was shown to have a direct effect on information sharing. Furthermore,

based on the described research, it is argued that it had an indirect effect as well; it influenced organizational commitment, information self-efficacy, perceptions of information ownership and information culture. Professional culture was also found to impact perceptions of organizational ownership. In addition, it was proposed to influence information culture, information self-efficacy and the effect of organizational culture. Moreover, professional culture was also proposed to have a direct effect on information sharing.

In conclusion, cultural differences influence information sharing directly as well as indirectly, through their influence on the various factors in the framework. Since cultural differences were also related to the reasons given for (not) sharing, it is also hypothesized that the strength of the effect of the various factors, and the relative importance of these factors, differs per culture.

In order to empirically examine whether the established research model and the expected impact of cultural differences on this research model are indeed correct, a combination of methods will be used. Like Constant et al. (1994) and Jarvenpaa & Staples (2000; 2001) a questionnaire will be developed to measure the factors in the framework. Also in accordance with these researchers, the contrastive vignette technique (Burstin, Doughtie & Raphaeli, 1980) will be used within this questionnaire, in order to measure information sharing. Following Jarvenpaa & Staples (2000) partial least squares analysis will be performed to determine if and how, i.e. direct and / or indirect, the factors in the framework contribute to information sharing. In addition, similar to Chow et al. (1999), open-ended questions will be used to determine the reasons for sharing. The responses to these questions will be subjected to content analysis.

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