

**UNDERSTANDING INFORMATION CULTURE:
INTEGRATING KNOWLEDGE MANAGEMENT
SYSTEMS INTO ORGANIZATIONS**

by

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**Understanding Information Culture:
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Abstract: Knowledge management initiatives to help organizations create and distribute internal knowledge have become important aspects to many organizations' strategy. The knowledge-based theory of the firm suggests that knowledge is the organizational asset that enables sustainable competitive advantage in hypercompetitive markets. Systems designed to facilitate knowledge management (knowledge management systems) are being implemented in an attempt to increase the quality and speed of knowledge creation and distribution in organizations. However, such systems are often seen to clash with corporate culture and, as a result, have limited impact. The current article introduces a framework for assessing those aspects of organizational culture that are likely to be the source of implementation challenges. In so doing, the article associates various organizational subunit cultures with different information cultures, and presents a series of propositions concerning the relationships among individual, organizational, and information cultures.

1. Introduction

When asked about why the organization was building a worldwide Intranet and knowledge management system, the Chief Knowledge Office of a large multinational consulting firm replied “we have 80,000 people scattered around the world that need information to do their jobs effectively. The information they needed was too difficult to find and, even if they did find it, often inaccurate. Our Intranet is meant to solve this problem.” [Leidner, 1998]. Roughly a decade ago, case studies of organizations implementing executive information systems (EIS) suggested that a major reason behind these systems was a need for timely, accurate, and consistent information and to help managers cope with the problem of information overload [Rockart and DeLong, 1992; Houdeshel and Watson, 1987]. And although a goal of management information systems (MIS) was to provide relevant information for managerial control and planning, MIS was unable to provide timely, complete, accurate, and readable data of the type executives needed for strategic decision making [Zmud, 1978]. Even earlier, in 1967, Ackoff notes that “I do not deny that most managers lack a good deal of information that they should have, but I do deny that this is the most important information deficiency from which they suffer. It seems to me that they suffer from an overabundance of irrelevant information.” Interestingly, in 1997, Courtney et al state that “omitting the unimportant information [from corporate intranets] may be as important as concentrating on the important. The mere availability of ‘information’ may have a distracting effect....”. Is information systems’ history repeating itself over and over again in a continuous cycle of providing more information in greater detail in a more timely manner in a more graphical format, yet forever doomed to be providing “too much irrelevant” information while leaving the important information “too hard to find.”? Or, is it that each time progress is made on one front, new forms of barriers to the impact of IS are encountered? Alternatively, has the real culprit in IS’s seeming failure to impact organizational effectiveness not yet been discovered?

Recommended approaches to helping ensure that information systems result in organizational improvements have included structuring information systems requirements analysis [Yourdan and Constantine, 1978], involving users in analysis [King and Rodriguez,

1981; Ives and Olson, 1984], attempting to link IT to the business strategy [Pyburn, 1983], and improving change agency skills [Markus, 1996]. All of the approaches merit consideration, as do contingency theories which would suggest that the success of information systems (IS) in an organization depends upon the proper fit of IT to the organization's structure and design. Yet despite the prescriptive advice, information-based systems still seem to fail to live up to expectations and often fail to provide the dramatic improvements in organizational effectiveness for which they are designed [Lyytinen and Hirschheim, 1987; Mowshowitz, 1976]. Moreover, there appears to be almost a crisis in the image of IS in organizations, with such problems as high CIO turnover, executives not recognizing the strategic importance of IS, and declining top management commitment to large IS investments.

This article offers a new exegesis to the reasons why information-based systems appear to be encountering the same problems repeatedly despite significant advances in planning and implementation methodologies and theories, as well as in the technology itself: an incongruity with corporate culture. The article posits that information systems implementation efforts must take into account corporate culture when designing the plan for change; if not, such systems might produce results, some anticipated others not, but the systems will fall way short of providing the major improvements expected in most large systems implementation efforts.

This article will first trace briefly information-based systems advancements and the dominant organizational paradigms used to investigate the organizational effects of IS, and will then examine current developments in information-based systems, namely knowledge management systems. It will show how these systems in particular call for a new paradigm of interpretation, that of organizational culture theory. The article will introduce the notion of information culture in the context of knowledge management systems and will present a brief overview of the relevant work on organizational culture. The article offers the existence of information culture as framework for assessing those aspects of organizational culture that are likely to be the source of implementation challenges. Propositions will be offered concerning the relationship between organizational subunit culture and information culture and these will be tied to managerial prescriptions on managing the implementation of knowledge management systems.

2. Advances in Information Systems

Information systems can be classified in several ways, including according to their broad function, to the organizational function they serve, to the underlying technologies, or the organizational level at which they are used [Laudon and Laudon, 1997]. This article will consider information systems by broad function since much of the IT literature focuses on particular systems classified in this manner, such as decision support systems, expert systems, and electronic mail. In particular, we are interested in systems designed to provide information to managers and professionals at any organizational level. Hence, we will focus primarily on MIS and EIS (as both systems aim to supply managerial information) and knowledge management systems (a new line of systems oriented to providing professionals and managers unstructured information).

2.1 MIS and the Structuring of Organizations

As noted in Somogyi and Galliers [1987], as firms began to computerize in the 1950s, the first applications were in the area of transaction processing. Transaction processing systems are computerized systems that perform and record the daily routine transactions necessary to the conduct of business such as payroll, sales order entry, shipping, order tracking, accounts payable, material movement control [Laudon and Laudon, 1997]. These systems were designed to facilitate data collection and to improve the efficiencies of organizational transactions. Soon thereafter, with advances in programming languages, databases, and storage, systems oriented toward providing performance information to managers emerged [Somogyi and Galliers, 1987]. Management information systems (MIS) are computer based information systems that provide managers with reports, and in some cases, with on-line access to the organization's current performance and historical records. MIS primarily serve the functions of planning, controlling, and decision making at the management level. Generally, they condense information obtained from transaction processing systems and present it to management in the form of routine summary and exception reports.

Simon [1977] predicted that computers, namely MIS, would recentralize decision making, shrink line organizational structures, decrease the number of levels, and result in an

increase in the number and size of staff departments. It was believed that information technology would enable greater centralization of authority, clearer accountability of subordinates, a sharper distinction between top management and staff, and the rest of the organization, and a transformation of the planning and innovating functions. The organizational theory used to evaluate the effect of MIS on organizations was contingency theory of organizational structure, technology, and the environment. Research prior to 1970 indicated that IT provided a means of collecting and processing large amounts of data and information, thus enabling a small number of persons effectively to control authority and decision making; hence, IT was said to facilitate centralization [Klatzky 1970; Whisler 1970; Stewart 1971; Carter 1971]. Research after 1970 seemed to find that IT, by enabling organizations to gather and process information rapidly, facilitated decentralizing decision making [Carter 1984; Foster and Flynn 1984; Dawson and McLaughlin 1986]. For example, Carter [1984] felt that as the extent of computer utilization increased in subunit applications, the locus of decision making authority would become more decentralized in the organization, and the division of labor as reflected by functional diversification, functional specialization and functional differentiation would increase. Carter found in her study of newspaper organizations that as computers become the predominate technology, upper management was released from the day-to-day encumbrances of centralized decision making, fostering a decentralized organizational structure. In other cases IT appeared to have had no effect when changes were expected [Franz, Robey and Koebnitz, 1986]. Considering the weak relationships found when using technology as an independent variable, other researchers employed technology as a moderator variable between the environment and structure or as a dependent variable. Robey [1977] found that IT supported an existing decentralized structure in organizations with uncertain environments but that in more stable environments, IT strengthened a centralized authority structure.

In summary, early research on the impact of IT, namely MIS, on organizations focused on the effect of IT on organizational structures. The results were highly mixed, leading to an emergent imperative which argued that the particular effects of IT were dependent on a given organization's context and hence, were not predictable or systematic across organizations. An

alternative perspective was that certain inherent limitations of MIS prevented predictable improvements to organizational effectiveness. Among the limitations of MIS are that they have highly limited analytical capabilities, they are oriented almost exclusively to internal, not environmental or external, events, and that the information content is fixed and not tailored to individual users [Laudon and Laudon, 1997].

2.2 DSS, EIS and Organizational Decision Making

Decision support systems (DSS) and executive information systems (EIS) aimed to provide what MIS were unable to: specific online information relevant to decision makers in a flexible format. DSS are interactive model-oriented systems, and are used by managers and knowledge workers, analysts, and professionals whose primary job is handling information and making decisions [Keen and Morton, 1982; Sprague and Carlson, 1982]. DSS assist management decision making by combining data, sophisticated analytical models, and user-friendly software into a single powerful system that can support semi-structured or unstructured decision making [Keen and Morton, 1982; Sprague and Carlson, 1982]. DSS tend to be isolated from major organizational information systems and tend to be stand-alone systems developed by end-user divisions or groups not under central IS control [Hogue, 1985]. EIS are computer-based information systems designed to provide managers access to information relevant to their management activities. Originally designed for senior managers, the systems quickly became popular for managers at all levels. Unlike DSS which are tied to specific decisions and which have a heavy emphasis on models, EIS focus on the retrieval of specific information, particularly daily operational information that is used for monitoring organizational performance. Features distinguishing EIS from such systems as management information systems and decision support systems include a non-keyboard interface, status-access to the organizational database, drill-down analysis capabilities (the incremental examination of data at different levels of detail), trend analysis capabilities (the examination of data across desired time intervals), exception reporting, extensive graphics, the providing of data from multiple sources, and the highlighting of the information an executive feels is critical [Kador, 1988; Mitchell, 1988]. Whereas the traditional focus of MIS was on the storage and

processing of large amounts of information, the focus of EIS is on the retrieval of specific information about the daily operational status of an organization's activities as well as specific information about competitors and the marketplace [Friend, 1986].

Huber [1990] advanced a theory of the effects of advanced decision and information-providing technologies, such as DSS and EIS, on organizational decision making. While he also made propositions concerning the effect of such systems on organizational design and structure, the dominant paradigm for examining the organizational effects of information technology was turning towards decision making. Huber and McDaniel [1986] argued that decision making was the most critical management activity and that the effectiveness of IS rested more in facilitating organizational decision making than enabling structural responses to environmental uncertainty. A wide body of research emerged examining organizational decision making and the decision making consequences of IS. However, most of the IS literature focused on the individual level of analysis, which was reasonable given that DSS were designed in most cases for individual decision makers, and most of the EIS research also supported individual rather than organizational improvements.

While some of Huber's propositions have been substantiated [Leidner and Elam, 1995; Molloy and Schwenk, 1995], the organizational level effects have received little substantiation and have been overshadowed by the individual level effects [Elliott, 1992]. Moreover, research on DSS showed that decision makers used the tools in such a manner as to reduce time, but not necessary to increase quality [Todd and Benbasat, 1991] but in the cases where the systems did appear to increase quality, the decision makers seemed not to subjectively perceive this improvement [Le Blanc and Kozar, 1990]. Empirical evidence has shown that EIS enable faster decision making, more rapid identification of problems, more analysis before decision making, and greater understanding of the business [Leidner and Elam, 1995; Elliott, 1992]. Evidence also suggests that EIS allow single and double-loop learning [Vandenbosch and Higgins, 1996]. Other promises for EIS, which have not been empirically substantiated, involved helping companies cope with reduced staff levels [Applegate, 1988; Applegate and Osborn, 1988], substantial monetary savings [Holub, 1988], power shifts and a change in business focus [Applegate and Osborn, 1988], and improving service [Holub, 1988; Mitchell,

1988; Kador, 1988]. Interestingly, these promises sound reminiscent of the promises that were made for MIS and that are now being made for Intranets, as will be discussed later.

Among the most serious challenges to EIS implementation involved overcoming information problems, namely organizational subunits feeling ownership of information that was suddenly being accessed by senior managers who previously had relied on these subunits to summarize and analyze their own performance in periodic reports. Such ownership problems led to system failure in some cases, when subunits consciously and covertly altered data to be more favorable to the unit and thereby rendered the EIS inaccurate [Leidner, 1992]. Other weaknesses of EIS are the difficulty of pulling information from multiple sources into a graphical PC-based interface, justifying the costs of the systems given the unclear payoff, and ensuring that the information remains relevant as the needs of managers changes [Leidner, 1992]. In summary, DSS and EIS research adopted an organizational decision making paradigm as a reference theory for determining the organizational impacts of these systems. While the systems have well documented individual level benefits, the organizational level benefits have been less lucid.

2.3 Knowledge Management Systems and Organizational Culture

A new line of systems based on web technology has emerged which compensates for some of the limitations of EIS, namely the difficulty of integrating information across platforms. These systems return control for information content to organizational subunits, hence bypassing some of the informational problems encountered with EIS, yet also require active participation of users not only in the design process, but also in the process of information provision. Corporate Intranets are private web-based networks, usually within a corporation's firewalls, that connect employees to vital corporate information. They let companies speed information and software to employees and business partners [Thyfault, 1996; Vidal et al, 1998]. The primary incentive is their ability to provide "what computer and software makers have frequently promised but never actually delivered: the ability to pull all the computers, software, and databases that dot the corporate landscape into a single system that enables employees to find information wherever it resides" [Cortese, 1996]. While there

is a business case for the value of Intranets, there is little proof of the economic value of such systems [Rooney, 1998].

Among the most lauded potential applications of intranets is the provision of tools for knowledge management. Knowledge includes the insights, understandings, and practical know-how that employees possess. Knowledge management is a method of systematically and actively managing ideas, information, and knowledge of employees [Back, 1998]. Knowledge management systems refer to the use of modern information technologies (e.g., the Internet, intranets, extranets, browsers, data warehouses, software filters and agents) to systematize, enhance, and expedite intra- and inter-firm knowledge management [Alavi and Leidner, 1998]. Knowledge management systems (KMS) are intended to help organize, interpret, and make widely accessible the expertise of an organization's human capital to help the organization cope with turnover, rapid change, and downsizing. KMS are being built in part from increased pressure to maintain a well-informed, productive workforce.

The concept of systematically coding and transmitting knowledge in organizations is not new--training and employee development programs have served this function for years. The integration of such explicit knowledge involves few problems because of its inherent communicability [Grant, 1996]. Explicit knowledge is that knowledge which is transmitted in formal systematic language [Nonaka, 1994]. It is externally documented tacit knowledge [Brown and Duguin, 1991]. It is declarative and procedural knowledge which can be divorced from the context in which it is originally created and transferred to various other contexts with little if any modification. Advances in information technology have greatly facilitated the integration of explicit knowledge through increasing the ease with which explicit knowledge can be codified, communicated, assimilated, stored, and retrieved [Huber, 1991]. However, what has in the past proved elusive--that context-dependent knowledge obtained by professional workers (referred to as "tacit knowledge" [Nonaka, 1994])--is the focus of KMS. Figure 1 classifies knowledge creation into tacit and explicit, based on Nonaka [1994].

INSERT FIGURE 1 ABOUT HERE

Nonaka focused on knowledge creation, although the knowledge management process must give equal attention to knowledge storage, knowledge distribution, and knowledge integration in order to achieve significant organizational improvements [Alavi and Leidner, 1998]. Indeed, the the major challenge of tacit knowledge is less its creation than its integration [Grant, 1996; Davenport, 1997a]; such knowledge is of limited organizational value if it is not shared. With KMS, it is not sufficient that users use the system, they must actively contribute their knowledge. This is a large departure from previous information systems where user involvement was needed primarily at the analysis and design phase, not the content provision phase. Moreover, such systems make information readily available at a low cost across functions and business units, hence implying the capacity for an integration of information even if the functions and units themselves remain unintegrated.

While there is not yet empirical evidence of the organizational impacts of KMS, preliminary descriptive research suggests that KMS may require a change in organizational culture and that the values and culture of an organization have a significant impact on the learning process and how effectively a company can adapt and change [Sata, 1989]. Respondents in the Alavi and Leidner [1998] study suggested that the information and technology components of knowledge management constituted only 20% of the challenge whereas overcoming organizational cultural barriers accounted for the major part of effective knowledge management initiatives. Similarly over half the respondents in Skryme and Amidon [1998] recognize that corporate culture represents the biggest obstacle to knowledge transfer and a similar proportion believe that changing peoples' behaviors represents the biggest challenge to its continuing management.

Junnarkar and Brown [1998] suggest that knowledge managers interested in the role of IT as an enabler of knowledge management should not simply focus on how to connect people with information but how to develop an organizational environment conducive to tacit knowledge sharing. Similarly, Newman [1998] sees information hoarding behavior resulting from perceptions of the strategic value of information. His modified Johari Window (see figure 2) provides a view of when individuals are likely to cooperate and when they are unlikely to do so.

INSERT FIGURE 2 ABOUT HERE

Poor communication between people can be a major barrier to learning. In many organizations, information and knowledge are not considered organizational resources to be shared, but individual competitive weapons to be kept private [Davenport, 1997b]. Organizational members may share personal knowledge with a certain trepidation--the perceived threat that they are of less value if their knowledge is part of the organizational public domain. Research in organizational learning and knowledge management suggest that some facilitating conditions include trust, interest, and shared language [Hanssen-Bauer and Snow, 1996], fostering access to knowledgeable members [Brown and Duguin, 1991], and a culture marked by autonomy, redundancy, requisite variety, intention, and fluctuation [Nonaka, 1994].

Hence, in understanding the potential impact of KMS on organizations, it is first necessary to understand the cultural implications of such systems. We would argue that the division of knowledge creation into tacit versus explicit, while interesting, does little to advance our understanding of the users' view of the knowledge or information included in KMS. The Johari Window of knowledge sharing likewise does not explicitly deal with the users' view of their own knowledge (except to classify apparent knowledge as "high or low in strategic value" although it is unclear if this is value to the individual, organization, or both). If we consider the user as a contributor of information to the KMS, we can think of information as having a certain value to the user as an individual asset and a certain degree of value as a corporate asset. This is depicted in a simple matrix in Figure 3.

INSERT FIGURE 3 ABOUT HERE

According to Figure 3, we would expect certain individuals to share knowledge willingly, others to hoard knowledge, others to be indifferent (labeled random sharing), and others to engage in selective sharing. Moreover, it should be noted that certain types of knowledge will be viewed differently than other types of knowledge. For example, explicit knowledge such as a company training manual is unlikely to be perceived as valuable as an individual asset.

However, the very type of knowledge that KMS are designed to amalgamate--tacit knowledge such as lessons learned on a project--is likely to be the type of knowledge with the greatest potential for being viewed as an individual asset. One could try to classify various categories of knowledge into the four quadrants; for our propositions, we will consider the primary challenge of knowledge management to be that of fostering the sharing of tacit knowledge.

Based on the above discussion and Figure 3, we would propose the following propositions:

Proposition 1: Individuals perceiving their tacit knowledge to be high in individual value and high in corporate value will engage in selective sharing, sharing that knowledge which might bring recognition and reward to them but concealing that knowledge which might be successfully used by others with no reward for them.

Proposition 2: Individuals perceiving their tacit knowledge to be high in individual value and low in corporate value will engage in information hoarding, choosing to avoid sharing their knowledge but attempting to learn as much as possible from others.

Proposition 3: Individuals perceiving their tacit knowledge to be low in individual value and high in corporate value will engage in information sharing, sharing freely with others for the benefit of the organization.

Proposition 4: Individuals perceiving their tacit knowledge to be low in individual value and low in corporate value will engage in random sharing, sharing freely when their knowledge is requested but not consciously sharing otherwise.

In determining the factors that might influence information culture (i.e. the perceptions on the value of tacit knowledge to the individual and to the organization), an understanding of corporate culture is in order. This will be discussed in Section 3.

2.4 Summary

New classes of information systems for managers and professionals are continuing to emerge, yet the perennial problem of obtaining systematic benefits from the systems remains. IS researchers have attempted to explain the impact of IS on organizations by considering the effect of IS on organizational structure and decision making. The former line of research led to mixed findings and the latter, findings more at the individual than organizational level. With

the changes in systems, summarized in Table 1, the role of the user has progressed from involvement in system design (MIS), to in many cases system designer (DSS), to interactive system user (EIS), to information content provider (KMS). This shift in the role of the user requires a concomitant shift in our conceptualization of information systems with less emphasis on the “systems” aspect and more on the “information” aspect, namely the users’ view of information as an individual or corporate asset. Information has been classified according to its accuracy, timeliness, reliability, completeness, precision, conciseness, currency, format, accessibility, and perceived usefulness [Delone and McLean, 1992]. Previous systems’ design focused on these aspects as the foundation of information quality. What is missing is an understanding of the information culture issue. As we have seen, the latest class of systems requires far greater activity of users in not just information requirements processes, but in supplying information for the system.

INSERT TABLE 1

Moreover, we seem to have moved from a “one for all” to a “one for one” to an “anyone anytime anywhere” information provision strategy as we have advanced from MIS to DSS and EIS, to KMS. The latter strategy requires greater horizontal and vertical integration of information in an organization. It is arguable that the potential impact of systems is greater when a larger part of the organization is affected, such as with systems integrated organization-wide, or even across organizations. Yet the greater the required integration, the greater the potential implementation difficulties. As the degree of horizontal integration increases, we would expect structural constraints. For example, enterprise-wide systems are transaction-based systems which most effectively operate in environments with horizontal coordination. In organizations where little horizontal coordination existed, i.e. where units were highly decentralized, we would expect greater implementation challenges than in already centralized organizations. Likewise, vertical integration is expected to pose control challenges. In loosely formalized organizations, for example, email systems would not be expected to pose threats to power distributions (in that employees can easily communicate upward without

hesitation) but in rigidly formalized organizations, the possibility of lower level employees bypassing individuals in the hierarchy via electronic communication might create difficulties. Systems requiring both vertical and horizontal integration will create the greatest cultural challenges for organizations (see Figure 4). We will next examine organizational culture and its implication for KMS implementation.

INSERT FIGURE 4 ABOUT HERE

3. Organizational Culture and its Implication for KMS

Schein [1985] defines organizational culture as “the set of shared, taken-for-granted implicit assumptions that a group holds and that determine how it perceives, thinks about, and reacts to its various environments.” Burack [1991] defines culture as the “organization’s customary way of doing things and the philosophies and assumptions underlying these,” and Johnson [1992], as “the core set of beliefs and assumptions which fashion an organization’s view of itself.” These are similar to Hofstede’s [1980, 1991] definition of national culture as the “collective programming of the mind that distinguishes one group of people from another.” Culture is hence viewed as a shared mental model which influences how individuals interpret behaviors and behave themselves, often without their being aware of the underlying assumptions. Schein [1985] states that the members of a culture are generally unaware of their own culture until they encounter a different one.

Culture is manifested in rituals and routines, stories and myths, symbols, power structures, organizational structures, and control systems [Johnson, 1992]. Whereas a wealth of inconclusive contingency research examines the appropriate structure and technology in various environments to maximize organizational effectiveness, we are only now beginning to see research aimed at determining the contribution of organizational culture to organizational effectiveness. Part of the reason for this has been the difficulty of categorizing and measuring organizational cultures. Furthermore, there may have been an unstated view that cultures evolve and are beyond the control of organizational decision makers; hence, research focused on more malleable constructs such as structure, technology and decision making processes.

In the organizational culture literature, culture is examined either as a set of assumptions or as a set of behaviors. Behaviors, or norms, are a fairly visible manifestation of the mental assumptions, although some argue that the behaviors should be considered “organizational climate” and the norms, as comprising organizational culture. We will present a brief discussion of both the values and behavioral perspectives of culture.

3.1 The Value View

Denison and Mishra [1995] studied the impact of organizational culture on organizational effectiveness and looked for a broad set of cultural traits that were linked to effectiveness in various environments. Denison and Mishra suggested that, from a values perspective, culture could be thought of as including degrees of external versus internal integration and tradeoffs of change and flexibility with stability and direction. They classified cultures as being adaptability oriented, involvement oriented, mission oriented, or consistency oriented. Their classification is drawn from Quinn and Rohrbaugh’s [1983] value set which argued that organizations focus to various degrees internally or externally, and, in terms of structure preferences, have tradeoffs in stability and control versus flexibility and change.

Denison and Mishra found that in two of four organizations studied, organizational effectiveness appeared to be tied to consistency and mission, yet the cases also seemed to support the idea that involvement oriented cultures led to organizational effectiveness. In a survey, Denison and Mishra found that mission and consistency, traits of stability, predicted profitability whereas involvement and adaptability, traits of flexibility, predicted sales growth.

Chatman and Jehn [1994] argue that organizational cultures within a given industry tend to deviate very little; in other words, they argue that the environment dictates to a certain extent cultures in organizations (at least for organizations that survive in the industry). A problem with Denison and Mishra’s study is its inability to consider the effect of the environment on cultures given that there was not sufficient industrial variation in the sample. Thus, we are unable to deduce if the environment might have influenced their findings.

Hofstede et al [1990] examined culture both in terms of values and behaviors. In terms of value, they found that organizational culture was tied to the national culture dimensions identified by Hofstede [1980] and reflected preferences for centralized versus decentralized decision making (power distance), preferences for the degree of formalization of routines (uncertainty avoidance), degree of concern over money and career versus family and cooperation (masculinity/femininity dimension), and degree of identification with the company and preference for individual versus group reward systems (collectivistic/individualistic dimension). When the authors eliminated the effects due to nationality, the value differences between organizations were primarily dependent upon subunit characteristics rather than overall membership in the organization. Hence, the authors concluded that organizational subunits were the more appropriate level of analysis for organizational culture study. Moreover, they found that behaviors were a better means of distinguishing subunit cultures than were value systems.

3.2 The Behavioral Perspective

Although popular literature insists that shared values represent the core of organizational culture, the empirical data from Hofstede et al [1990] showed shared perceptions of daily practices formed the core of organizational subunit culture. The behavioral dimensions isolated by the authors were:

- (1) process versus results oriented: this dimension refers to a focus on improving the means by which organizational goals are achieved (process) as opposed to a focus on the attainment of goals.
- (2) employee vs. job oriented: employee orientation suggests a concern for people whereas a job orientation refers to a concern over performing tasks effectively.
- (3) parochial vs. professional: a parochial orientation suggests that individuals are loyal to their organization whereas a professional orientation suggests that individuals are loyal to their profession.
- (4) open vs. closed system: this dimension describes the communication climate in the subunit.

(5) loose vs. tight control: the control dimension reflects the degree of internal structuring, with loose organizations having few written or unwritten codes of behavior and tight organizations having strict unwritten and written policies.

(6) normative vs. pragmatic: pragmatic units are market driven and customer oriented whereas normative units are product oriented. Interestingly, some units were found to be pragmatic but not results oriented (i.e., a goal of improving customer service might not imply a goal of improving the bottom line).

The process/results, parochial/professional, loose/tight, and normative/pragmatic were found to relate partly to the industry, confirming Chatman and Jehn's [1994] conclusion that industry or environmental factors more generally affects organizational cultures, whereas the employee/job orientation and open/closed system were more determined by the philosophy of the founders and senior managers. These latter dimensions might therefore be more malleable.

In considering the possible influence of the behavioral dimensions of subunit culture on information culture, one dimension in particular appears more relevant to predicting the quality of the knowledge contributed to a system rather than to predicting the value placed on the knowledge. Specifically, loose versus tight control might influence whether individuals follow organizational rules and procedures about sharing knowledge but would not necessarily influence their beliefs about whether the knowledge was properly theirs or the organization's and hence, might influence the quality of the knowledge they elected to contribute to a system but would not likely influence their attitude about the value of that knowledge to them or the organization. We therefore do not include this dimension in predictions about the influence of subunit culture on information culture. If we map the remaining dimensions into Figure 4 to form Figure 5, we might expect that certain of these subunit cultural behaviors would tend to foster the view of tacit knowledge as an individual asset whereas others would encourage viewing tacit knowledge as a corporate asset.

INSERT FIGURE 5 ABOUT HERE

Proposition 5: Individuals in subunits characterized by a results orientation will view tacit knowledge largely as an individual asset whereas individuals in subunits characterized by a process orientation will view tacit information less as an individual asset.

Proposition 6: Individuals in subunits characterized by a professional orientation will view tacit knowledge less as a corporate asset whereas individuals in subunits characterized by a parochial orientation will view tacit knowledge more as a corporate asset.

Proposition 7: Individuals in subunits characterized by an open communication culture will view tacit knowledge less as an individual asset whereas individuals in subunits characterized by a closed communication climate will view tacit knowledge more as an individual asset.

Proposition 8: Individuals in subunits characterized by a pragmatic culture will view tacit knowledge less as a corporate asset whereas individuals in subunits characterized by a normative culture will view tacit knowledge more as a corporate asset.

Proposition 9: Individuals in subunits characterized by an employee culture will view tacit knowledge more as a corporate asset whereas individuals in subunits characterized by a job orientation will view tacit knowledge less as a corporate asset.

The above propositions are intended to predict the possible influence of subunit cultural factors on information culture. A final consideration will be the dimension of culture at the individual level, as discussed next.

3.3 Individual Cultures

Although Hofstede et al [1990] discount the utility of considering culture at the individual level, others propose that individual level cultures interact either synchronously or disharmoniously with organizational culture [Patterson, Payn and West, 1996; Chatman and Barsade, 1995]. Chatman and Barsade [1995] examined individual level culture in organizations using the individualistic/collectivistic dimension of culture which has been the topic of extensive communication research at the individual level of analysis [Gudykunst et al, 1996].

Individualism versus collectivism was first identified by Hofstede [1980] as a dimension distinguishing national cultures. Individualism is the preference for a loosely knit social framework in society in which individuals are supposed to take care of themselves and their immediate family as opposed to collectivism in which there is a larger in-group to which

is given unquestioning loyalty [Hofstede, 1980]. Individualism is related to a low-context communication style wherein individuals prefer information to be stated directly and exhibit a preference for quantifiable detail whereas collectivism is related to a high-context communication style in which individuals prefer to draw inferences from non-explicit or implicit information [Hall, 1976; Gudykunst, 1997]. In individualistic cultures, the needs, values, and goals of the individual take precedence over the needs, values, and goals of the ingroup. In collectivistic cultures, the needs, values, and goals of the ingroup take precedence over the needs, values, and goals of the individual [Gudykunst, 1997; Hofstede, 1980]. Research suggests that those who are associated with individualistic values tend to be less concerned with self-categorizing, are less influenced by group memberships, and have greater skills in entering and leaving new groups than individuals from collectivist cultures [Hofstede, 1980; Hall, 1976]. Individualistic values are associated with preferences for individual rewards (or a norm of justice, meaning that an individual is rewarded according to his/her input rather than a norm of equality in which all individuals who work as a group are rewarded equally) [Gudykunst and Ting-Toomey, 1988].

Earley [1994] argued that organizations could also be thought of as being dominantly individualistic or collectivist. Organizations encouraging individuals to pursue and maximize individuals' goals and rewarding performance based on individual achievement would be considered as having an individualistic culture whereas organizations placing priority on collective goals and joint contributions and rewards for organizational accomplishments would be considered collectivist [Chatman and Barsade, 1995].

On an individual level, Chatman and Barsade [1995] propose that workplace cooperation--the willful contribution of employee effort to the successful completion of interdependent tasks--is as much dependent on individual culture as organizational culture. They suggest that individuals with cooperative dispositions place priority on working together with others towards a common purpose while persons with a low cooperative disposition place priority on maximizing their own welfare irrespective of others. Cooperative persons are more motivated to understand and uphold group norms and expect others to cooperate whereas individualistic people are more concerned with personal goals and expect others to behave in

like manner. Chatman and Barsade [1995] proposed that people who have a high disposition to cooperate and who work in a collectivistic organizational culture will be the most cooperative while people who have a low disposition to cooperate and who work in an individualistic culture will be the least cooperative. This may suggest that individualistic cultures are results oriented and tend to be closed whereas cooperative cultures are process oriented and tend to be open. It might be that cooperative people in a cooperative culture could be more willing to share tacit knowledge than individualistic individuals in a cooperative culture or cooperative individuals in an individualistic culture. When mapped into Figure 4, we would expect the following influence of individual culture on information culture (see Figure 6):

INSERT FIGURE 6 ABOUT HERE

If we consider the relationship between individual level culture, subunit culture, and information culture, we propose the following:

Proposition 10: Individualistic individuals in collectivistic organizational subunits will engage in selective sharing of tacit knowledge.

Proposition 11: Cooperative individuals in collectivistic organizational subunits will engage in full sharing of tacit knowledge.

Proposition 12: Individualistic individuals in individualistic organizational subunits will engage in hoarding of tacit knowledge.

Proposition 13: Cooperative individuals in individualistic organizational subunits will engage in random sharing of tacit knowledge.

3.4 Summary

This section has presented a brief summary of organizational subunit cultures and has made propositions concerning the relationship of subunit culture and individual culture with the information culture discussed in Section 2. The propositions, in abbreviated form, are summarized in Table 2.

INSERT TABLE 2 ABOUT HERE

The above propositions reflect an organizational imperative--that organizational factors, in this case organizational subunit and individual culture, influence the successful implementation and use of knowledge management systems. It is also conceivable that KMS will affect organizational cultures (a technology imperative). There is evidence that as systems integrate information vertically and horizontally, organizational cultures are altered. For example, in the case of EIS, it has been found that by virtue of the fact that top managers are viewing detailed daily information previously viewed in monthly or weekly reports in a summarized fashion, all levels in the organization take notice of the information being tracked by the senior managers and alter their behavior in such a manner as to focus on the measures being examined by the top managers. In some cases, this was part of a planned attempt to help focus the attention of employees on the factors considered most critical by the top managers [Carlsson, Leidner, and Elam, 1996]. Over time, the underlying values might shift to become consistent with the new behavior. KMS are being implemented in a time of increasing global competition and the need to be "flexible"; as such, part of the implementation goal may be directed toward enabling a more flexible, adaptable culture. In this case, by implementing the system and inculcating desired sharing behaviors, over time the organizational culture may itself become more open, flexible, and employee oriented. However, the current article purports to evaluate the constraints posed by organizational culture on the implementation of KMS rather than the potential long-term consequences of KMS on organizational culture. The latter interesting question is left for future research.

4. Implications and Conclusion

It can be argued that the first step in developing an implementation plan is understanding where barriers might be encountered and why. The above analysis is intended to help evaluate where and why such barriers might exist when implementing KMS. Several strategies for KMS implementation have been suggested: one strategy is to include information of high value such as corporate directories which make users comfortable with,

and dependent upon, the corporate intranet. Another is education on the need and potential of such a system to improve individual productivity and customer service. Another commonly used strategy is providing rewards and incentives, such as bonuses, based on the amount and quality of knowledge one contributes. The strategy used to implement KMS should be tied to the organizational subunit culture. For example, individuals in reward oriented subunits might respond well to incentive systems whereas individuals in process oriented subunits might require greater education and training on the benefits of such a system. Furthermore, changes in reward systems will do little to change the information culture; in which case, at most, we would expect that subunit cultures which foster a view of knowledge as a high individual asset (results oriented, professional oriented subunits) will be able to encourage selective information sharing but not the full sharing of the most valuable of tacit knowledge. To obtain full sharing in subunits that are results oriented, closed, professional oriented, and job oriented, the change management plan might need to first focus on changing the culture and only secondly, on implementing the system. It would be misleading to think that the system would encourage full sharing in organizations where the information culture ran contrary to such sharing, just as it has been found that electronic mail systems do not encourage greater communication among subunits with infrequent, irregular communication [Vandenbosch and Ginzberg, 1997]. However, in organizations with cultures that that foster the attitude of tacit knowledge as primarily a corporate asset, it would be expected that KMS could be implemented with little resistance.

This article has taken the view that organizational effectiveness in the highly competitive global environment will depend largely on an organization's capacity to manage individual employee knowledge. We have argued that knowledge management systems will be important computer-based information system components to such effectiveness but that the success of these systems will depend on an appropriate match with organizational subunit and individual culture. The article has offered propositions in an attempt to provide a framework for understanding where potential incongruity between these new IS and organizational culture might exist.

One way to consider the advances of information-based systems in organizations is to consider the dominant organizational theory underlying the assumptions of the need for information. The era of MIS can be thought to correspond to the organizational theory termed the “information processing view of the organization” This view posited that organizations process information to reduce uncertainty--the absence of information and to reduce equivocality--the existence of multiple and conflicting interpretations about an organizational situation [Daft and Lengel, 1986]. According to this view, information systems are needed to help organizations understand the environment and make appropriate plans in response. As DSS and EIS came into vogue, so was the information-processing view of the firm replaced with the decision making view of the firm espoused by Huber and McDaniel [1986] wherein decision making was seen as the most critical managerial activity. This view placed the primary purpose of IS as supporting organizational decision makers by providing tools, timely information, and ready access to important operational and financial information. More recently, it is being argued that the most critical organizational activity is creating, sharing, and utilizing the knowledge that resides in employees [Nonaka, 1994]. To understand the potential organizational effect of systems designed to harness knowledge, it is argued that the traditional paradigms of structure and decision making are insufficient, but a perspective incorporating organizational culture is needed.

The major intent of the article has been to encourage thinking about the important topic of current IS and its relationship to organizational culture rather than to offer a complete set of guidelines on implementing KMS or evaluating the effectiveness of KMS in given organizational cultures. It is hoped that the reader leaves with a framework for assessing the potential conflicts resulting from cultural factors that may arise with the implementation of knowledge management systems, and can use the frameworks proposed in this paper to guide thinking on potential implementation strategies.

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Table 1: Summary of Information-based Systems

	MIS	DSS	EIS	KMS
Purpose:	Provide summarized performance reports to management	Provide tools, models, and data for aid in decision analysis	Provide online access to realtime financial and operational information	Provide online access to unstructured information and knowledge throughout the organization
Users:	Managers at various levels	Analysts and middle managers	Senior and middle managers	Professionals and managers throughout an organization
Role of Users	Participation in Design	Participation as Designer, Active User	Participation in Design Active User	Participation in Design Active User Content Provider
Information Strategy:	One-for-All	One-for-One	One-for-One	Anyone, Anytime, Anywhere
Interpretive Framework:	Organizational Structure	Organizational Decision Making	Organizational Decision Making	Organizational Culture

Nature of Proposition	Proposition Number	Proposition (abbreviated)
Information Culture	1	Individuals perceiving their tacit knowledge as high in individual and corporate value will engage in selective sharing of tacit knowledge.
	2	Individuals perceiving their tacit knowledge as high in individual and low in corporate value will engage in information hoarding.
	3	Individuals perceiving their tacit knowledge as low in individual and high in corporate value will engage in full sharing.
	4	Individuals perceiving their tacit knowledge as low in individual and corporate value will engage in random sharing.
Organizational Subunit Culture Influence on Information Culture	5	Results, as opposed to process, oriented subunits will foster a view of tacit knowledge as an individual asset.
	6	Parochial, as opposed to professional, oriented cultures will foster a view of tacit knowledge as a corporate asset.
	7	Closed, as opposed to open, subunit communication climates will foster a view of tacit knowledge as an individual asset.
	8	Normative, as opposed to pragmatic, oriented cultures will foster a view of tacit knowledge as a corporate asset.
	9	Employee, as opposed to job, oriented cultures will foster a view of tacit knowledge as a corporate asset.
Individual and Organizational Culture Influence on Information Culture	10	Individualistic individuals in collectivistic cultures will engage in selective sharing of tacit knowledge.
	11	Cooperative individuals in collectivistic cultures will engage in full sharing of tacit knowledge.
	12	Individualistic individuals in individualistic cultures will engage in hoarding of tacit knowledge.
	13	Cooperative individuals in individualistic cultures will engage in random sharing of tacit knowledge.

Table 2 : Summary of Propositions

Figure 1: The Knowledge Creation Process (from Nonaka, 1994)

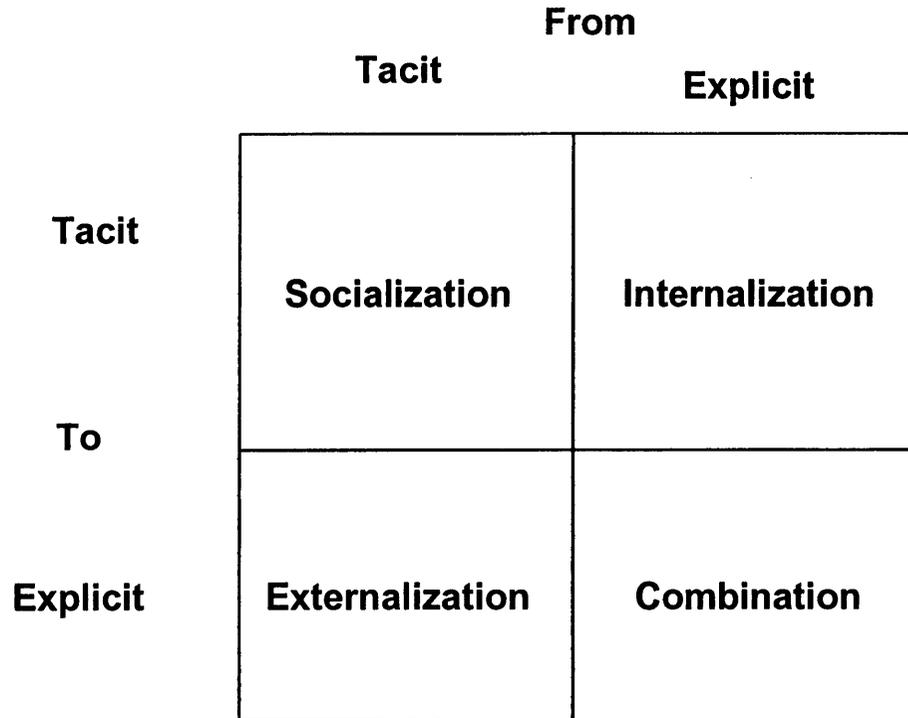
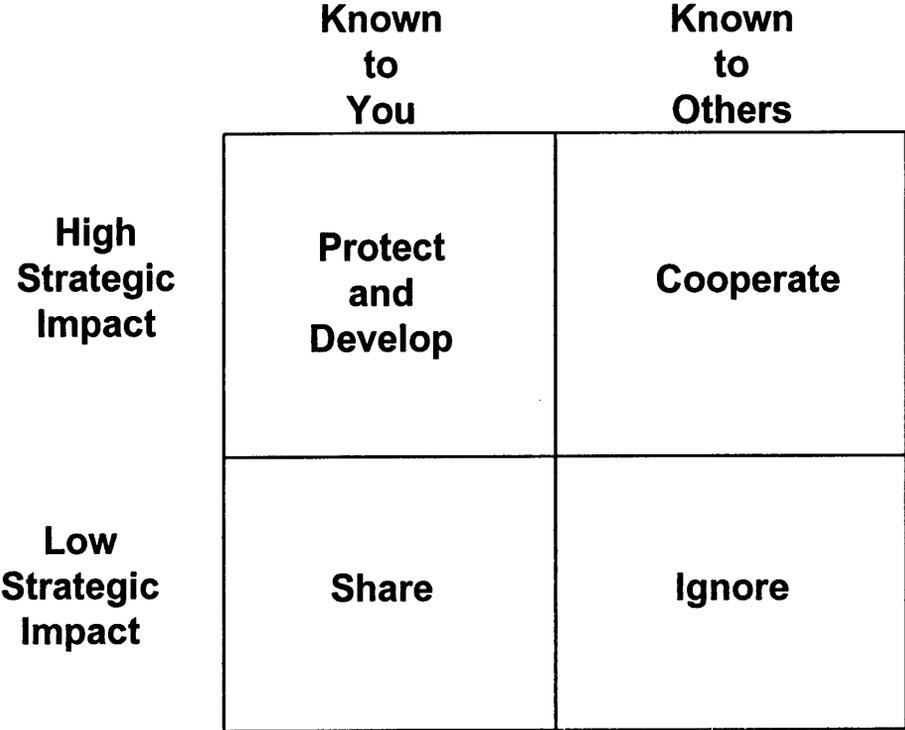


Figure 2: The Johari Window (from Newman, 1998)



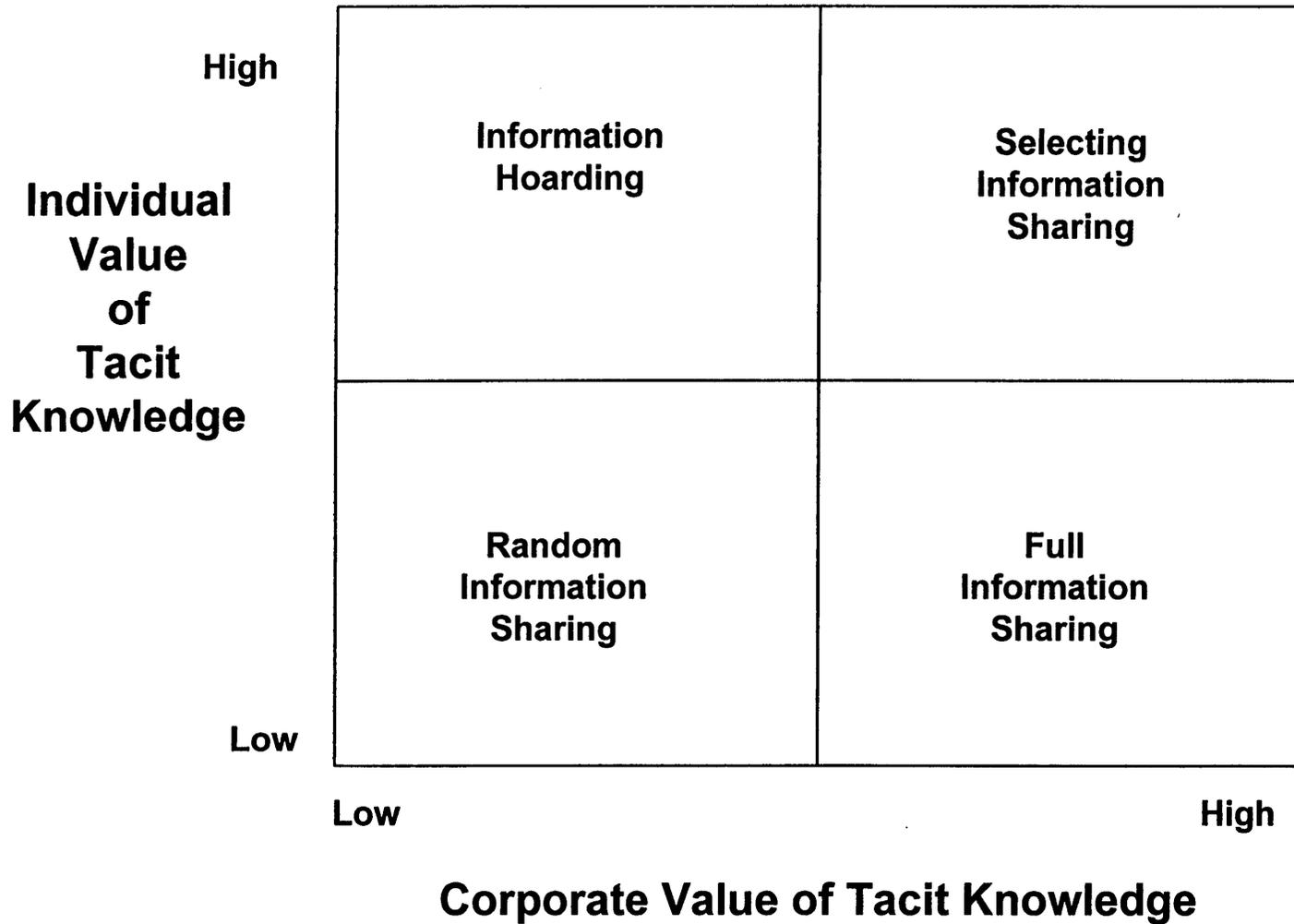


Figure 3: Information Culture Matrix

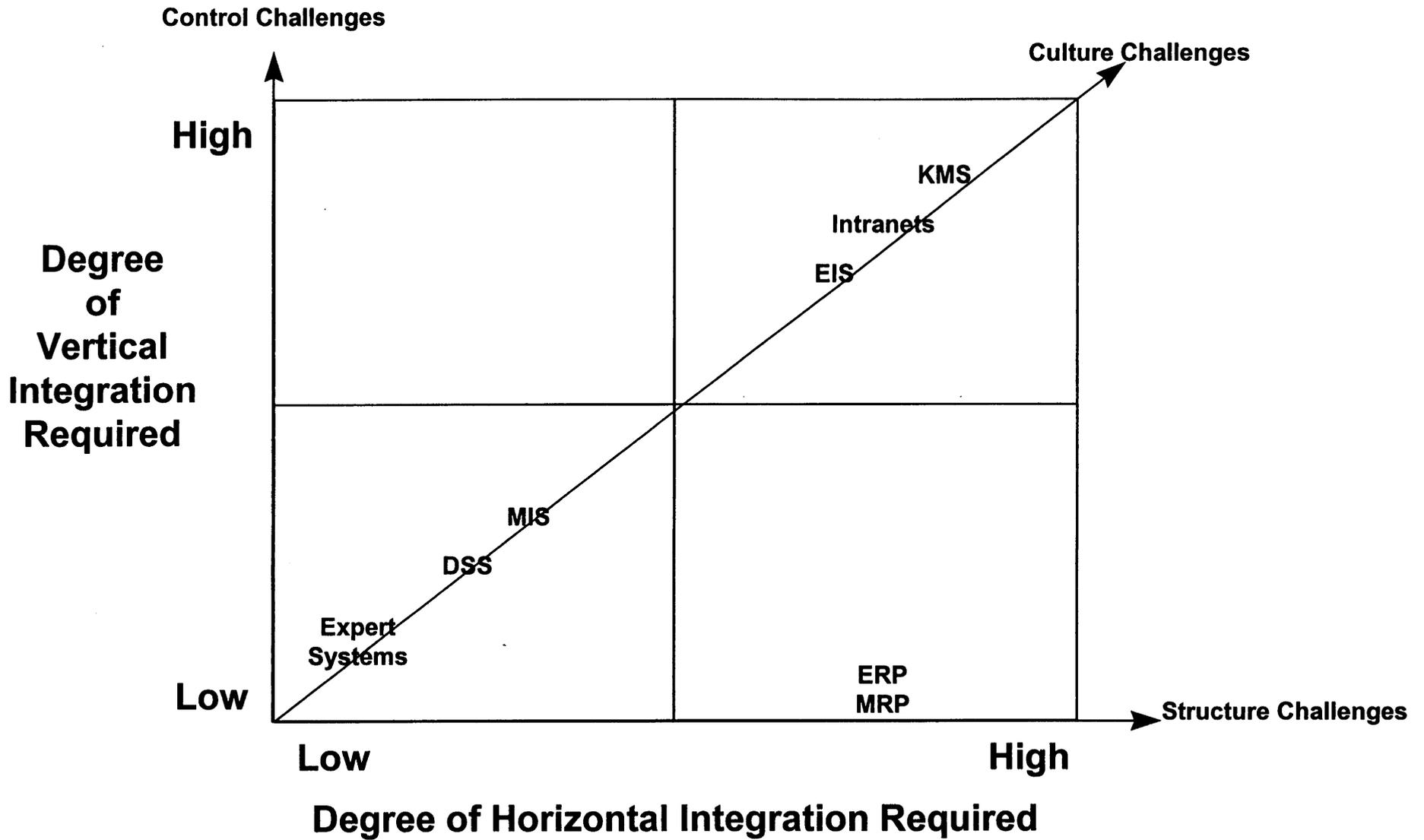


Figure 4: Systems and Organizational Integration

Organizational Subunit Characteristics

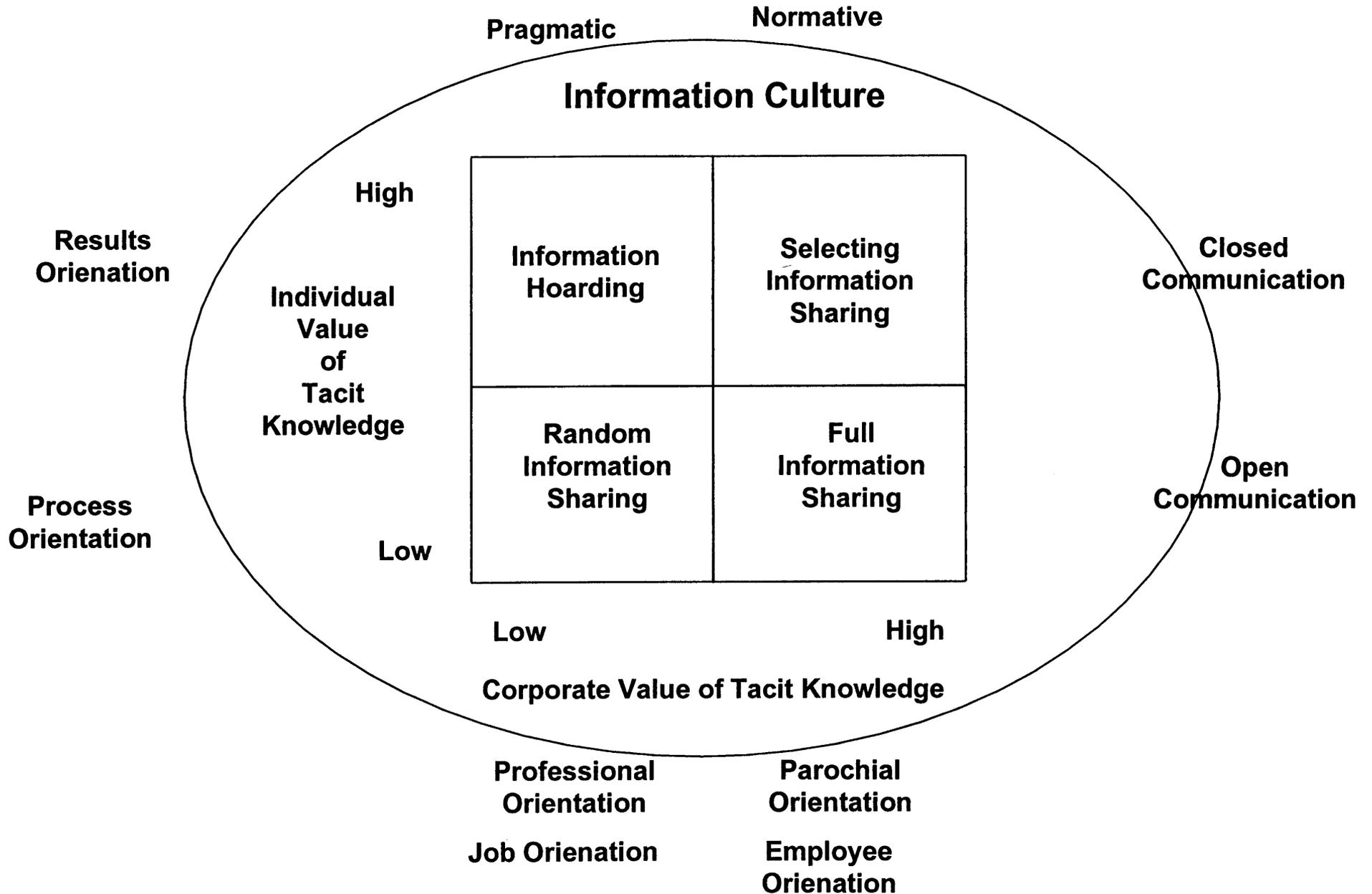


Figure 5: Subunit and Information Culture Relationship

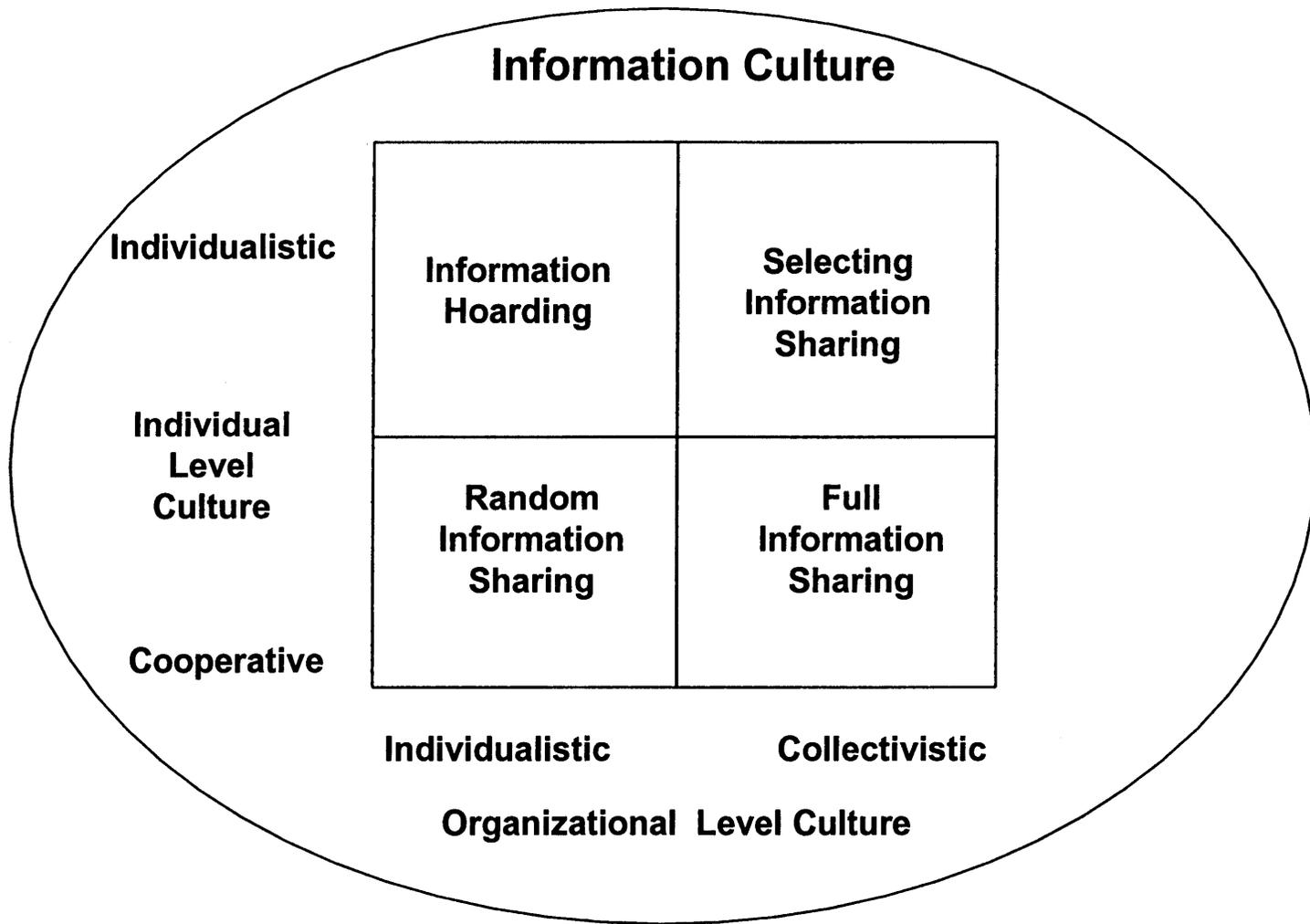


Figure 6: Individual Culture's Relationship to Information Culture