Sharing Knowledge Through Intranets: A Study of Organizational Culture and Intranet Implementation

Abstract—This study explores factors affecting the implementation of intranets, which are the technology upon which many knowledge management (KM) systems are built. Because intranets facilitate sharing of employee knowledge, many believe that organizational culture will influence intranet implementation. The results of this study found that intranet implementation is facilitated by a culture that emphasizes an atmosphere of trust and concern for other people (ethical culture), flexibility and innovation (developmental culture), and policies, procedures, and information management (hierarchical culture). Management should ensure that the proper values are in place to optimize intranet implementation and facilitate knowledge sharing.

Index Terms—Corporate culture, ethics, intranet, knowledge management (KM), organizational communication, trust.

In recent years, knowledge management (KM) has captured the attention of both academics and practitioners. KM can be broadly defined as the strategies and tactics utilized by organizations to capture, manage, and leverage their intellectual capital resource. The KM literature differentiates between explicit and tacit knowledge [1]–[3]. Explicit knowledge is easily codified, verbalized, and published [1]–[3]. Tacit knowledge, such as insights, intuitions, and hunches is not as easily codified and is more difficult to articulate and transfer [2], [3].

While both types of knowledge should be shared or externalized, it is tacit knowledge that most strongly facilitates learning, builds intellectual capital, and adds value and competitive advantage to organizations because it is more difficult for competitors to replicate [3]. Tacit knowledge includes technical knowledge, such as personal skills and “know-how,” and cognitive knowledge, such as beliefs, ideals, values, and mental models that we take for granted [2]. Inkpen and Dimur [1] suggest that an organization’s goal is to convert tacit to explicit knowledge so it can be shared more easily. This sharing and communicating of knowledge transforms individual knowledge into organizational knowledge [1], [4].

Information becomes tacit knowledge when it is processed in the mind of an individual. Knowledge becomes explicit knowledge again when it is communicated or articulated to others in an appropriate format (text, graphs, spoken, written, etc.) [5]. Because knowledge is in the individual’s mind and must be processed and communicated, increased knowledge may result from investments in connecting employees through the use of electronic communication technologies such as intranets [6]. Intranets initiate KM efforts because they allow the sharing of
document-level information and concepts or issues, rather than the record-level information that traditional systems do [7].

The nature of the intranet with its browsers, search capabilities, and information-sharing abilities, enables a de facto KM system. Intranets facilitate communication and interaction and create what has been referred to as a “knowledge connection” [1]. An intranet supports KM in at least three ways: (1) providing compression of time and space among the users, (2) offering the flexibility to exchange information, and (3) supporting information transfers and organizational networking independent of direct contacts between users (cf. [8]). Scott [9] developed a theoretical framework that suggests the multiple ways intranets support knowledge and gives numerous examples, including the inclusion of timely information, metaphors, analogies, prototypes, discussion threads, debates, video clips, animation, and online databases on the intranet. Online networks allow the combining of new knowledge with existing information, and they can generate and systematize knowledge throughout the organization [2]. Without shared knowledge, an intranet’s impact on organizational effectiveness would be limited [1]. Therefore, KM and intranets are closely linked, with intranets enabling KM because of their ability to connect people.

Recently, attention has focused on how to manage and enable this knowledge process. Ruggles states that KM is “an approach to adding or creating value by more actively leveraging the know-how, experience and judgment resident within and, in many cases, outside of an organization” [10, p. 80]. He views KM from a process perspective. When knowledge is viewed as a process rather than an asset, the emphasis is on creating a proper environment to enable and facilitate the flow of information [11]. Thus, KM can be viewed as creating the proper environment that facilitates the flow of tacit and explicit knowledge. Intranets, acting as pipelines to deliver knowledge, are seen as critical to that environment [12], [13].

However, evidence (e.g., [5], [9], [14]–[16]) suggests that employee acceptance of or resistance to intranets as a knowledge-sharing environment is a management and corporate culture issue rather than a technology issue. A 1999 (best practices) study by the American Productivity and Quality Center found that a company’s ability to use technology to share knowledge is based on employee enthusiasm, or lack thereof, which in turn is rooted in the corporate culture or subculture that is salient to the employee [14], [16]. This paper examines the influence that the organization’s culture has on intranets. The intention of this examination is to ensure that a compatible culture exists to facilitate knowledge sharing, along with fostering the success of intranets and KM efforts.

ORGANIZATIONAL CULTURE AND INTRANETS

Since sharing on intranets is also a sharing of some level of knowledge (either explicit knowledge in the form of manuals or procedures, or tacit knowledge in the form of electronic conversations or advice), an organizational culture that supports such sharing can lead to more effective KM and intranet use. Instilling a culture of sharing and maintaining information is critical to intranet success. Edvinsson and Sullivan [17] propose a model that identifies the importance of culture in managing knowledge by suggesting culture is part of the intangible structural capital that supports the development and transfer of knowledge.

Yet it has been suggested that a KM culture is the most difficult success factor to build if the culture does not already exist [13], [18]. In a study of KM practice, only 19% of executives indicated that their organizational performance in “facilitating knowledge growth through culture and incentives” was good or excellent [10]. Culture is the shared interpretations and understanding of organizational events, and this understanding develops over time [19]. Denison suggests that “culture refers to the deep structure of organizations which is rooted in the values, beliefs, and assumptions held by organizational members” [20, p. 624]. These shared cultural assumptions are preconscious, powerful, and a group phenomenon [21] that do not change quickly.

Despite organizational culture’s inertia, successful KM implementation has been identified as transformative to the organization and its culture [22]. Managers believe that many of the most important gains from intranets are in improving worker productivity and morale, decision making, and information sharing [23]. Therefore, the effect of culture on intranets, and, with the passage of time, the effect of intranets on organizational culture are an important part of KM practice [24].

Similarly, organizational culture has been found to influence the successful implementation of several other information technologies (ITs), including CASE, Lotus Notes, and advanced manufacturing technologies [25]–[27]. Yet Cooper [21] and Robey et al. [28] suggest that culture, which offers a promising perspective to understanding contradictory findings regarding IT and organizational transformation, is a factor that has been largely ignored by IT implementation researchers.

In addition, mismatches between information technologies and their organizational settings have caused an IT productivity paradox where the increased
use of IT does not result in expected increases in productivity [29]. Without a match between the culture of an organization and the cultural assumptions embedded in an IT innovation, a costly implementation failure is likely to occur [30]. Culture can prevent some IT projects and their associated organizational transformations from occurring when users cling to old assumptions about autonomy and control [4].

This is also true for the IT innovation, intranets, since, as Fichter suggests, “Intranets are inherently about people and organizational cultures” [31, p. 74]. Some managers have suggested that the information/technology component of KM is only 20% of the KM and intranet issue; culture and management issues dominate [9]. When intranets are implemented, their success depends strongly on employees using them, not merely their existence [32]. In sum, implementation effectiveness is related to the strength of an organization’s culture for the implementation of the specific IT innovation [33].

What kind of culture supports intranets? A culture that rewards members for innovation and learning can cause new insights to grow out of new IT implementations [34]. Otherwise, the existing culture may find a way to preserve old forms, such as face-to-face meetings or hard-copy documents, despite electronic alternatives, because the old forms are part of the employees’ ingrown habits and are familiar and comforting to organizational members [28], [29].

Intranet implementers may also need to encourage cooperation and win–win strategies to be effective [31]. Some interpretivist studies (e.g., [24], [35]) have found that collaboration and cooperation, as well as trust, are key to understanding implementation, usage, and outcomes of information systems.

Mistrust is an aspect of culture that has a negative impact on building a KM culture, whereas “pleasure in helping others” has a positive impact [18], [34]. Therefore, a culture that is not conducive to intranets is one that emphasizes unilateral control, maximizing winning and losing, and minimizing the expression of negative feelings. This environment can create miscommunication, mistrust, protectiveness, and escalating errors [34], [36].

Trust or lack of trust is a perspective that goes beyond the simple rational perspective that the organization wishes to maximize economic efficiency and effectiveness [35]. Trust can create social capital, defined as the increased capability that arises from the prevalence of trust, and is usually created and transmitted through cultural mechanisms: that is, organizations based on cultures of shared ethical values and trust can reduce regulations and contractual overhead [35]. Where an ethical and trusting culture may already exist, there may be less need for monitoring or privacy guidelines [37]. Thus, an ethical and trusting culture may reduce some burdens, increase social capital, and aid intranet implementation.

The effect of culture may only increase in the future. While the less critical, easy to implement systems can be converted quickly, intranet-based mission-critical applications are in the early stages of implementation, and they may only be used in certain areas of organizations [15], [38]. Using the intranet for collaborative applications, such as discussion groups, workflow, and document management, creates higher risk and longer time frames, but it also creates greater potential for performance improvement (cf. [38]). Employees must be willing to share and trust others to share [8]. Management must realize that knowledge must be nurtured, supported, enhanced, and cared for [2]. Platforms and cultures must be developed where knowledge can freely emerge [2].

Therefore, this research focuses on the aspects of an organizational culture that may affect the early implementation and diffusion of intranets. A model of the research study can be found in Fig. 1. Because the research was conducted early in the intranet adoption trend, it is believed that culture impacts intranet use. However, as time proceeds, the causal flow may reverse: that is, intranets may cause changes to the existing culture. The predicted continued and rapid growth of both KM and intranets, and the need to expand intranets enterprise-wide and even interorganizational, suggests that this type of research is of great interest to the business community as well as the academic community.

**DIMENSIONS OF ORGANIZATIONAL CULTURE**

Quinn and Rohrbaugh [39] developed a framework for organizational effectiveness that is based on competing values. This framework has been used as an intervention in organizations to enhance performance, as well as in empirical research (e.g., [40]–[42]) because of its ability to tap into the aspects of organizational effectiveness via different values, assumptions, and interpretations that define an organization’s culture.

The first dimension of this framework results from an organization that either values organizational flexibility or organizational order. The other dimension varies from an external focus to an internal focus. This results in a framework containing four quadrants:

- one with an external focus which values flexibility (developmental),
- another with an external focus which values order (rational),
• another with an internal focus that values order (hierarchical), and
• the last with an internal focus which values flexibility (group).

These quadrants represent four different value sets that provide competing viewpoints on the meaning of organizational effectiveness.

An organization may contain multiple values, however, such as valuing order while encouraging some flexibility, thus the culture dimensions are not mutually exclusive. Instead, each dimension reflects the strength of the organization’s belief that the dimension is important to achieving organizational effectiveness [41], [43]. Maximum effectiveness may be achieved when an organization is strong in all dimensions. Organizations should be both adaptable and controlled, as well as focused on growth and resource acquisition while adhering to tight information management and formal communication [43].

While strength in these four dimensions comprises some researchers’ thinking on culture, they are not intended to be all encompassing with respect to culture’s possible dimensions. One important dimension needed for the sharing required by KM and intranets, and implied by the above discussion, is an ethical and trusting culture [15], [44], [45]. Cultural values for KM are “openness and honesty, sincere service attitude toward membership,” and a “high trust culture for shared learning” [46, p. 52]. None of the four dimensions of the competing values framework specifically address these values of ethics and trust. Meanwhile, ethics researchers have included such dimensions in their culture studies by using values of benevolence, egoism, and other principles in work climates (cf. [47], [48]).

Thus, while the competing values framework captures an internal versus an external focus or flexibility versus order, there is nothing captured in these competing values that suggests these important aspects of ethics and trust are specifically related to any particular quadrant(s). We prefer to think of an ethical culture as an overarching concern for all members of the organization, regardless of the internal/external focus or flexibility/order values. Therefore, this study would be remiss without a “fifth” dimension describing the strength of the culture for ethics and trust, with the resulting, proposed corporate culture dimensions relevant to KM shown in Fig. 2. We will now examine each of the four quadrants of the competing values framework, as well as the fifth dimension of ethical work climate, with respect to intranets and the organizational culture.

Developmental Culture A developmental culture is a culture that values flexibility and has an external focus. Cooper [21] and Cooper and Quinn [40] identify a developmental culture as one where an organization faces a complex, turbulent, and politicized environment. Management believes that chances for organizational survival and growth are increased through the promotion of organizational insight, innovation, and adaptation [21], [40].

The rapid spread of intranets suggests that those who wish to remain competitive would be aware of the trend toward intranets and their widely touted benefits and relatively low costs [23]. With the competition rapidly implementing intranets as discussed above, it

![Research model of intranet implementation.](image)

1 Solid lines represent the model under study and the presumed direction of organizational culture's effect during initial implementation of intranets. Dotted lines represent possible relationships presumed to occur over time and after initial implementation of intranets.
would seem that an organization with a developmental culture would also feel pressure to implement one. Organizations with an external view and concern for competitive pressures would implement an intranet since its barriers are low. Moreover, a developmental culture is more flexible and innovative and willing to try new things. In such a culture, change and the importance or ideological appeal of the task being undertaken motivates individuals [26]. Intranets flourish where information resource utilization is an active, rather than reactive, cultural component [8]. Therefore, we propose:

H1: There is a positive relationship between a developmental culture and intranet implementation.

Rational Culture The rational culture is one in which the organization is aware of its environment and reacts to it as a cohesive unit in an intentionally optimizing manner. Key management activities are designed to maximize profit through planning, directing, and goal setting [21], [40]. The rational culture reacts to its environment in a manner that optimizes organizational productivity. Because it values order and stability, it establishes control structures with varying degrees of formalization and centralization to deal with contextual factors, such as organizational size and environmental uncertainty [40]. Structures vary because nearly all decisions are driven by rational-economic criteria.

Since many intranets have grown without formal return on investment (ROI) analysis [23], organizations that require such ROI calculations would be less likely to create intranets in a grass-roots manner. It has been suggested that among early adopters these grass-roots or “underground” intranets far outnumber official intranets [49]. Moreover, the pre-implementation ROI is difficult to estimate, with post-implementation estimates only now being declared at 1000% ROI [24]. It may be that rational cultures will implement intranets now that such estimates are becoming known, but not as early implementers which are the focus of this study.

While the external focus of this culture would make the organization aware of the rapid adoption of intranets, the desire for order may stifle innovations that tend to be in early stages of development because it is difficult to maintain order and encourage productivity while experimenting with intranets.

Intranets, especially those formed as a grass-roots phenomenon, can conflict with this culture’s desire for formalization and control. Thus, while intranets were developed to lessen information overload and to allow the sharing of knowledge, they can likewise lead to the very thing they were designed to decrease [50]. Therefore, we propose:

H2: There is no relationship between a rational culture and intranet implementation.

Hierarchical Culture The hierarchical culture is one in which the environment is not considered a significant factor. Rather, management interest is focused upon measurement, documentation, and information management [21], [40]. Since this culture is concerned with an internal focus and order, it identifies ways to bring order to the internal organization. It is highly specialized, departmentalized, and has internal control structures. Leaders tend to be conservative and wish to obtain timely, regular reports of internal information. Individuals comply with organizational mandates because roles are formally stated and enforced through rules and regulations. Although the focus is internal, the emphasis is on the task rather than the individual performing the task [21].

Fig. 2. Five dimensions of organizational culture.
Intranets have an internal focus and can be used to publish policies and procedures. Research (e.g., [15]) suggests that intranets are quickly and easily used for publishing internal policies and procedures, resulting in greatly lowered publication costs, and this represents the most common intranet application. Thus intranets are consistent with a hierarchical culture’s values that emphasize policies, procedures, and information management with their internal focus.

In addition, Lynch [49] suggests that the biggest issue in intranet use is content management. A hierarchical culture would have much if not all of this content already in place, although it may exist in paper form. Similarly, Curry et al. [15] suggest that establishing policies and procedures for intranet use, content management, and security are recommended as key elements of intranet management. In a hierarchical culture where control and security are valued [26], security procedures and project management methods may already be implemented. These security measures, as previously discussed, are important to the technical ability to implement intranets. Therefore, we propose:

H3: There is a positive relationship between a hierarchical culture and intranet implementation.

**Group Culture** The group culture is one in which the maintenance of the organization and its human resources is key, emphasizing cohesive relationships, individual commitment, and contribution. While this culture is inwardly focused, it also values flexibility. Managers promote employee dialogue, participation, and training to accomplish this goal [21], [40].

Orlikowski [24], in her study of the impact of culture on Lotus Notes, a technology with a knowledge-sharing purpose, found that a competitive culture that does not support cooperation or sharing is countercultural to the underlying premise of these technologies. KM requires a technical architecture that is more open, social, transparent, flexible, and respectful of employees [51]. Intranets, with the capability for opening up communication and information in a technologically transparent manner within an organization, have the capability to encourage such sharing through features like discussion groups or, what is being referred to in the literature as, communities of practice. Kirchner [32] states intranet success is 60% communication and 40% technology. In a culture of cooperation and sharing, intranets enhance the ability to share knowledge, and group cultures appear to be compatible with intranets.

In addition, group cultures value affiliation, human resource development, and employee participation in decision making. Such values may encourage employee commitment through increased group collaboration, trust, and tradition [26], [42]. One of the frequently cited uses of intranets is for human resource management purposes. The intranet can be used to provide information concerning employee benefits and job openings, as well as training materials. Moreover, greater participation is encouraged, as information not previously available now becomes available to employees. This enhanced ability to find the information to do their jobs may be important, for it has also been suggested that personal responsibility is an enabler of KM [22]. Similarly, it has been suggested that KM efforts should try to avoid the loss of intellectual capital by retaining employees through enabling personal development and empowerment [22], [45].

In sum, group cultures would likely support the development of intranets. Therefore, we propose:

H4: There is a positive relationship between a group culture and intranet implementation.

**Ethical Culture** While the competing values framework describes values often used for decision making, it does not include specific measures for trust and an ethical work environment. Group culture is believed to facilitate trust through affiliation and member participation [26], but the group culture measure does not measure trust or the ethical values of benevolence and concern associated with trust. Yet evidence exists that if a climate of benevolence and trust does not exist, knowledge sharing will be diminished [15], [44], [45]. Davenport [13] suggests that sharing knowledge is an “unnatural act.” Therefore, for firms where employees are concerned mainly with their own best interests and there is a low level of trust, the inherent sharing of information on an intranet is counter-cultural [34], [46].

Employees may fear sharing knowledge for fear of becoming redundant, giving away expertise, or being embarrassed [16]. Employees who lack other forms of control or power may use knowledge as a control and defense device [44] unless they feel that they will be treated fairly and respectfully. The need for empathy and concern for others is fundamental to sharing knowledge [2], [34], [44], [45]. These propositions are consistent with findings of the previously mentioned study on the impact of culture on Lotus Notes implementation [25]. It is also consistent with Schwartz [38], who suggests that the real value of intranet development comes from the level of interdepartmental collaboration required to design and implement the sites. When studying intra-firm networks, it was found that
cooperative behavior may emerge when trust exists, leading to a positive association between trust and the extent of resources exchanged within units of a firm [52]. Similarly, Inkinen [53] found trust a necessary element of the organizational culture that facilitates the effective implementation and utilization of knowledge. Thus, organizations that encourage a caring, trusting environment, while discouraging self-interests, would be more likely to implement intranets successfully. Therefore, we propose:

H5: There is a positive relationship between an ethical, trusting culture and intranet implementation.

**Methodology**

A survey was constructed and used to obtain as broad a cross section of organizations as possible and compare across these organizations the effect of different culture types on intranet implementation. According to Kerlinger [54], such surveys have the advantage of accuracy and can be used to obtain social facts, beliefs, and attitudes. Since many qualitative accounts of culture’s effect on KM have been reported, survey methodology is an appropriate methodology for confirming or denying hypotheses generated based on qualitative accounts.

Surveys were sent to U.S. information systems (IS) managers randomly selected from a national mailing list. IS managers were selected because it was believed they were in the best position to assess their organizational culture and the extent of intranet implementation. Several sources have argued that when studying culture, managers are the appropriate source of evaluation of the overall culture [29], [55], [56]. Managers’ values, behaviors, and interpretations become the sentiments that organizational members reflect, resulting in a homogeneous culture with respect to morality [19], [57]. Thus, it seems reasonable that managers would be in the best position to describe management values and attitudes toward their employees’ interests, the overall management expectations that are reflected in the culture, and the culture itself.

Approximately 375 surveys were mailed in 1996, and were believed to reach the appropriate person, with 44 surveys returned for a response rate of 12%, which is lower than desired. Since other studies (e.g., [47], [58]) on ethics have also had low response rates, we were concerned that a nonresponse bias may have entered into the study. To ensure there was no response bias, a follow-up survey was sent in 1998, asking nonrespondents why they did not respond and also asking them to reply to a shortened version of the intranet survey that did not include ethics or trust questions. The responses to the follow-up suggest that the major reasons for not responding were: (1) too many surveys: 36%, (2) not enough time: 23%, (3) length of survey: 20%, and (4) company policy not to respond to surveys: 8%. Only 3% responded that the sensitive nature of the questions was a reason, suggesting that there is no response bias among those previously responding.

The shortened survey sent in the second round duplicated only the questions concerning intranets. Because questions on ethics and trust were not included, the second survey was not intended to be used in the statistical analysis. Instead, it was used to confirm that the original respondents and nonrespondents were no different in their implementation of intranets and to confirm that intranets were being used in a manner consistent with KM and the concepts of this study.

To further test for the representativeness of the respondents, industry classifications of the respondents were compared to the industry classification of the mailing list as a whole, and no significant departures were found. Also, the survey asked about technologies other than intranets; so the sample is not biased toward only those organizations that are using intranets. Therefore, we do not believe there is a nonresponse bias even though the response rate is less than desired.

**Measures**

Culture was measured using several previously used culture/climate questions from Yeung, Brockbank, and Ulrich [41] and Victor and Cullen [47]. These questions have been analyzed in previous studies [48], [59] and have been found to have good reliability and construct validity. Previous research [41], [42] has also suggested that an organization with more than one strong culture type is possible and desirable since the culture types are ideals. In fact, those organizations that emphasize all four dimensions (group, hierarchical, developmental, and rational values) have been found to be associated with better organizational performance [41]. A complete list of the questions used, together with their loading on the relevant cultural factor, can be found in Table I. Factor analysis was used to determine if the culture questions loaded into the four competing values quadrants as well as the “fifth dimension” of ethical culture, as discussed above. The questions loaded as expected, as shown in Table I. The resulting measures also had good internal reliability, as shown in our results section.

Intranet implementation was determined by responses to the following categories: never considered, currently being considered, initial implementation, partial implementation, fully implemented, and tried and rejected. This categorical measure
is preferable to a dichotomous use/not use variable. It allows the assignment of a rank order to the level of intranet implementation and allows analysis of the variables with respect to the level

<table>
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<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
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**Factor 1: Rational Culture** (Items 1-4)
1. The relationship with our customers and suppliers can best be described as one of cooperation and trust.
2. I have found that my employees are usually dependable, especially when it comes to things that are important to me.
3. My department is a very production oriented place. People are concerned with getting the job done.
4. The glue that holds my group together is an emphasis on task and goal accomplishments. A production and achievement orientation is shared.

**Factor 2: Ethical Culture** (Items 5-8)
5. In this organization, people are mostly out for themselves. (REVERSED)
6. Our major concern in this organization is always what is best for the other person.
7. The atmosphere within this organizational can best be described as one of mutual confidence and trust.
8. The environment is largely ignored, with upper management interest focused inward attempting to maintain the stability and equilibrium of the organization. In order to attain these goals, managers focus upon measurement, documentation and information management. (REVERSED)

**Factor 3: Group Culture** (Items 9-10)
9. My department is a very personal place like an extended family. People seem to share a lot of themselves.
10. My group emphasizes human resources. Morale is important.

**Factor 4: Developmental Culture** (Items 11-12)
11. The glue that holds my group together is commitment to innovation and development. There is an emphasis on being first with products and services.
12. My group emphasizes growth through developing new ideas. Generating new products or services is important.

**Factor 5: Hierarchical Culture** (Items 13-14)
13. My department is a very formal and structured place. People pay attention to procedures to get things done.
14. The glue that holds my group together is formal rules and policies. Following rules is important.
of implementation rather than merely to its adoption.

RESULTS

A frequency table of implementation is given in Table II below. Implementation levels among respondents between 1996 and 1998 changed little. Only about 11% have never considered using an intranet, and 20% have fully implemented it. Overall, about 69% of the organizations have begun implementing intranets, with another 22% considering using them in 1998. These figures appear consistent with reports in the popular literature [38] and lend support for the representativeness of the sample.

In the 1998 survey, the respondents were asked to estimate the percent of their intranet usage across various categories. The results were (1) publishing information: 34%, (2) sharing knowledge (such as “best practices”): 33%, (3) delivering applications: 17%, (4) training: 6%, (5) other: 8% (with email most frequently described). Intranets are being used for knowledge sharing and management activities. The respondents were also asked whether the intranet had improved internal communications in their organizations. Ninety percent (90%) responded that it had, with a minimum estimated improvement of 5%, an average 35%, and a maximum of 200%.

TABLE II
INTRANET IMPLEMENTATION

<table>
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<tr>
<th>Level of Implementation</th>
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<th>1998 Study</th>
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<tr>
<td>Currently being</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Initial implementation</td>
<td>6</td>
<td>14%</td>
</tr>
<tr>
<td>Partial implementation</td>
<td>15</td>
<td>34%</td>
</tr>
<tr>
<td>Fully implemented</td>
<td>9</td>
<td>21%</td>
</tr>
<tr>
<td>Tried and rejected</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>44</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Correlation Results The stronger the developmental culture, the greater intranet implementation is (see Table III below), thus supporting H1. A developmental culture, because of its external focus and willingness to undergo change, would be aware of intranets’ rapid growth and be willing to explore and implement intranets.

An ethical culture is also highly significantly correlated ($r = 0.36$; $p < 0.05$) with intranet implementation, supporting H5. This factor measures concern for others in the organization, as well as mutual confidence and trust. This confidence and trust most likely are necessary for the sharing of information, which is important and inherent in intranets [15], [45]. Also as expected, H2 was supported since no significant relationship exists between a rational culture and intranet implementation.

While H4, the relationship between group culture and intranets, was not directly supported by the correlation analysis, the group culture was highly correlated with the ethical culture, which was related to intranet implementation. Similarly, the hypothesis (H3) relating a hierarchical culture to intranet implementation was not supported at the $p < 0.05$ level of significance. It was, however, marginally significant ($p < 0.10$), suggesting that the existence of rules and order may have some effect on the use of intranets since procedures and rules for its development and use may exist.

Stepwise Regression Results The five cultures were entered into a stepwise regression to determine the impact of each culture on intranet use. As can be seen in Table IV, the first culture to enter the regression was the ethical

TABLE III
CORRELATION RESULTS

<table>
<thead>
<tr>
<th></th>
<th>1 Ethical</th>
<th>2 Rational</th>
<th>3 Group</th>
<th>4 Developmental</th>
<th>5 Hierarchical</th>
<th>6 Intranet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ethical</td>
<td>(.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Rational</td>
<td>0.25*</td>
<td>(.73)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Group</td>
<td>0.38***</td>
<td>0.40***</td>
<td>(.67)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Developmental</td>
<td>0.11</td>
<td>0.34**</td>
<td>0.26*</td>
<td>(.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Hierarchical</td>
<td>0.00</td>
<td>-0.01</td>
<td>-0.05</td>
<td>0.06</td>
<td>(.64)</td>
<td></td>
</tr>
<tr>
<td>6 Intranet</td>
<td>0.36*</td>
<td>0.15</td>
<td>0.18</td>
<td>0.33*</td>
<td>0.26*</td>
<td>(1.00)</td>
</tr>
</tbody>
</table>

*** $p < .001$, ** $p < .01$, * $p < .05$, * $p < .10$

Note: Numbers in parentheses on the diagonal are Cronbach alphas.
culture, accounting for about 14% of the variation in intranet use.

Beyond the explanation of intranet implementation provided by an ethical culture, the next culture to enter the regression was the hierarchical culture, accounting for an additional 10% of the variation. Although the hierarchical culture does not by itself correlate with intranet use at the $p < 0.05$ level (i.e., it was significant at $p < 0.10$), it does explain the variance in intranet use beyond that explained by an ethical culture. Thus, the rationale provided above for a positive relationship between hierarchical culture and intranets appears supported when a threshold level of an ethical culture already exists.

**Limitations** This study was an attempt to explore the early adoption and implementation of intranets as an information technology supporting KM. Since it was a national mailing of a somewhat lengthy, blind survey to busy managers, we believe the response rate was low. Even so, because of the low response rate, the generalizability of these findings is somewhat in question, and it is important that the study be replicated both in the U.S. and other cultures.

The conclusions for this study are largely drawn on data collected at the advent of intranets and KM before intranets had much opportunity to alter the culture. This study points out the need for the consideration of culture when a new technology or procedure is implemented that may be incompatible with the existing culture. Thus, this research is important, for many organizations are just now implementing intranets and/or are devoting a larger share of their intranets toward KM efforts. Such organizations can benefit from understanding culture’s role in intranet implementation, not only as intranets expand across the wider enterprise, but also as intranets expand inter-organizationally in the form of extranets or supply chain management linkages.

This study of early intranet adoption is also important for other reasons. While many anecdotal accounts of a potential culture clash with KM and intranets have been described in the popular press, few, if any, studies have empirically analyzed the previously validated dimensions of culture across many organizations, as has this study. Also, as the tools for building intranets and the technology changes, follow-up research would help identify which dimensions of culture become more important or are affected as intranets become more widely diffused, thereby enabling the understanding of intranets and KM implementation, as well as culture, over time.

**Implications for Theory and Research**

The results of this study suggest that early adoption of intranet use is most likely to occur in firms where the organizational culture is ethical or, as characterized in this study, as having a high concern for the other person and an atmosphere of mutual confidence and trust. Although the data for this research was conducted in the early stages of intranet adoption, the results are applicable both to organizations that have already adopted intranets, as well as to organizations considering intranet adoption, because organizational culture changes very slowly. To build a culture of trust and concern for the other person takes time, and even organizations that were early adopters of intranets would benefit from understanding what culture to strive for (i.e., an ethical culture) and why it is advantageous.

This study points out that where information sharing and communication are important to success (as in KM), an ethical, trusting culture may act as a facilitator. Where the culture is such that employees are concerned mainly with their own best interests and there is a low level of trust, the sharing of information on an intranet is counter-cultural. Since this research was conducted during the early implementation of intranets,

| TABLE IV
| STEPWISE REGRESSION RESULTS FOR INTRANET IMPLEMENTATION |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | Degrees of Freedom | Sum of Squares | Mean Square | F               | Prob > F        |
| Regression      | 2                | 17.57          | 8.79         | 6.00            | 0.0054         |
| Error           | 38               | 55.65          | 1.46         |                 |                |
| Total           | 40               | 73.22          | R-squared: 0.24 |                |                |
| Variable        | Parameter Estimate | Partial R- squared | T for Ho: Parameter = 0 | Pr > | T | Std Error of the Estimate |
| Intercept       | -2.38            | -1.73          | 0.09         | 1.38            |
| Ethical         | 0.60             | 0.14           | 2.82         | 0.0075          | 0.21           |
| Hierarchical    | 0.47             | 0.10           | 2.33         | 0.025           | 0.20           |
future research may wish to look at whether an ethical culture becomes more or less important in the sustaining of intranet use. For example, it may be that the lack of an ethical culture acts as a barrier to adoption, but once implemented and in use over time, intranet use may be ingrained and thus not require a high level of trust. Alternately, increasing emphasis on eliciting and sharing tacit knowledge from employees who are experts in some domain may cause an even greater need for trust in future intranet implementations.

Counter to our hypothesis, group culture did not affect intranet implementation. Yet other studies have found that group culture is associated with more employee communication [41], a foundation of intranets. However, an explanation may be offered by this study in that group culture was strongly correlated with ethical culture. Such a relationship has been found in previous research [42]. It may be that group culture acts as an antecedent to an ethical culture, and so indirectly is important in intranet implementation. Moreover, different kinds of communication may be involved; for example, the types of communication required for developing trust relations may be different than those required for developing employee communication through intranets. Further research is required to clarify the types of communication required for trust relations versus intranets and KM systems, as well as determining whether group culture effects an ethical culture.

This study found that a developmental culture is directly and positively related to intranet implementation, as hypothesized. Organizations fostering a developmental culture are more proactive and aware of changes in their environment. They also tend to be in competitive environments. The confirmation that organizations with developmental cultures are implementing intranets suggests that they may also be among the first to implement extranets or business-to-business systems, since such systems extend the intranet to customers or suppliers. It is estimated that 82% of organizations with intranets expect extranets to increase in the next three years; more support for collaboration with business partners is expected as well [60]. If the current study’s findings are extended to extranets, a developmental culture combined with an ethical culture may be required for maximum extranet implementation, as well as broader inter-organizational knowledge systems. A question raised is whether an ethical or trusting relationship will be necessary, and, if so, how will it be built between organizations and their business partners. An examination into the types of trust relationships (e.g., integrity, competence, honesty, commitment, legal contracts) between business partners may provide insights important in extending these findings to extranet implementation.

This study also found that a stronger hierarchical culture has some (albeit weak) effect on the level of intranet implementation. It is presumed that hierarchical cultures are conducive to intranets because of the procedures, manuals, and controls that are already in place. It is not clear, however, whether a stronger hierarchical culture will, in the future, act as a facilitator or a barrier to further intranet growth. The intranet literature suggests that we are moving into phase II of intranet development [38] in which intranets are being used to deliver more than the publishing of policies and procedures. This suggestion is supported by our 1998 findings that, while 34% of intranets are used for publishing purposes, a nearly equivalent number (33%) are now being used for knowledge sharing. Intranets are being used to link to legacy systems to deliver mission-critical applications, to deliver training, to share knowledge in real time in chat rooms, etc. This rapid growth and greater linking of systems can cause organizations to lose some control [50]. Therefore, a hierarchical culture, which under earlier circumstances aided intranet use, may inhibit its further use. A stronger hierarchical culture may act as an initial facilitator to adoption but be less important in established intranets. Future research may wish to examine these relationships further.

As hypothesized, a stronger rational culture was not related to intranet implementation. The grass-roots, ad hoc, nature of intranets that do not have to be cost-justified does not require a culture that values objectives-based measures. Because early intranets have been characterized as relatively low cost to implement and quick to return “soft” benefits, there has not been a need for such measures. Investment in intranets to expand KM ability and extranets is expected to increase [61]. As these intranets and KM systems mature and require investment in more sophisticated information architectures, metrics to assess the benefits of such systems may be necessary or desirable [5], and the values associated with a rational culture may take on increasing importance.

Overall, the significant relationship between organizations with strong developmental, ethical, and hierarchical cultures and intranet growth may be accounted for by how intranets are implemented. Initial intranet implementation, as studied here, is believed to be largely ad hoc and grass-roots oriented, concentrating on the publishing of policies and procedures. Initial implementation implies that strong developmental and hierarchical cultures are
most conducive to intranet implementation.

As intranet implementations add more features (database access, delivering applications, and chat rooms) to meet specific organizational objectives, it may be that the greater sharing of information acts in opposition to the control valued by hierarchical cultures, altering the organizational mindset toward the values underlying the group and rational cultures. The model in Fig. 1 represents one suggested by the literature as appropriate. While this study empirically examines only the solid arrows, the results of this study, as well as the research (e.g., [22], [24]), suggest the relationships indicated by the dotted lines are appropriate areas for future research.

Further, the rapid growth of intranets has been described as a “phenomenon” [62], [63], and we believe this status warrants study by the academic community. When a technology with low barriers to adoption makes rapid deployment possible, this study suggests that the people-based issues such as culture are increasingly important, and they represent a significant potential barrier to effective use despite the adoption of the technology. Thus, this study validates the need for the study of organizational culture as a factor in the adoption and implementation of IT innovations such as intranets, as well as other types of innovations designed to facilitate communication. Increasingly, IT innovations have a communications component, and the results of this empirical study suggest the role of organizational culture in the adoption and implementation of these innovations should not be ignored when conducting future studies.

IMPlications FOR PRACTICE

Organizations wishing to implement an intranet are best served by building a trusting and cooperative culture among the employees who are placing and using information on the intranet. In addition, the need for trust suggests that the content contained on the intranet must be well managed and kept up-to-date from its inception so employees can rely upon its accuracy and trust can be built in the information available on the intranet. Intranets and KM systems require a shift away from the traditional reward systems based on individual performance and know-how to a shared, collaborative work environment [5]. A reward system based on a measure of knowledge sharing, such as the number, quality, and reuse of publications placed on the intranet, may expedite the organizational change [5], [46].

Managers may wish to answer the questions in Table I to determine which cultural dimensions are strongest within their organization. Also important would be what type of knowledge already exists or is missing from their organization. Then action can be taken to either make the KM effort and intranet fit the culture or alter the culture to be more appropriate for the knowledge needed. For example, developmental cultures, which are innovative, are likely to be more conducive to “best practices” or sharing of new ideas, whereas hierarchical cultures may be better oriented to more immediate access to existing data and reduced printing costs.

Also, the awareness of the external versus internal focus of the organizations will make the organization more or less aware of developments in intranet and KM efforts and either more or less conducive to implementing an intranet and KM system. The popularity of intranets is becoming increasingly difficult to ignore, and as a result of having an external, proactive focus, a developmental culture with employees willing to try new things should help the organization explore intranet use, and perhaps novel use, in an effort to remain competitive. Ninety percent of the organizations with intranets in this study found internal communications improved, and an estimated average of 33% of each organization’s intranet use was for sharing knowledge (such as best practices). Such promising results published here and elsewhere may encourage organizations with strong developmental culture to go beyond the current traditional uses, such as publishing information, to more cutting-edge uses such as for prototypes, internal chat rooms for holding meetings and sharing ideas, and building communities of practice. Moreover, such a developmental mindset should encourage employees to extend the intranet to process improvements and significant marketing-related outcomes, such as customer-related databases, repositories of external knowledge (such as competitive intelligence), extranets and other inter-organizational systems such as supply-chain systems.

A stronger hierarchical culture may aid in the early implementation of intranets. However, procedures and controls should not be regarded as a method of replacing trust with control, but rather as a framework to facilitate collaboration and provide content for the intranet. Initially, the existence of order and procedures helps deal with several of the problems associated with the implementation of intranets, such as security, content management, and making users aware of its existence and encouraging them to use it [64], [37]. In hierarchical organizations, a promising approach would be to initiate a top-down directed approach and, after implementing common data storage and collaboration software, demonstrate how that system could save organizational members time gathering information and checking potential problems [16].
Examples of what might be on such an intranet are structured internal knowledge, such as research reports, marketing materials, and techniques and methods. Using the intranet as part of a method to check the completeness or quality of work may also be appropriate. Of note, however, is that a hierarchical culture taken to the extremes is not advisable [44]. Too much power concentrated at the top and lack of concern for employees may stifle knowledge sharing because of its potentially negative effect on the ethical and trusting dimension of culture.

While strong ethical, developmental, and hierarchical culture dimensions are conducive to intranet implementation, it may be difficult to change an existing culture where group or rational dimensions predominate. Imposing a technology that radically changes the culture or bypasses the usual organizational chain of command, as intranets do, can result in power struggles and unexpected resistance (cf., e.g., [65]). In general, the approach to KM and intranets should fit the organization, its employees who are potential intranet users, and its culture [16], [31].

In group cultures where collaboration is already established, one obstacle may be that the information or material for the intranet may not yet be coded. Providing incentives and systems to encourage data capturing may be appropriate. Intranets may be built to facilitate ease of data capture. Ways to capture informal, internal knowledge may include discussion databases of know-how or “lessons learned.” Moreover, chat rooms, discussion threads, and systems for spontaneous team-building and debates may be especially suitable for group cultures that have a high degree of team and group interaction.

For rational cultures, because of their goal and measurement-oriented values, sharing knowledge should be made part of the business strategy and ongoing objectives. Successes resulting from knowledge sharing should be widely disseminated. Content on the intranet may include research papers (white papers), lessons learned, or deliverables with value-added description [46]. One approach is to piggyback sharing knowledge onto other key business initiatives or onto efforts to solve specific business problems [16]. Trust building, through the use of face-to-face contact, may be important to building a knowledge-sharing culture where rational cultures have previously rewarded individual achievement.

CONCLUSIONS

This research adds to the body of literature on intranets, IT innovation, and KM. As the knowledge shared across intranets continues to move from the posting of public documents, such as employee manuals and other explicit knowledge, to greater sharing of tacit knowledge, an ethical and trusting culture will become increasingly important. It is this sharing of tacit knowledge that will yield organizations more competitive advantage from KM efforts [3]. Moreover, as intranets are opened up as extranets to outside organizations for access, trust between organizations will likely gain importance. Therefore, the role of trust in intranet growth and KM will continue to be a major concern and may increase in importance as intranets continue to develop.

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REFERENCES


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