Organizational knowledge management structure

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Abstract

Purpose – To propose and evaluate a novel management structure that encourages knowledge sharing across an organization.

Design/methodology/approach – The extant literature on the impact of organizational culture and its link to management structure is examined and used to develop a new knowledge sharing management structure. Roadblocks to implementing a new management structure and methods for overcoming these impediments are discussed. The efficacy of the proposed management structure is evaluated empirically by examining its effect on organizations that have implemented portions of the proposed structure.

Findings – The foundational ideas behind the proposed knowledge management organizational structure and the structure itself have been implemented in parts at various organizations located both in the USA and internationally. While the full management structure model has not been evaluated, the portions implemented in various organizations have enabled these organizations to assume leading roles in their respective industries.

Research limitations/implications – The proposed knowledge sharing management structure has not been fully implemented under controlled circumstances. The empirical evaluation is performed on portions of the proposed model, thus the full impact of the proposed management structure may well exceed the described benefits and additional structural-shift roadblocks may limit the realization of the proposed benefits.

Practical implications – The proposed knowledge sharing management structure gives managers a practical way to approach cross organizational knowledge sharing, which is frequently identified as a theoretical benefit of knowledge management. Means for diminishing or circumventing recognized impediments to organizational change are described to further facilitate the implementation of the proposed cross-organizational knowledge sharing structure.

Originality/value – The proposed knowledge sharing management structure is organized around knowledge-based teams of knowledge workers, but further extends this concept to include larger knowledge groups to transform an organization into a knowledge-based organization. If an organization's functional structure can be successfully transformed, then this enables the maximization of competitive advantage realized through knowledge management initiatives, more specifically through knowledge sharing. Upper level management, who are responsible for organizational change are the primary audience, though the principals described may be implemented through a more grass roots approach by lower level management.

Keywords Knowledge management, Knowledge sharing

Paper type Conceptual paper

Introduction

The worldwide economy has shifted from an industrial manufacturing/product oriented economy to one based on knowledge and services, where the principle commodity is information or knowledge. Effective management of intellectual capital is a critical issue facing organizations in today's global and information-driven economy. Knowledge management is not really about managing knowledge, but rather managing and creating a corporate culture that facilitates and encourages the sharing,

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appropriate utilization, and creation of knowledge that enables a corporate strategic competitive advantage.

The need for developing a "knowledge culture" is obvious for most service organizations (e.g. the product of a consulting firm is knowledge). Many service organizations are already performing knowledge management under the name of customer relationship management (CRM), with large customer and product or service databases centered on content management that includes sharing, distribution, and utilization of knowledge. The need for increased efficiency and productivity produced by the downsizing trends in organizations during the downward trend in the recent economy is emphasizing the need for knowledge management, or a "knowledge culture", in manufacturing and retail industries as well.

Another motivation for examining the knowledge management methodology at an organization is the effect of corporate culture on new strategic initiatives. With the continuing globalization of the economy, organizations are facing increasing pressure to effectively manage their intellectual capital. Organizations that attempt to introduce a knowledge management initiative without having a managerial support structure will soon find that the investment in knowledge management does not produce any perceived benefits (Goh, 2003; Goh and Richards, 1997; Nahm *et al.*, 2004; Swan *et al.*, 2000; Zammuto *et al.*, 2000; Zammuto and O'Connor, 1992). Gold *et al.* (2001) state that organizational structure is an important factor in leveraging technology and more specifically that organizational structures must be flexible to encourage sharing of knowledge and collaboration across traditional organizational boundaries to promote knowledge creation.

Achieving a "knowledge culture" requires managerial focus in three areas: preparing the organization, managing knowledge assets, and leveraging knowledge for competitive advantage (Abell and Oxbrow, 1997). Preparing the organization is the first step in developing a "knowledge culture" and often involves changing the culture of the organization, changing the way employees work and interact. Organizational culture shifts are difficult to accomplish (Roth, 2004). Smaller organizations, 200 or fewer employees, and newer entrepreneurial organizations will have an advantage in making the prescribed culture shift over larger and older organizations that have a long history of corporate culture and a more rigid managerial structure (Becerra-Fernandez *et al.*, 2004). This article proposes a knowledge-based management structure that facilitates the development and maintenance of an organizational knowledge culture.

Background

Knowledge culture and structure

Various taxonomies of knowledge and knowledge management exist (see Alavi and Leidner, 2001). For purposes of this article, knowledge is defined as any data, skill, context, or information that enables high quality decision making and problem solving to occur. Knowledge management then is any process (either formal policy or informal personal methods) that facilitates the capture, distribution, creation and application of knowledge for decision making. This decision making may be at the tactical level of day-to-day operations performed by an employee or at a more strategic level of developing organizational strategy by upper level management and every level of decision-making in between. Effective knowledge management ensures

that every employee has access to appropriate and the highest quality of information available at the time when a decision needs to be made. The presence of a "knowledge culture" is critical to the success of knowledge management within an organization (DeLong and Fahey, 2000; Nahm *et al.*, 2004) as it signals a managerial commitment to knowledge management initiatives and promotes sharing of tacit knowledge for higher quality decision-making.

Organizational culture is formed and reinforced through the interrelated elements of strategy, structure, people and process (Sanchez, 2004). People work within the organizational structure that supports organizational processes to accomplish the overall business strategy. While organizational structure and corporate culture are interrelated, both have been identified as necessary elements for knowledge management initiative success (Santoro and Gopalakrishnan, 2000).

Knowledge and knowledge sharing

Nonaka (1994) defines types of knowledge as tacit or explicit. Tacit knowledge is knowledge that is internal to a person, including cognitive learning, mental models, and technical skills. Explicit knowledge is knowledge that has been encoded into some media external to a person including paper documents, electronic databases and files, and the operating procedures of an enterprise.

Four tacit and explicit knowledge transfer mechanisms are found in organizations: socialization, externalization, internalization, and combination (Nonaka, 1994; Nonaka and Konno, 1998). Socialization is the process of transferring tacit knowledge to another individual who encodes the new knowledge in tacit form. Socialization may be performed informally, such as casual conversations around the coffee machine or lunch table, or more formally as in a mentoring program. Because of the personal nature of tacit to tacit knowledge transfer, traditional hierarchical management schemas do not promote this type of knowledge sharing.

Externalization is the process of encoding tacit knowledge into some explicit format, such as e-mail messages or company correspondences. Internalization is the process of accessing explicit knowledge and then this knowledge is "learned" by the individual and becomes part of their tacit knowledge resources. Internalization necessarily adds context to knowledge as explicit sources such as a large organizational database are accessed and interpreted by an individual. Finally, combination is the translation of explicit knowledge into a new explicit format and may include the addition of new contexts or simply changing the encoding format of the explicit knowledge. All three of externalization, internalization, and combination are facilitated by information technology research, such as wireless computing for distribution of information to facilitate internalization and voice recognition systems that would facilitate externalization of knowledge.

The knowledge structure to support an organizational knowledge culture, described in the next section, enables flexible management of corporate knowledge assets that will facilitate both explicit and tacit knowledge sharing and utilization and consequently knowledge creation.

A knowledge management structure

Traditional hierarchical management structures, as displayed in Figure 1, allow vertical knowledge transfer through typical chain-of-command, but inhibit horizontal

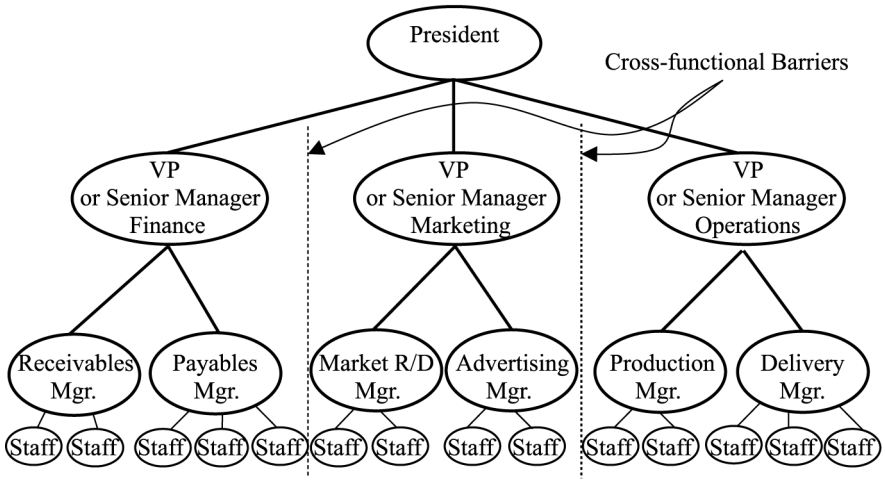

Figure 1.
Traditional organization management hierarchy (partial)

knowledge transfer that must cross the organization's functional boundaries. Increasing competition and ever shortening rates of technological change necessitate better transfer of knowledge across organizational boundaries (Gopalakrishnan and Santoro, 2004), with organizational structure identified as one of five factors attributing to knowledge transfer performance.

The development of knowledge teams composed of knowledge workers from cross-functional areas of the organization is a first step towards developing a fully distributed knowledge transfer system (both vertical and horizontal) within the organization. Cross-functional team members provide knowledge sharing from their knowledge team back to their original functional areas.

However, the scope of teams is limited to the organizational problem assigned to the team and results in limited knowledge sharing throughout the organization. The idea of teams and knowledge sharing must be extended to include all aspects of the organization. A knowledge team-based organizational structure is displayed in Figure 2. The knowledge organization of Figure 2 is composed of knowledge groups that are composed of knowledge teams, which are built from knowledge workers selected for participation on a knowledge team due to their tacit knowledge and skills. Ideally, the knowledge workers on any knowledge team come from different organizational (and educational) backgrounds and will bring a diversity of tacit knowledge and skills to the team.

Adoption of a new organizational structure (the "knowledge organization") or managerial methodology ("knowledge culture") faces resistance within the organization (Goh, 2003; Zammuto *et al.*, 2000). Resistance to change may be minimized by reducing the perception of change for the stakeholders. Initially, the knowledge team management structure may be aligned to an existing hierarchical management structure by aligning the knowledge groups with the existing functional areas of the organization including: accounting, marketing, production, and research similar to the idea of communities of practice. Knowledge teams or intermediate groups of knowledge communities are then aligned with the subdivisions within each functional area.

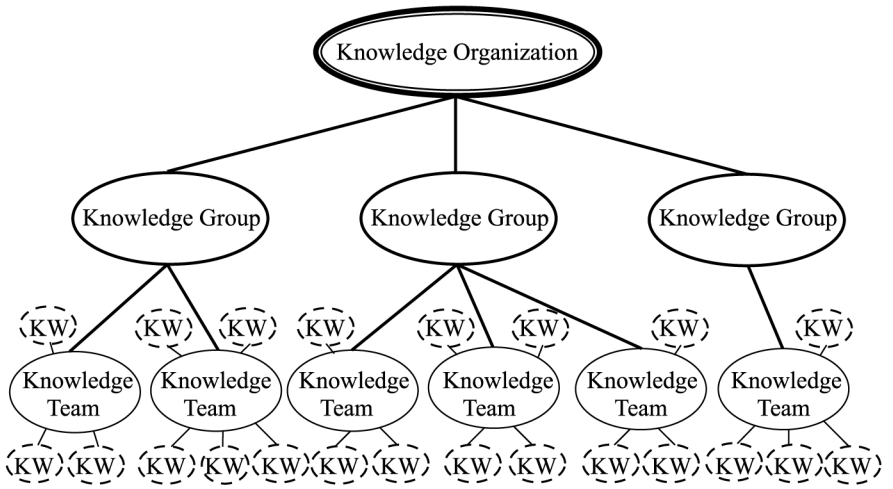

Figure 2.
Elements of the knowledge organization hierarchy

The recognition of individual personnel as knowledge workers will promote the development of new knowledge teams to address an organization's opportunities and consequently will facilitate the development of knowledge team communities that are diverse and more focused on knowledge-oriented problem solving. Knowledge workers are expected to share and utilize knowledge with other team members to produce the highest quality decisions. New knowledge teams and groups must be promoted to develop around product lines or other core competencies of the enterprise as opposed to functional area team composition. Knowledge teams should be created dynamically to take advantage of an organization's business opportunities or new business strategies.

Over time, the idea of an accounting (or other functional) branch of the organization will be replaced by communities of knowledge workers that have knowledge/expertise in accounting and may thus utilize other tacit knowledge to specialize in functional capabilities within a knowledge group. Communities of practice will still be an important element within the knowledge organization structure to enable knowledge team members to interact with members of other knowledge teams with similar interests and competencies and further promote inter-team knowledge sharing. Furthermore, communities of practice have been identified as a strategy to improve organizational performance through enhanced knowledge sharing (Lesser and Storck, 2001).

Knowledge teams that identify the need for specific knowledge (e.g. accounting or marketing) would then recruit knowledge workers that had the desired tacit knowledge to join the team (from a dissolving team that has already accomplished it's primary purpose or from a team that did not have a current need for the requested knowledge worker's tacit knowledge). The role of a knowledge librarian or expertise locater system can facilitate the identification and location of knowledge workers with desired tacit knowledge and skills.

This section has described a new organizational knowledge structure. Initial implementation of knowledge teams and knowledge groups may be aligned to

traditional organizational hierarchies to overcome corporate culture shift resistance. The knowledge groups are eventually aligned to core competencies and projects instead of by more traditional functional divisions. However, communities of practice related to functional interests/areas should still be promoted within the new knowledge organization to further promote inter-group knowledge sharing. The role of a knowledge librarian may be required to facilitate the coordination of knowledge workers with the tacit knowledge requirements of the knowledge teams and groups.

Motivating employees to adopt the "new" knowledge culture

Because the role of a knowledge worker may be a new role within the organization's culture, the development of a knowledge culture for sharing, dissemination, and utilization of knowledge will take some time. Motivating the desired knowledge culture and corresponding knowledge sharing behavior is facilitated through evaluating entire knowledge teams within the proposed knowledge management structure as a unit without reverting to individual praise or blame. Those teams that achieve a knowledge community approach to problem solving must be rewarded and acknowledged throughout the new "knowledge organization" (O'Reilly and Pfeffer, 2000).

Another motivational strategy for the new knowledge culture may be based on rewarding the development of knowledge that is subsequently utilized by other knowledge workers or knowledge teams. Any knowledge that is externalized into explicit form or combined from one explicit encoding into a more useful format becomes eligible for a knowledge-use award (either monetary or other benefits), but the awards are based on subsequent use of the created explicit knowledge by other knowledge workers. A similar approach can be used to encourage the internalization transfer of new knowledge by rewarding knowledge teams for incorporating explicit and tacit knowledge from other knowledge teams and groups (or even other knowledge workers) into their knowledge team solutions. Wiig (1995) and others (O'Reilly and Pfeffer, 2000) discuss additional standard management practices for motivating employees to become knowledge workers. The critical aspect of any motivation strategy with respect to the "knowledge culture" is that knowledge sharing within knowledge teams and across knowledge teams and groups is rewarded, not individual performance (which would lead to knowledge hoarding).

Knowledge creation and assessment within the "knowledge culture"

The knowledge organization management structure promotes the development of intellectual capital or knowledge creation in several ways. The "knowledge culture" community of knowledge workers will provide a diverse background of tacit knowledge and the combination of these various knowledge sources into a knowledge team enables the development of new views, behaviors, ideas, etc. As stated above, knowledge teams are dynamic and should be formed to address specific business opportunities or challenges. Whenever a knowledge worker leaves one knowledge team and joins another, the knowledge worker takes all of the acquired tacit knowledge from the previous team, such as best practices or lessons learned. Consequently, the rotation of knowledge workers into new knowledge teams also serves to propagate the application of appropriate (best practices) knowledge into new business areas.

A key element of any knowledge management process model is assessment to evaluate the appropriateness or utility of knowledge owned and created (or acquired) by the knowledge organization. The knowledge structure method assumes that all knowledge workers are involved in the assessment process, since each worker utilizes different explicit and tacit knowledge assets. Knowledge workers within a knowledge team or group will provide consensus support for knowledge actions taken by the team and thus provide peer evaluation of all knowledge-based behaviors.

Evaluating the proposed "knowledge structure"

Evaluation of the proposed knowledge organization management structure and resulting knowledge business culture may be made through empirical evidence from organizations that have implemented a knowledge organization structure (Goh, 2003). In this section, three brief case studies for organizations that have adopted an organizational structure or partial structure similar to the proposed knowledge structure are presented.

Applied Energy Services (AES) Corporation founded in 1981 with eight people, became the largest independent power producer in the USA in 1988, currently owns or has investments in 173 facilities in 27 countries worldwide and employs over 10,000 people. The culture at AES Corporation enables and requires individuals to make decisions and the organizational culture adopts and supports those decisions. Individuals closest to the action make decisions for the corporation (AES Corporation, 2000).

A large percentage of AES people are active in new business development (AES Corporation, 1997). Decision making by AES's knowledge workers is supported through a dynamic team-based approach where team members come together for new projects and advise and help educate project decision makers with current knowledge (AES Corporation, 2000). Through the initial development of a knowledge structure and resulting knowledge culture and empowering knowledge workers within the knowledge team framework, AES has achieved continued growth in the power services industry, which in general has suffered ups and downs.

GIVO established in 1993, is a high-end garment manufacturer located in Gurgaon, India. Over 90 percent of the employees at GIVO are at the staff level creating a relatively flat organization focused on garment design and manufacture. Each new hire is first sent through extensive training on the technology utilized at GIVO to facilitate the transfer and absorption of technology. Although not representative of the full knowledge structure proposed above, GIVO is representative of early team adoption along functional business lines.

Nadira Chaturvedi, Executive Director for GIVO, is interested in increasing the roles of her knowledge workers and has put in place two team-based organization structure modifications. The first is the establishment of teams that are responsible for the end-to-end production of specific types of garments (e.g. trousers or jackets), wherein the entire team is evaluated for the team's net production. Next, individual workers become knowledge workers by learning the manufacturing processes and technologies that precede and follow their normal position, so that they may rotate job positions within the production teams to increase output productivity. Staff level employees and supervisors are jointly accountable for production quality. Selected individuals are

trained on the entire production process to be able to supplement missing skills when needed.

In addition to compensating the knowledge teams for their production performance individual recognition is also given out in the form of the non-monetary Jolly awards. Following implementation of the team-oriented structure and increased tacit knowledge learning for knowledge workers overall productivity and garment quality has increased from previous years when such structures were not in place. Similar knowledge-based team alignments and individual recognition strategies have been used at other non-manufacturing businesses as well (Ormerod and Aitken, 2004).

Another example of a partial knowledge structure is PRI Automation, which produces advanced automation systems and software for the semiconductor industry. One of the core competencies of PRI is customer service. Field service representatives at PRI are the knowledge workers serving on various customer specific or product specific knowledge teams that form the customer support knowledge group. Field service knowledge workers use Palm VII palm PCs and wireless connectivity to access explicitly encoded performance support knowledge. The source of the performance support knowledge is encoded tacit knowledge from other field service knowledge workers and teams as well as product development engineers, thus creating virtual knowledge teams to best satisfy the core competency of customer service. These virtual teams conform to the knowledge management goal of mutual support through technology for high-volatility service firms as specified by Kankanhalli *et al.* (2003).

One of the ROIs that PRI Automation is interested in obtaining from its knowledge management initiatives is improved customer service through improved data accessibility. PRI estimates that malfunctions of its products may cost customers up to $1,000 of lost profit per minute and up to $100,000 per incident. Previously, PRI had relied on service manuals, which were out of date almost as soon as they were printed and field service workers were individuals. By enabling their field service knowledge workers to become members of a virtual knowledge team that allows access to critical knowledge when and where it is needed, PRI has reduced typical data access times from 30 minutes to five minutes and increased the quality of the knowledge-based problem solving for a potential net ROI of $25,000 per incident (Mabe, 2001).

The GIVO and PRI Automation cases above show that organizations can achieve competitive advantage through implementation of part of the "knowledge organization" structure. However, the gains from a partial implementation are still dependent on developing a knowledge culture that is organization wide so that knowledge workers are motivated to utilize appropriate knowledge for decision-making and to share knowledge to improve the decision-making of others. Larger organizations may select to implement knowledge teams within a single functional division or in multiple divisions, but temporarily not aggregate the knowledge teams into knowledge groups. These partial strategies will still result in performance gains if accompanied by the necessary cultural shift that encourages knowledge workers to share and utilize knowledge to improve the quality of their decision making process.

The three cases presented represent both organization wide utilization (AES) and partial implementations, including both actual (GIVO) and virtual knowledge teams (PRI Automation), of the proposed knowledge structure. In each case, the utilization of

knowledge teams or the entire knowledge structure led to increased productivity along at least one of the organization's core competencies.

Conclusions

A critical issue in adoption of knowledge management initiatives is the preliminary preparation of the organization to accept, adopt, and utilize new knowledge management processes. Preparing an organization for knowledge management initiatives means changing or adapting the organizational culture to facilitate, support, and encourage the sharing, utilization, and creation of knowledge. The resulting "knowledge culture" will maximize the competitive advantage realized from any knowledge management process.

Organizational culture is composed of business strategy, people, processes, and structure (Sanchez, 2004). The knowledge organization management structure presented in this article facilitates the development of a "knowledge culture" within an organization by first supporting the decision making of knowledge workers through collaboration in knowledge teams (real or virtual). Second, by facilitating the exchange of tacit knowledge through interaction in knowledge teams with other knowledge workers (Nonaka and Konno's (1998) socialization process). Horizontal knowledge transfer is also facilitated as knowledge workers migrate to new knowledge teams working on new business opportunities or needs and through the maintenance of communities of practice organized along functional lines of business.

Three cases: AES Corporation that has a complete knowledge structure and corresponding culture and GIVO and PRI Automation that have implemented knowledge workers and knowledge teams, imply competitive advantages enabled through a supporting knowledge structure. Future research is needed to further investigate the relationship between degrees of knowledge management structure implementation within an organization and corresponding increases in organizational performance.

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