



Organizational size and knowledge flow: a proposed theoretical link

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Abstract

Purpose – This paper seeks to present a theory clarifying the negative relationship between organizational unit size and knowledge flows referred to as Gita's Rule.

Design/methodology/approach – This paper draws from the literature and develops a grounded theory. Various applications and propositions are suggested through this theoretical lens.

Findings – It is suggested that, as the size of an organizational unit increases, the effectiveness of internal knowledge flows dramatically diminishes and the degree of intra-organizational knowledge sharing decreases.

Research limitations/implications – It is proposed that 150 employees represents a general breaking point, after which knowledge sharing reduces due largely to increased complexity in the formal structure, weaker interpersonal relationships and lower trust, decreased connective efficacy, and less effective communication.

Practical implications – The research points to the key dimension of organizational size that must be considered when developing models and reviewing case studies.

Originality/value – The research reported in this paper is among the first to explicitly tackle the issue of how knowledge flows are affected by organizational size. A theory is developed and several research propositions are introduced for future studies.

Keywords Knowledge management, Knowledge sharing, Intellectual capital

Paper type Conceptual paper



Introduction

The purpose of this article is to describe a theory developed to explain the relationship between the size of an organizational unit and its intra-unit knowledge flows. It is suggested that organizational unit size, defined as the size of the workforce (i.e. the number of employees), has an effect on four important variables that, in turn, influence the flow of knowledge inside this unit. All factors pertaining to this theory have already been discussed in the KM/IC (knowledge management and intellectual capital) domain. At the same time, previous observations and findings have not been

aggregated as a formalized theory that follows commonly accepted theory development guidelines.

Human capital is at the core of any knowledge-based enterprise (Bontis, 1999, 2001). As such, knowledge management theorists are interested in studying and developing processes that continue to build human capital. Most importantly, employees are encouraged to collaborate and learn from one another so that new organizational efficiencies are brought to bear, thus boosting performance (Bontis *et al.*, 2002; Chauhan and Bontis, 2004). Unfortunately, much of the extant KM/IC literature is too general when it comes to describing the organizations in which these new efficiencies have a high probability of success. All organizations are not created equal. One of the biggest glaring differences is their size.

The main drivers behind the development of a theory to address organizational size within the context of knowledge sharing are as follows:

- the importance of knowledge sharing in organizations is without question and clearly evident in the academic and practitioner literature;
- the emergent stage of the KM/IC field warrants a closer examination on why size matters; and
- even though the field of intellectual capital is generally theory-based, the closely related field of knowledge management is mostly driven by practical needs.

This proposed theory intends to fill the void by bridging that gap between theory and practice.

Despite the embryonic stage of the KM/IC field (Serenko and Bontis, 2004), the extant literature offers a number of factors that affect intra-organizational knowledge flows and serve as antecedents to knowledge sharing. These are based on four different schools of thought:

- (1) the social school;
- (2) the structural school;
- (3) the rational school; and
- (4) the incentive school.

According to the *social school*, rapport is the most important antecedent, including the ability to trust one another so that the knowledge recipient will use shared knowledge in an appropriate way. Within the *structural school*, knowledge is shared because the knowledge donator feels obligated to a stakeholder, such as a boss, client or shareholder. The *rational school* suggests that an intrinsic micro cost-benefit analysis determines whether knowledge is shared on a case-by-case basis. From the *incentive school's* viewpoint, economic gains are guaranteed by a reward and recognition system that compensates individuals when they share knowledge. Riege (2005) highlights a variety of knowledge sharing barriers that managers must consider (see Table I).

Out of these various lines of thought, a number of specific, overlapping factors have been identified and reported by researchers (Huber, 2001; Cabrera and Cabrera, 2002; Connelly and Kelloway, 2003; Hutchings and Michailova, 2004; Bock *et al.*, 2005, 2006;

| Level of analysis | Knowledge-sharing barrier |
|-------------------|---|
| Individual | <p>General lack of time to share knowledge, and time to identify colleagues in need of specific knowledge</p> <p>Apprehension or fear that sharing may reduce or jeopardize people's job security</p> <p>Low awareness and realization of the value and benefit of possessed knowledge to others</p> <p>Dominance in sharing explicit over tacit knowledge such as know-how and experience that requires hands-on learning, observation, dialogue and interactive problem solving</p> <p>Use of strong hierarchy, position-based status, and formal power ("pull rank")</p> <p>Insufficient capture, evaluation, feedback, communication, and tolerance of past mistakes that would enhance individual and organizational learning effects</p> <p>Differences in experience levels</p> <p>Lack of contact time and interaction between knowledge sources and recipients</p> <p>Poor verbal/written communication and interpersonal skills</p> <p>Age differences</p> <p>Gender differences</p> <p>Lack of social network</p> <p>Differences in education levels</p> <p>Taking ownership of intellectual property due to fear of not receiving just recognition and accreditation from managers and colleagues</p> <p>Lack of trust in people because they misuse knowledge or take unjust credit for it</p> <p>Lack of trust in the accuracy and credibility of knowledge due to the source</p> <p>Differences in national culture or ethnic background; and values and beliefs associated with it (language is part of this)</p> |
| Organizational | <p>Integration of KM strategy and sharing initiatives into the company's goals and strategic approach is missing or unclear</p> <p>Lack of leadership and managerial direction in terms of clearly communicating the benefits and values of knowledge-sharing practices</p> <p>Shortage of formal and informal spaces to share, reflect and generate (new) knowledge</p> <p>Lack of transparent rewards and recognition systems that would motivate people to share more of their knowledge</p> <p>Existing corporate culture does not provide sufficient support for sharing practices</p> <p>Deficiency of company resources that would provide adequate sharing opportunities</p> <p>External competitiveness within business units or functional areas and between subsidiaries can be high (e.g. not invented here syndrome)</p> <p>Communication and knowledge flows are restricted into certain directions (e.g. top-down)</p> <p>Physical work environment and layout of work areas restrict effect sharing practices</p> <p>Internal competitiveness within business units, functional areas, and subsidiaries can be high</p> <p>Hierarchical organization structure inhibits or slows down most sharing practices</p> <p>Size of business units often is not small enough and unmanageable to enhance contact and facilitate ease of sharing</p> |

Table I.
Knowledge sharing
barriers

(continued)

| Level of analysis | Knowledge-sharing barrier |
|-------------------|--|
| Technological | <p>Lack of integration of IT systems and processes impedes the way people do things</p> <p>Lack of technical support (internal and external) and immediate maintenance of integrated IT systems obstructs work routines and communication flows</p> <p>Unrealistic expectations of employees as to what technology can do and cannot do</p> <p>Lack of compatibility between diverse IT systems and processes</p> <p>Mismatch between individuals' need requirements and integrated IT systems and processes restrict sharing practices</p> <p>Reluctance to use IT systems due to lack of familiarity and experience with them</p> <p>Lack of training regarding employee familiarization of new IT systems and processes</p> <p>Lack of communication and demonstration of all advantages of any new system over existing ones</p> |

Table I.

Lin and Lee, 2006; Michailova and Hutchings, 2006; Al-Alawi *et al.*, 2007; Ang and Massingham, 2007; Du *et al.*, 2007; Hall and Goody, 2007; Lin, 2007; Makela *et al.*, 2007; Riege, 2007; Yang, 2007). Many of these research highlights are summarized here:

- Internal compensation structures or sufficient extrinsic rewards are necessary to motivate people to share knowledge. At the same time, over-reliance on compensation alone may dramatically impede knowledge flows because of the threat of system abuse or collusion.
- Intrinsic motivators that include the enjoyment of sharing knowledge, the positive mood resulting from helping others, higher knowledge self-efficacy, feelings of contributing to overall organizational performance, or confidence in one's ability to provide important knowledge are all key drivers of knowledge flows.
- Top-level management commitment and support (i.e. senior executives who exhibit behaviours of knowledge sharing themselves) and getting other influential organizational members to publicly share their knowledge also acts as a driver of overall collaboration.
- The availability of knowledge sharing spaces aids in the collaboration process. These include physical meeting places and virtual spaces, for example access to knowledge management systems (KMS), groupware, portals and various communications technologies that facilitate knowledge exchange.
- National cultural influences impact the propensity of organizational members to share knowledge (e.g. collectivistic societies such as Japan versus individualistic cultures such as the USA).
- Connective efficacy and feedback on the quality and usefulness of knowledge donated and received is also precursor to sharing.
- Organizational structures that are less bureaucratic better support knowledge flows.

- Technological issues related to system integration, support, IT training, and understanding the capabilities and limitations of current systems.
- Workforce heterogeneity/homogeneity (e.g. differences in age, ranks, experience, education, gender, etc.) has an impact on knowledge sharing.
- Intra-organizational work climate also drives knowledge sharing behaviours. Examples here include the degree of affiliation with the organization, perceptions of job security, innovativeness and tolerance to failure, freedom in decision-making and degree of monitoring, interpersonal relationships (i.e. degree of familiarity between knowledge donor and recipient), interpersonal trust, and interpersonal communication.

On the one hand, the factors listed above are independent, and organizations may influence each of them individually. On the other hand, a mixture of factors is required to facilitate internal knowledge flows. For example, top management may attempt to lead by example, but if extrinsic motivators are missing, many employees are unlikely to engage in knowledge sharing behaviours. Even if an advanced KMS is in place, this technology will not be used, or will be under-utilized, if there is an atmosphere of internal mistrust.

In terms of the proposed theory, it is believed that the factors directly affected by organizational unit size are:

- unit structure;
- the degree of interpersonal relationship and interpersonal trust;
- connective efficacy; and
- interpersonal communication.

All other internal and external factors being equal, larger units tend to be more bureaucratic in terms of their structures, their employees are less familiar with one another, may have a lower degree of trust, be unsure that their contributions will actually reach those who need this knowledge, and communicate less frequently with all other organizational members which may impede the circulation of internal knowledge. Specifically, it is argued that as the size of an organizational unit increases, the effectiveness of internal knowledge flows dramatically diminishes and the degree of intra-organizational knowledge sharing decreases. In this manuscript, this proposition is further referred to as Gita's Rule[1]. The following subsection discusses each variable in more detail.

Discussion

Size is an important variable that affects various organizational aspects as well as overall organizational performance. Whereas the impact of size on group dynamics has been well explored in the social sciences literature, the discussion of organizational size has received less attention in management (Stoel, 2002). For example, prior research has examined the impact of organizational size on information technology innovation adoption but the results appeared to be mixed and inconsistent because of the influence of other unaccounted variables (Lee and Xia, 2006). It was argued that the size of a subsidiary may influence internal knowledge distribution (Strach and Everett, 2006).

Employees in smaller firms are more flexible than employees of larger organizations in terms of making cultural shifts, but they perceive various cultural aspects the same way (Ismail, 2005; Walczak, 2005). Organizational size, together with the quality of the workforce, is considered a component of the human capital of the firm (Namasivayam and Denizci, 2006). Connelly and Kelloway (2003) demonstrated empirically a negative relationship between organizational size and knowledge sharing resulting from changes in social interactions. The following subsections review the effect of organizational unit size on four important factors that impact internal knowledge flows.

Organizational unit structure

The structure of an organization or a unit is usually designed to form a horizontal and vertical division of work, activities, and responsibilities; it is a fundamental framework required to enable desired organizational processes and systems (Thomas and Allen, 2006). It should facilitate the discovery, transfer and utilization of intra-organizational knowledge. Flat, informal, decentralized, and flexible structures that have short communications lines are ideal for knowledge sharing activities (Nonaka and Takeuchi, 1995; uit Beijerse, 2000; Riege, 2005; Walczak, 2005; Al-Alawi *et al.*, 2007; Riege, 2007).

In the past, most scholars have studied KM issues in large organizations leaving out small-to-medium sized enterprises (SMEs) because large organizations were the leading KM force (Wong and Aspinwall, 2005; Chen *et al.*, 2006). In fact, most research initiatives on new business principles and instruments, such as balanced scorecards, business process reengineering and total quality management, have been conducted in large organizations (McAdam and Reid, 2001; Zhang *et al.*, 2006). In terms of KM, Wong and Aspinwall (2004) conclude that most small businesses lack the understanding of key KM concepts and are slow in implementing systematic KM practices. On the one hand, it may be argued that large organizations have more resources available to finance these endeavours than SMEs. On the other, it is suggested that smaller organizations as well as smaller units have a lesser need for establishing mechanic and official knowledge-sharing initiatives since their structure is flatter and less bureaucratic that better facilitates knowledge exchange on its own. In fact, when any group grows in size, it tends to become more complex and formally structured (Hare, 1976). Even though smaller units are less advanced at launching formalized KM programs and have lower KM investment rates, similarly to large organizations, they encourage direct dialogue among employees as part of knowledge embodiment and facilitate informal discussions that are critical for knowledge transfer (McAdam and Reid, 2001; Desouza and Awazu, 2006). As such, it is argued that organizational units of a smaller size provide a structure that is more open, flexible, flatter, informal, multi-task oriented, decentralized, less bureaucratic and more conducive to internal knowledge sharing. Therefore, we propose an inverse relationship between organizational unit size and internal knowledge sharing resulting from changes in organizational structures.

Trust and degree of interpersonal relationships

There are three types of organizational commitment reported in the literature (van den Hooff and van Weenan, 2004):

- (1) affective (a feeling of emotional attachment to the organization);
- (2) continuance (a feeling of needing to continue employment); and
- (3) normative (a feeling of obligation towards the organization).

Prior findings demonstrate that the greatest willingness to share knowledge occurs when social relationships are based on emotional attachment, mutual trust, respect and genuine understanding of fellow workers' strengths and capabilities. The challenge for knowledge managers, then, is not only to recognize the intellectual capital assets of individual employees, but also to nurture and sustain an environment in which employees are willing to transfer their personal assets to the organization.

Lucas (2005) distinguishes between the concepts of trust and reputation, and how they impact the transfer of best practices and knowledge within an organization. Trust is engendered among individuals who develop relationships based on interactions with colleagues. The more positive relationships any given individual is able to maintain by keeping promises, the higher that individual's reputation will be, resulting in a higher trustworthiness evaluation from others, and so forth, leading to a greater willingness to share knowledge. Trust and reputation are not necessary preconditions of one another; it is possible to trust someone who does not have a particularly good reputation, and it is equally possible to mistrust another person with a stellar reputation. An additional useful category that combines features of both trust and reputation is likeability, or public self-consciousness (Fenigstein *et al.*, 1975). Individuals who have high degrees of public self-consciousness are habitually aware of themselves as social objects, concerned with self-presentation, making a good impression and how others interpret, evaluate and respond to them. They are concerned with being "likeable". Likeability, similar to trust, is determined by subjective evaluation of historical performances among actors, but any one individual may only be capable of evaluating the historical performances of others in smaller groups. Lucas (2005) notes that reputations can have a signalling effect, which allows an individual, who does not necessarily have any historical data to consult, to make a decision about whether to participate in knowledge transfer.

Trust, then, can be assessed on the basis of personal interaction, and is limited to a specific small group of people; the larger this group, the fewer personal relationships employees have established that impedes knowledge sharing (Connelly and Kelloway, 2003). Reputation can signal an assessment based on trust, made by others, as an indication of whether trust should be extended. Likeability, however, is the strongest predictor of whether an individual will accept the implicit assessment of trustworthiness provided by reputation, because individuals who are concerned with being likeable are motivated to compensate against charges of being untrustworthy by keeping promises (Miller and Myers, 1998; Miller and Major, 2000). Together, a likeable person is expected to be trustworthy, and to develop a reputation for being trustworthy, and thus to both encourage and participate in knowledge transfer. Various factors that encourage employees to nurture high degrees of public

self-consciousness are likely to exist in smaller groups and to facilitate the greatest degrees of knowledge transfer. Based on this, it is suggested that in smaller organizational units, people establish closer interpersonal relationships, a higher degree of mutual trust, and more intimate relationships that facilitate knowledge sharing.

Connective efficacy

According to expectancy theory (Vroom, 1964) and expectancy-value theory (Fishbein and Ajzen, 1975), people's motivation is directly linked to their expectations about the value of the outcomes of their actions. In terms of knowledge sharing, one's overall expectancy in turn is affected by two types of efficacy:

- (1) knowledge self-efficacy, referred to as the self-perceived value of the importance of shared knowledge to other group members (i.e. whether the others may find value in shared information); and
- (2) connective efficacy, defined as expectations that contributed knowledge would actually reach those group members who may require and utilize it (Cabrera and Cabrera, 2002; Kalman *et al.*, 2002).

With regard to Gita's Rule, it is believed that connective efficacy is negatively related to organizational unit size.

Connective efficacy is measured by the strength of the knowledge contributor-knowledge recipient relationship. For example, an employee may believe she possesses vital knowledge that, if properly utilized by several other organizational members, would benefit the entire organization (i.e. have a high degree of knowledge self-efficacy). At the same time, this person may feel that once her knowledge is distributed to the organizational unit, it is unlikely to reach those who require it (i.e. have a low degree of connective efficacy); the stronger this belief, the higher the probability of knowledge hoarding. In fact, there is no point contributing knowledge if this is not going to make any difference in organizational performance.

Prior research shows that group size affects the dynamics of social groups and demonstrates a negative impact of group size on internal cooperation. A group is defined as "two or more persons who are interacting with one another in such a manner that each person influences and is influenced by each other person" (Shaw, 1971, p. 10). As group size increases, several issues emerge (Cartwright and Zander, 1960; Diener *et al.*, 1980; Kerr, 1989; Cruz *et al.*, 1997; Forsyth, 2006). First, the larger the group, the more strongly one may believe that another group member may potentially come up with a better suggestion or a more relevant piece of information that discourages knowledge sharing. Second, fewer members have an opportunity to share their opinions. Third, when they do so, their voice is likely to be unheard and they may receive no feedback on their contributions. Feedback from others is an important factor facilitating knowledge-sharing, and its lack may discourage individuals (Brock *et al.*, 2005). Fourth, larger groups are less cohesive than smaller ones. Thus, an individual may feel that the larger the group is, the less likely it is to agree on her suggestions. Fifth, there is a positive relationship between group size and the degree of a person's de-individualization, so that as a group grows, one becomes less self-conscious and

concentrates less on her tacit knowledge. Sixth, information pollution becomes a major issue in large groups. At some point, individuals are bombarded with large amounts of irrelevant information they cannot possibly process and they start ignoring incoming messages. Based on these factors, it is concluded that as a group increases in size, individuals may believe that their suggestions will not reach those who may need this information and develop a lower degree of connective efficacy that in turn may impede knowledge sharing behaviour. This proposition further supports Gita's Rule.

Interpersonal communication

Interpersonal communication refers to face-to-face, electronic or voice-based interaction among organizational members. This type of communication is vital for the development of social intra-organizational networking that forms the foundation for knowledge sharing processes (Smith and William, 2002; Al-Alawi *et al.*, 2007).

Small organizations tend to lack formal explicit knowledge repositories such as shared hard-drives, databases or intranets, have limited organizational memories, and possess very few, if any, systematic KM approaches. For example, Lim and Klobas (2000) demonstrate that small companies lag behind large corporations with respect to the adoption of computerized knowledge storage systems. At the same time, in small organizations, knowledge exchange takes place predominantly through formal and informal socialization when employees communicate with the owner and one another (Desouza and Awazu, 2006). In small organizations as well as in smaller units, the socialization process occurs naturally because most people work in close proximity of one another; this shortens interpersonal communications channels and enables the flow of information in any direction. On the one hand, it may be argued that if no formal KM guidelines are in place, a major part of social interaction may relate to non-organizational aspects. On the other, it is often difficult to distinguish between business and non-business topics, especially, in small circles. In addition, such informal interpersonal communications may build long-lasting trusting relationships that in turn facilitate further knowledge flows. With respect to Gita's Rule, it is hypothesized that there is an inverse relationship between organizational unit size and knowledge flows resulting from changes in the degree of interpersonal communication.

Organizational unit size

In his book, *Intellectual Capital: The New Wealth of Organizations*, Thomas Stewart (1997) argues that while all organizations may benefit from the agile management of their intellectual capital assets, some businesses, particularly those that have a stringent requirement to innovate constantly (e.g. software, pharmaceutical, technology-based industries) may benefit more. Indeed, Stewart argues that the major portion of the wealth of these organizations is comprised of the cumulative knowledge and experience of their workforce, which very often is in far excess of 150 employees. How can the insights gleaned from anthropology, biology and psychology be used to investigate knowledge management in these large organizations?

The theory articulated in this paper is that it is not organizational size that matters, but rather the size of the organizational units, and the requirement for knowledge sharing across units. Peters (1994) informs us that human social channel capacity has limits. He strongly suggests that no organizational unit should exceed 150 individuals,

because this is the point at which a formal structure is required, interpersonal relationships and communication start to break down, and trust diminishes; this decreases knowledge sharing among unit members. Similar observations have been also reported in the management and social sciences literature (Peters, 1994).

Why does this phenomenon take place? Concepts drawn from cognitive psychology, evolutionary biology and anthropology suggest that there are limits to any individual's capacity to successfully manage knowledge. As a graduate student, George Miller (1956) conducted classified military research on signal jamming by focusing on the effect of grammatical noise on the intelligibility of any given signal. During the course of this research, Miller noted a curious, recurring event: "I have been persecuted by an integer. For seven years this number has followed me around, has intruded in my most private data, and has assaulted me from the pages of our most public journals" (p. 81).

Miller referred to a ubiquitous limitation of human memory to recall only seven bits of information. He noticed that "there seems to be some limitation built into us either by learning or by the design of our nervous systems, a limit that keeps our channel capacities in this general range" (p. 86). Miller contributed to the nascent field of knowledge management by highlighting what appears to be a natural limitation to handle information, a concept he called "channel capacity".

We turn to evolutionary biology to explore a related concept that builds on Miller's work, called "social channel capacity", developed by British anthropologist Dunbar (1992). In exploring the relationship between various primate groups and neocortex size, Dunbar noted that the size of the primate's neocortex could be used to predict the average size of the social group that characterized that specific group of primates. Dunbar then looked at hunter-gatherer societies, the military[2], self-sufficient religious groups and other organizations, and discovered that a group limit of 150 seemed to emerge organically. This may be explained by the fact that human neocortex size predicts a group of approximately 150 individuals.

An outstanding example of a business organization negotiating the 150 rule is W.L. Gore & Associates, the manufacturer of fluoropolymer products, which limits each production facility to a maximum of 150 people. According to Bill Gore, the company founder, "we found again and again that things get clumsy at a hundred and fifty" (Gladwell, 2002, p. 184). In limiting plants to no more than 150 people, Gore was able to eliminate a layer of middle management and engage in KM activities. Gore has created an organizational structure that allows managers to "really know somebody – know their skills, and abilities and passions – what you do, what you like to do, what you are good at" (p. 190). Company managers are able to successfully operate intellectual capital assets and use them to create wealth by observing the natural limits of human workers' social channel capacity.

The theoretical basis for this is a concept called "transactive memory", developed by psychologist Daniel Wegner (1987). This is the tendency for individuals to assign certain information and memory tasks to one another once close relationships have been established; however, the number of close relationships that can be included in any transitive memory system is limited by the social channel capacity of the actors. Therefore, it is suggested that 150 employees is the breaking point at which Gita's Rule takes place. In other words, as organizational or unit size increases beyond 150

employees, internal knowledge flows decrease dramatically and knowledge sharing is impeded.

Summary

Figure 1 visualizes the main tenets of Gita’s Rule. Assuming there are no systematic knowledge management practices in place, as the workforce size of an organizational unit increases, organizational structures become more bureaucratic and formalized, interpersonal relationships deteriorate, the level of interpersonal trust decreases, connective efficacy diminishes, and interpersonal communication reduces, which impedes intra-unit knowledge flows. Specifically, this effect dramatically emerges as unit size exceeds 150 employees.

Boundaries of the theory

The previous sections described three important elements of the theory:

- (1) *what* (i.e. which factors are considered part of the phenomenon);
- (2) *how* (i.e. the relationships existing among the identified factors); and
- (3) *why* (i.e. what are the underlying principles justifying the selection of factors and why this theory should be given credence).

The fourth important element – *who, where* and *when* – that establishes a range of contextual and temporal factors outlining the boundaries and limitations of the theory (Whetten, 1989) is described in this section.

First, there are some critical differences in public versus for-profit organizations that may impact the applicability of Gita’s Rule in each case. By their nature, public organizations and their units tend to be more formalized and exhibit a more bureaucratic structure regardless of their size (Borins *et al.*, 2007). This implies that the organizational structure factor may have a lower effect, if any, on knowledge flows in the public sector. In contrast to private businesses, public organizations have multiple, intangible, and non-financial objectives that are difficult to define, measure, and report

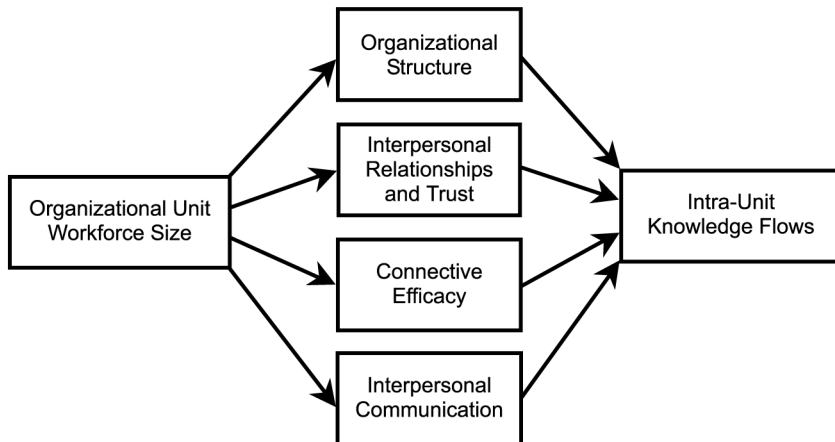


Figure 1.
Gita’s Rule – relationship between organizational unit size and knowledge flows

on. Therefore, knowledge donors in public sectors may not directly observe outcomes of their contributions; in other words, they are less likely to receive measurable feedback on their knowledge-sharing activities than employees of commercial companies. Thus, public employees may initially exhibit a lower degree of connective efficacy that would be very difficult to increase. With respect to Gita's Rule, this demonstrates that changes in unit size may have a lower effect on public rather than for-profit organizations. In addition, three other factors, such as interpersonal relationships, trust and communications, may also differ in these two types of organizations. Overall, it is hypothesized that Gita's Rule is more applicable to for-profit rather than to public sectors because the latter organizations may exhibit less variability in their relationship between workforce size and their structure, interpersonal relationships, trust, connective efficacy and interpersonal communication.

Second, the suggested relationships may also depend on a number of organization-specific factors that relate to human capital management such as turnover and attrition rates (Bontis and Fitz-enz, 2002; Stovel and Bontis, 2002). For instance, incompetent employees in an organization with a high involuntarily turnover rate are unlikely to engage in knowledge sharing behaviours regardless of the unit size simply because they do not want to be embarrassed and expect their jobs to be terminated anyway.

Third, Gita's Rule holds true in organizations that have no formal or informal KM practices in place. Once such systematic procedures are established, the relationships among the outlined components may change dramatically.

Overall, a number of moderating variables are assumed that may potentially affect the relationships among the various components constituting the proposed rule. A moderating variable is a factor that changes the strength or direction of a link between other variables. As discussed by Bontis and Serenko (2007a, b), moderators may affect a number of important relationships in KM models. Examples of such contextual factors may be the national culture, organizational norms, or societal values. It is urged that future researchers pay close attention to moderating variables when testing Gita's Rule.

Application of the theory

The way organizational size is defined and measured constitutes an essential issue when considering the application of Gita's Rule. Theoretical development of the concept of organizational size is scarce and different definitions exist that may or may not be referring to the same construct. It was more than 30 years ago when Kimberly (1976) defined the panorama as a "theoretical wasteland" in which academic progress was scant. The achievement of a single concept of organizational size is the first step toward advancing our understanding of its relationship with knowledge sharing.

In addition, when describing the link between organizational size and knowledge sharing, a curvilinear relation is assumed to exist. However, it must be proved that this curvilinearity is true. Furthermore, whereas Gita's Rule highlights the number of employees as the underlying operationalization of size, could we not consider other similar proxies (e.g. revenue size, physical capacity, volumes of input and output, financial resources)? Also, what happens to the threshold of size in various industries?

For example, can the same behaviours of knowledge sharing be realized in a firm of 150 employees within the software industry versus the steel industry?

Clearly, there is a conceptual level of organizational size – regardless of how it is measured – after which the need for formal KM practices is necessary. This is a very important implication of managers of fast growing companies. Although they may initially start off as entrepreneurial ventures with a small set of founding partners, as soon as the firm grows beyond its intimate roots, particular attention must be paid to its overall collaborative capability.

A potential line of future research related to Gita's Rule might involve the ability to manipulate the size threshold. In other words, how can knowledge flows be accelerated in organizational units that do not observe social channel capacity? We return to Miller's concept of "channel capacity" for signals, and the related concept of "chunking" data to suggest some organizational strategies for managing knowledge in larger organizations.

Most individuals demonstrate a capacity to recall seven letters of the alphabet randomly generated. When those letters are chunked into data sets, such as acronyms or words, the number of letters recalled rises, although the number of data sets remains stuck at seven. The number of relationships that any given individual seems capable of managing is around 150, but these relationships might also benefit from chunking into various organizational units for individual knowledge managers. The knowledge manager would then be responsible for recognizing the experience, information, expertise and intellectual capital assets of the group, rather than the specific individuals that comprise this group. Theoretically, the group could range in size from two to 150 individuals, incorporating the natural limits suggested by social channel capacity. This way, a large organization could identify knowledge managers and link them to specific groups according to internal criteria relevant to the industry sector, organization, location, etc.

While various studies have been conducted into different techniques for measuring intellectual capital assets (Bontis, 1998; Bontis *et al.*, 1999, 2000; O'Regan *et al.*, 2001; O'Donnell *et al.*, 2006), these assets will have no impact on wealth creation unless they can be managed successfully. Insights from psychology and anthropology suggest that while group size is an important aspect of knowledge management, the corollary ability of individual actors to "chunk" data into sets permits the social channel capacity of employees to be expanded and directed towards the task of creating wealth.

The theory of public self-consciousness or likeability suggests that a likeable person's reputation can signal trustworthiness to outsiders, in this case, other organizational units, allowing the limits of social channel capacity to be transcended (Froming and Carver, 1981). When organizational unit leaders develop reputations for being trustworthy, knowledge can flow across units, effectively chunking employees into manageable data sets and dramatically increasing the flow of knowledge across an organization.

Large organizations that require the efficient and maximal flow of knowledge across organizational units should limit the number of individuals in any one unit to 150, and support activities that increase the likelihood that at least one individual with a high degree of public self-consciousness emerges from each unit with a strong

reputation for trustworthiness. This person can spearhead regular opportunities for these individuals to interact and share their accumulated unit knowledge.

Technology firms seem to be the most adept at providing these types of atmospheres, with game rooms, café-like cafeterias, organized sporting, cultural and leisure activities during working hours, casual conferences and flat organizational structures. Not coincidentally, technology firms also have a very high need for knowledge sharing across organizational boundaries.

Overall, this study represents one of the initial attempts to explicate the relationship between organizational unit size and internal knowledge flows. It is hoped that future researchers empirically test the proposed theoretical link and further extend our understanding of this important phenomenon.

Notes

1. Gita Anselm was an MBA student who took the P727 “Strategic Knowledge Management” course taught by Dr Nick Bontis in 2001 at the DeGroot School of Business, McMaster University. Based on her previous work experience, Gita made a suggestion during class about the negative hypothesized relationship between organizational unit size and internal knowledge flows. This became a common theme of discussion during subsequent case analyses throughout the course. For more information about P727 refer to Bontis *et al.* (2006).
2. Military strategists never considered knowledge management issues deciding on the size of their units. At the same time, it is possible that knowledge sharing might become a by-product of the employment of smaller size military units resulting from close interpersonal relationships, trust and effective communication.

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