An Analysis of Collaborative Group Structure Technological Facilitation from a Knowledge Management Perspective

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Abstract: A range of collaborative group structures are analysed from the perspective of knowledge management enabling technologies. A framework is developed demonstrating the application and role of specific technologies in supporting collaborative group structures including Communities of Practice, Centres of Practice, Special Interest Groups, Centres of Competence and Communities of Competence. In evaluating the utilisation of such technologies, the nature, purpose and capabilities of such group structures are analysed.

Keywords: communities of practice, knowledge management, communities of competence, knowledge management technologies

1. Introduction

It is widely claimed by contemporary organisations that their most valuable asset are their employees, or more precisely the human capital these individuals possess. Human capital (HC) is defined as the "combined capabilities of knowledge, skill, innovativeness and the ability of individuals to meet the task at hand" and intellectual capital (IC), being the value creation aspect, consists largely of human capital as well as intellectual property (O'Sullivan and Stankosky 2004). In the current knowledge based economy, filled with intense competition, globalisation and rapid technological change, IC is the future basis of sustained competitive advantage (Perez and de Pablos 2003). Ulrich (1998) defines IC, in mathematical terms, as the product of competence and commitment. He further asserts that IC is the firm's only appreciable asset, and therefore, must grow if the organisation is to prosper. However, competent and committed individuals will not be able to fully contribute towards the development of IC if they don't have the opportunity by means of work autonomy (Burr and Girardi 2002). On the collective level, just getting people together will prove insufficient, unless they are also empowered and offered a chance of self-management (Mohamed, Stankosky and Murray 2004). We assert that this work autonomy dimension of IC can be activated by nurturing, facilitating and investing into highly synergetic groups such as CoPs and CoCs within knowledge intensive organisations.

In this paper we examine the differences and common ground between the different collaborative group structures in use in contemporary business organisations, namely Centres and Communities of Practice (CoPs), Special Interest Groups (SIGs) and Centres and Communities of Competence (CoCs). For many years, organisations have strived to create more effective ways to get work done and fully utilise the maximum potential of their employees. This paper is focused on establishing a guideline for the use of collaborative structures in terms of increased productivity and the optimisation of innovation.

Organisations have started to manager their intellectual capital and knowledge as assets of the organisation. Similarly, as organisations have embraced the group approach to work processes, the value of sharing knowledge in an effective manner has become extremely important. Extending this model and introducing the concepts of Knowledge Management (KM) to the mix and we end up with Communities of Practice, organic self-organised groups of individuals who are dispersed geographically or organisationally but communicate regularly to discuss issues of mutual interest (Lave and Wenger 1991). The CoP approach has been well established and has met with great success when implemented and managed correctly. However, the CoP approach is not the only methodology for achieving goals that transcend business units or organisations. In fact, if the incorrect group approach is selected, the desired results may not be achieved, or if they are achieved at all it may in a less than optimal way. Other methodologies discussed include Centres of Practice, Special Interest Groups, Communities of Competence and Centres of Competence. Throughout this article we shall examine the selection criteria for these methodologies, identifying their appropriateness for the tasks to be performed, the time frames involved in achieving those goals and the necessity and degree to which management involvement is necessary.

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From the individual's perspective, group membership positively affects individuals. Members communicating in an open forum where ideas are judged on their merit and originality rather than authority position, will experience increased self-efficacy and self-esteem. Innovative and "heretic" ideas will not be held back in a supportive and open group. Meaningful relationships evolve from personal contact with specific individuals (Liedtka 1998) such as fulfilling mentor relationships and further intellectual collaboration. Newer employees can gain access to more experienced practitioners (Lesser and Storck 2001) and learn from their knowledge and wisdom. Job satisfaction will be high when members are involved in challenging work in their core areas of expertise (Smith 2005) and have greater control on how to perform their work. Learning "loops" must be established as part of day-to-day work and processes involved allow individuals to continually improve themselves (van Marrewijk and Timmers 2003).

2. Collaborative group structure approaches

Prior to evaluating the appropriate technological resources for a specific group approach, it is important that an understanding of the nature of such group constructs be established. From our research we have established a range of group structures that are in common use in the contemporary business environment. Our research has also indicated that many organisations commonly do not correctly establish the form of group structure that is used to achieve organisational objectives. This may be explained by a lack of understanding in the business world as to the nature of such structures, or by a tendency to refer to all collaborative group structures as Communities of Practice. Based upon our research we have established five distinct categories of collaborative group structure with an additional structure that encompasses some of the features of the other structures. This sixth structure, Centre of Excellence, is not a major focus of this paper as there is significant enough evidence to indicate that for most organisations the establishment of a Centre of Excellence is more of a statement of capability rather than an actual collaborative structure. However, given the frequency with which this structure is used within the business environment it was felt that it at least deserved a cursory consideration within this paper.

	Community of Practice	Center of Practice	Special Interest Group	Community of Competence	Center of Competence
	Center of Excellence				
Structure	Flexible	Ridged	Ridged	Ridged	Ridged
Time Frame	Long Term	Medium Term	Medium Term	Medium Term	Short Term
Authority	Informal	Formal	Formal or Informal	Moderately Formal	Formal
Power Source	Informal	Legitimate	Legitimate	Legitimate	Legitimate
Focus	Broad	Moderate	Narrow	Narrow	Narrow
Dispersion	Wide	Moderate	Moderate	Moderate	Narrow

Table 1: A Comparison of Collaborative Group Structure

As illustrated in Table 1, the nature of these collaborate group structures can be examined from a number of different perspectives. For the purpose of our research we have selected the aspects of group structure, the time frame that the group exists for, the authority by which the group operates, the power structure that tends to exist in such groups, the focus of the mandate of the structure and the geographic dispersion of the group members. Of course, we discuss these structures and the aspects of their nature in general terms and in application the structure of the group may be adapted to the specific task(s) for which the structure was established. We shall now examine these structures in greater detail so that appropriate technological requirements can be derived. However, we have illustrated the differences between these structures in Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5.

2.1 Communities of practice

In examining the nature of communities of practice, it is essential that we do so from the perspective of what differentiates them from other forms of group structure. CoPs can be defined as consisting of "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise by interacting on an ongoing basis" (Wenger, McDermott and Snyder 2002). Although, such groups have traditionally been viewed as being beneficial to the individual's interests, they can be strongly tied to sustained competitive advantage and, thus, creating organisational value (Liedtka 1998). Importantly, they maybe collocated or dispersed geographically and may communicate by face-to-face meetings or through virtual collaboration tools. Such teams usually consist of a number of experts from similar functional areas who work together on a set of related issues or themes. The transformation of

traditional off-line communities of practice into virtual communities can improve the scope of the community. For example, the scope can be improved by extending a community of practice to another geographical site of the organisation. The transformation to virtual communities can also improve interaction efficiency and information and knowledge sharing (Koh and Kim, 2004).

It is widely established that learning is an integral and inseparable aspect of social practice (Lave and Wenger 1991). The value of social context in learning is critical because individuals discover knowledge through interaction within communities facilitated by a socially constructed process (Mohamed, Stankosky and Murray 2004). Lesser and Storck (2001) state that CoPs actively create organisational value by being an engine for the development of social capital that leads to a broader behavioural change where knowledge sharing becomes the way of doing work. CoPs can prove instrumental in helping employees achieve supportive interpersonal relationships aiding in career development and advancement by deriving information, knowledge and inspiration from social and world-related networks of peers (Smith 2005). A distinguishing and valuable feature of CoPs is their ability to operate beyond formal boundaries of an organisation. CoPs may bring together practitioners, experts and curious individuals from an array of organisations, communities and industries. In the face of a digital economy, an organisation's ability to react and operate at rapid web-speed is becoming increasingly important. However, many organisations today still lag behind with hierarchal structures and bureaucratic processes in place. Such obstacles make it difficult to quickly respond to rapidly occurring challenges and opportunities. By fostering a motivated group of practitioners, bonded in the shared context of community, CoPs operating beyond rigid boundaries can create an agile organisation capable of increased innovation.

The largely informal and self-evolving property of CoPs creates a membership collective that is highly interest-based and voluntary. Individuals truly interested in discussing, learning and sharing in a network of the like-minded usually are members of such teams. Ulrich (1998) notes that such "volunteers" are committed to their cause because of their emotional bond to the organisation and are more interested in the meaning of their work and how it contributes to the big organisational picture than mere economic compensation. Members are constantly involved in efforts to share best practices, learn from each other and keep abreast of the latest developments in their field. From an internal organisational perspective, the long-term focus of CoPs has implications in a strategic sense. By constantly engaging intellectually curious and intelligent minds on a long-term basis, these self-organising groups can prove to be instrumental in retaining and sharing organisational knowledge, which remains largely tacit in nature. Lesser and Storck (2001) note that due to worker mobility and other factors there is a strong need to retain organisational memory. They state that CoPs can attain this goal through their ability to allow members to more easily reuse existing knowledge assets, thereby, reducing rework and preventing "reinvention of the wheel". They also assert that CoPs are breeding grounds for innovation by serving as an interactive forum in which individuals can share a variety of perspectives on common topics and challenges.

The value creation potential of CoPs can be explained by another important characteristic. Liedtka (1998) attributes organisational competitive advantage to CoPs as they aid in the development of a broad-based set of capabilities, such as learning, collaboration, strategic thinking, and participative leadership, which are transportable across products and markets. Therefore, the power of CoPs lies in attaining these capabilities proving invaluable in a variety of settings and not restricted to a specific discipline or unit. As firms increasingly recognise the value of meaningful relationships between individuals promoting synergy, they must more importantly realise the value of these relationships in that how they can be leveraged, developed and maintained through participation in collaborative communities.

An important factor positively impacting CoPs is multifaceted dialogue among members. Unique perspectives arising from the different individual backgrounds (cultural, organisational experiences, education, training etc.) favour creation, transfer and integration of knowledge in CoPs (Zarraga and Garcia-Falcon 2003). This capacity also implies an openness to sharing one's thoughts, a willingness to listen and understand the perspective of others and to challenge and one's own, as well others' thinking (Liedtka 1998). Team heterogeneity is a source of synergetic collaboration because people with unique experiences and backgrounds can inject totally eccentric ideas into the process (Mohamed, Stankosky and Murray 2004). In this way, such intellectual conflict and reasoning can be seen as positive and beneficial in developing viable processes, decisions and strategies. CoPs can serve as an intellectually stimulating environment where cutting-edge solutions to unstructured problems are formulated by means of open discussion and exploration of new ideas.

Importance is placed upon ingenuity, effectiveness and applicability of ideas rather than formal authority. Members, with their unique experiences, create and share new knowledge that is not only useful today, but also serves as the basis of future knowledge acquisition.

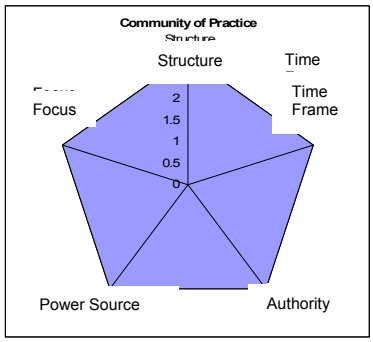

Figure 1: Nature of Community of Practice

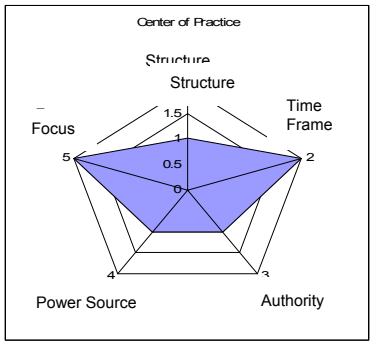

Figure 2: Nature of Centre of Practice

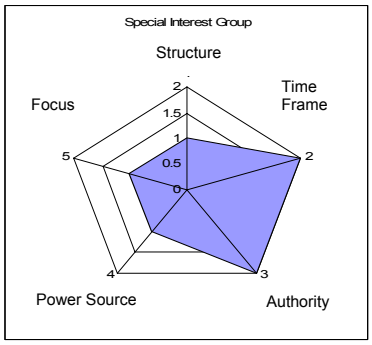

Figure 3: Nature of Special Interest Groups

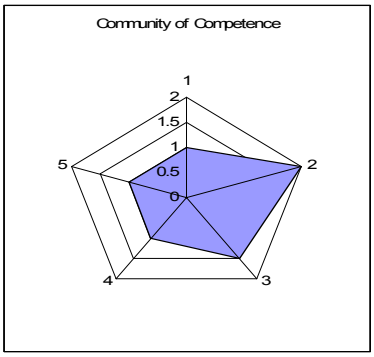

Figure 4: Nature of Community of Competence

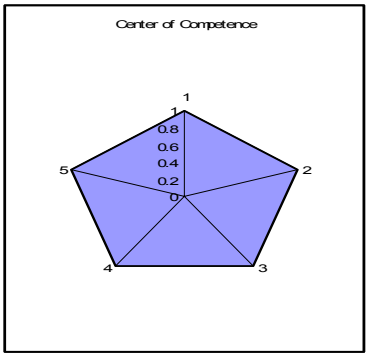

Figure 5: Nature of Centre of Competence

2.2 Centres of practice

Centres of Practice have been used from an organisational perspective for many years and follow the standard management practice of the hierarchical approach of span of control. Of course, this does not preclude centres of practice from utilising knowledge management technologies in assisting in the accomplishment of team, business unit or organisational goals. This form of group is similar to Communities of Practice, but internal in nature with a formal management structure with power derived from a position of authority. Individuals with skills or capabilities in common are grouped into a practice that provides assignment and management oversight. In terms of the scope of utilisation of such groups with knowledge management technology, O'Sullivan and Stankosky (2004) analysed the level of success of managing intellectual capital with such technologies and found that the size of the organisation or group was a major influence on the success of a particular technological group. Other influences include the proximity of the group members in special and whether communications were best served on a synchronous or asynchronous basis.

2.3 Special interest groups

Special Interest Groups (SIGs) are open forum groups that may be either internal or external to an organisation with a particular area of focus. They tend to be more narrowly focused than CoPs in that they target specific objectives. Once the objective has been accomplished the group disbands. From the perspective of control, SIGs generally have formal leadership appointed by the sponsoring organisation. Sponsoring organisations may be companies or CoPs, for example the Knowledge Management Working Group (KMWG) of the US Federal Government, a CoP charged with the promotion of knowledge management activities within the federal government, has in itself created a SIG. The KMWG CoP SIG serves as a network of people interested in learning and sharing experiences in establishing and supporting CoPs as a means to address compelling business needs within their organisations. The CoP SIG seeks: To collect, document and share good practices related to

CoPs through site visits with the organisations willing to share their experiences in CoPs.

- To create and maintain a network for knowledge exchange on CoPs.
- To serve as a resource for the federal government on CoPs.
- To act as a "sounding board" for CoP SIG members, and use its collective wisdom to provide insights for success" (US Government Knowledge Management Working Group 2006).

SIGs are transitory in nature in that they have stated goals that once achieved lead to the disbandment of the SIG. Similarly, the membership of the SIG is dynamic as members' interest is peeked or they become disinterested. Participation in a particular SIG tends to be a factor of member interest and availability, hence, the ability of a SIG to conform to strict timeframes is often very limited.

2.4 Communities of competence

Communities of Competence are a highly flexible and dynamic form of teams evolving from the concept of Communities of Practice. Smith (2005) proposes CoC as a new form of collaborative workgroup "whose members apply their state-of-the-art skills, abilities and knowledge to come up to speed" and which facilitates combination of separate strengths and core competences of individuals, groups and organisations into a meaningful goal-oriented whole. The most prevalent rationale behind CoCs is their fluid nature aligning well with the volatile state of the business realm full with fast growing opportunities and unexpected threats. One of their most important flexible aspects is the fact that they are assembled on an as-needed basis only for the duration of the project or goal at hand. At the very heart of CoCs lie the core competencies of their members at work and their ability to ensemble their collective competence towards the achievement of a specific goal. These groups are brought together to work on a very specific problem, attain an exact goal or new venture creation. Members must overcome learning curves in order to find solutions to the problem in question. Authority in such groups is moderately formal, but based upon competence and leadership skills. The goal-driven nature of CoCs sets them apart from CoPs and similar teams. However, there are several other characteristics that make CoCs different.

Technology Basis	Community of Practice	Centre of Practice	Special Interest Group	Community of Competence	Centre of Competence
Internet Based	High	Low	Medium	Low	Low
Intranet Based	Low	Low	Low	High	Low
Extranet Based	Medium	Medium	Medium	High	High
Document Management	Medium	High	Medium	Medium	Medium
Groupware	High	High	High	High	High
Knowledge Agents / Artificial Intelligence	Low	Low	Low	Low	Low
Data Warehousing	Medium	Medium	Medium	Medium	Medium
Decision Support Systems	Low	Medium	Medium	Low	Medium

Table 2: Application of KM Technologies to Groups

An important aspect of CoCs is their cross-functional nature. Since tacit knowledge is difficult to codify and extract from documentation, a face-to-face elicitation is the an effective way to share such knowledge, hence, cross-functionality provides this platform and an effective means of leveraging knowledge to solve problems or to make decisions spanning across multiple disciplines and functions (Mohamed, Stankosky and Murray 2004). However, it is to be noted that such groups may also be virtual in nature overcoming temporal and spatial boundaries using appropriately selected knowledge management technologies as we have shown in Table 2. CoCs combine individuals from different business units, departments, positions, experience levels and functional roles. They must rapidly and intensely focus on solving a challenging problem, which requires expertise across the board.

Membership criteria for CoCs are highly selective and based on individual competence or demonstrated potential to perform at a desired level of competence. "The opportunity to function at a high level of competence is a strong intrinsic motivator" and allows individuals to be become recognised as distinguished leaders in their respective fields by becoming champions for change (Smith 2005). Being a member in such groups is reputable and prestigious as the members have access to vast intellectual capital while working with the best minds. Members of a CoC:

- Operate autonomously by self-managing and, hence, self-initiating on critical steps to complete the goal at hand.

- Must quickly overcome steep learning curve and any possible gaps in levels of current and required competence (Lewis, Wright and Geroy 2004).
- Are capable of moving fast, in that they must form collaborative relationships quickly and perform at higher speeds than traditionally expected (Lewis, Wright and Geroy 2004).
- Are predicted to outperform other traditional forms of workgroups by producing higher quality products, being innovative and completing work projects more (Smith 2005).

Mohamed, Stankosky and Murray (2004) emphasise that much improvement needs to be achieved in terms of capturing and retaining collective knowledge of such groups during their lifeline as much of the collective knowledge can get lost when CoCs disband. After a CoC wraps up, members may reassemble into new teams and the trust building must also begin anew. The authors and we assert that these teams must be integrated within the larger construct of Communities of Practice, which promote intellectual relationships and knowledge sharing practices on a much wider scale. Therefore, allowing CoCs to be formed from existing CoPs will prove to be a more effective and optimal approach leading to their success and retention of valuable capital.

2.5 Centres of competence

While similar in nature to Communities of Competence, Centres of Competence differ in one fundamental way – the members of the centre are drawn from within the organisation. As the membership is internal to the organisation, the centre approach has the benefit of increased security, stability and supportability from an organisational perspective. However, there are corresponding drawbacks, which include a reduction in the diversity of the centre members. This drawback in itself may be enough to limit the use of Centres of Competence within small organisations, but may not be a large prohibiting factor in medium to large-scale organisations. Centres of Competence are formal groups within organisations with power derived from legitimate authority. Leadership authority is associated with a formal leadership role as opposed to an individual. The focus of such groups tends to be narrow and sell stated with stated objectives to be achieved within a relatively short time period. Once the objectives of the group have been achieved, the group may be disbanded or assigned further objectives. Members maybe employees of the organisation for the duration of the task or may be temporary or consultative to the group depending upon the capability that they offer and the requirement for that capability.

Human Resource Management (HRM) has the opportunity to play a major role in HC development, and thus, act as the strategic HRD function contributing value towards competitive advantage and wealth creation (van Marrewijk and Timmers 2003). HR must adopt an HCM approach actively focusing on the development, performance and readiness of individuals. A set of strategies must be developed and implemented by HR to support and facilitate collaborative group efforts that enhance HC. An overall competency profile of individuals must be maintained and monitored for assessment and placement in groups (Smith 2005). Traditional HR records such as resumes and CVs can be made internally available through intranet-based or groupware applications (O'Sullivan 2005). KM technologies, such as expertise locators and competence management systems, can be mixed with conventional HR documents in order to furnish an accessible, accurate and real-time competence depiction of a group or an organisation. Access to this knowledge will prove invaluable to managers, sponsors and team leaders interested in talent for groups. Successful group leaders must rely on and solicit the collective competencies of their group members (Smith 2005). HR should invest in training group leaders. Leaders must keep members motivated, therefore, individuals must be presented with challenges encouraging them to tap into their full potential and recognised for positive efforts.

Increased autonomy and the ability to self-manage are critical factors in the success of groups. HR can contribute by championing the cause of groups to management and sheltering them from hindering aspects of the norms and processes while taking advantage of the positive aspects of the organisation (Lewis, Wright and Geroy 2004). Groups should be empowered with access to tangible resources, such as financial assets, and intangible resources, such as relationship capital, throughout the organisation. HR must proactively reach out to isolated talent within the organisation and find ways to align individual interests with group focus. Membership in collaborative groups must be promoted, encouraged and rewarded by means of intrinsic motivators, such as challenging work, peer recognition (Smith 2001), learning from others and belonging to a strong cohesive group (Smith 2005), as well as non-intrinsic motivators such as salary, bonuses and performance reviews. In this day and age, organisational success will depend on the speed and effectiveness of generating, capturing and disseminating knowledge and then leveraging it to develop capabilities that cannot be easily copied by rivals (Sharkie 2003). It is clear

that supportive, interactive, learning environments built on trust, openness and collective ownership definitely encourage knowledge creation and sharing (Smith 2001), and thus in high demand situations these groups will solve problems better than isolated individuals (Ulrich 1998). Building and investing in such groups that keep up with the pace of rapid change must be a long-term strategic effort and will prove to be a source of sustainable competitive advantage, because it is difficult to imitate capabilities based on unique knowledge, intellect and organisational context.

3. The technology factor

Of course, because of the nature of the groups discussed above, technological enhancements may improve their ability to achieve their stated objective, and in fact, may be a requirement. In categorising technology, there are many different approaches taken in the literature ranging from thirty seven different categories to just two. In our research we have utilised an eight category model first utilised by KPMG in 1998 (O'Sullivan and Stankosky 2004). This model categorises knowledge management technology in terms of its core basis, in other words by the fundamental way in, which it is used. In Table 3. we detail these technologies with reference to the way in which they may be used to support collaborative group structures.

KM Technology	Application	Structure Application
Internet Based	Public Access Discussion Boards Search engines	Community of Practice Community of Competence SIG
Intranet Based	Internal Access only Discussion Boards Knowledge Dissemination	Centre of Practice Centre of Competence SIG
Extranet Based	Similar features to Internet and Intranet with the added abilities for secure intra-organisational collaboration	Community of Practice Centre of Practice SIG Community of Competence Centre of Competence
Document Management	Document Library Version Control Reference Capabilities	Centre of Competence Centre of Practice SIG
Groupware	E-Mail Collaborative spaces such as discussion boards and document libraries. WIKIs BLOGS Instant Messaging Conference Calling Video Conferencing	Community of Practice Centre of Practice SIG Community of Competence Centre of Competence
Knowledge Agents / Artificial Intelligence	Data Analysis Data Retrieval	Centre of Practice SIG Centre of Competence
Data Warehousing	Data Retrieval Data Storage	Centre of Practice SIG Centre of Competence
Decision Support Systems	Outcomes Analysis Assessment	Centre of Practice SIG Centre of Competence

Table 3: KM Technology Utilisation in Collaborative Group Structures

The selection of the appropriate technology to support the different forms of group depends upon a number of different criteria. These criteria include the nature of the group in terms of internal / external focus, security requirements, the operational form of the group in terms of operating in the same place same time, same place different time, different place same time and different place different time. The ability to archive and access knowledge developed by the group at a future time should also be a consideration.

4. Conclusion

The application of appropriate group structure is a product of several different factors. Once the appropriate structure has been selected, technological support can be applied considering environmental factors such as security and operational considerations in terms of how the group will operate. The establishment of the forms of groups outlined in this paper tends to have a positive outcome for the organisation from a

human capital perspective. Individuals benefit from involvement in collaborative groups such as CoCs and CoPs in that they become more knowledgeable, improve their self-efficacy and relationship capital. The ability to develop solutions and ideas faster may also lead to increased innovative capabilities. Essential to the selection of the correct collaborative structure is an understanding of the nature of those structures. In this paper we have demonstrated that there are significant differences in the nature and capabilities of the structures. Although the selection of a less optimal collaboration structure may be operational in achieving an organisational goal, the methodological approach taken by the group using the collaborative structure may not achieve the goal in the most effective way. Similarly, the value added benefits of using collaborative structures may not be achieved with a less optimal structure selection. Further research into the degree to which participation in such groups has upon the level of innovation is currently underway, however, based on research conducted thus far, it has become apparent that HR must play a strategic role in facilitating groups increasing human capital. The development of human capital management profiles from the HR department is key to the increased effectiveness of organisations in the selection of germane group formats and the rapid allocation of appropriate personnel to accomplish organisational objectives and increase innovation. The implications of the move towards centres of competence are significant in an ever more dynamic business environment given the need for agility in business operations and organisational structures in today's competitive environment.

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