What causes value to be created when it did not exist before? A Research Model for Value Creation

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Abstract

The use of collaborative technologies to support shared efforts give rise to environments ripe with potential for value creation. Organizational practice is amass with tools and techniques for value creation. However, this phenomenon remains illusive at best. Within the collaborative context lies the key to creating value from intellectual assets. This paper uncovers specific testable constructs that appear to directly influence value creation and concludes with a model through which the engines of value creation may be put into motion. It provides insight into key aspects of social intellectual infrastructure that may be fine-tuned to support value creation efforts.

1. Introduction

Value creation is important to because it relates to the achievement of (business) objectives and subsequently promotes economic growth. The importance of value creation is known, but it is not known what exactly causes value to be created and how. Intellectual assets are increasingly being seen as strategic resources that can create value. The term "intellectual capital" (or intellectual assets) is often used to represent knowledge that can be converted into profit and create value or the sum of everything everybody in a company knows that gives it a competitive edge [53]. Hibbard and Carrillo [22] claim information technology, which supports management of intellectual assets, such as datamining, groupware, document management and search and retrieval applications, are widely available and already exist in many companies. So how is value created from intellectual assets?

Quinn [45] suggests that most successful enterprises today can be considered "intelligent enterprises" as they convert intellectual resources into a chain of services in a form most useful for certain customers by selling the skills and intellects of key professionals. The effective performance and growth of knowledge intensive organisations requires integrating and sharing knowledge that is often highly distributed [61]. Distributed knowledge is often personalised and resides in pockets and communities within and outside of the organisation making it difficult to integrate, use and thus create value from it.

Technologies for collaboration appear to enable the sharing and use of distributed knowledge. Developments in collaborative technology are increasingly focusing on multi-locational technology and electronic collaboration is becoming instrumental in capitalising on an organisation's intellectual capital. Nunamaker *et al.* [33] and Qureshi *et al.* [47] suggest that an organisation's potential to create value through the use of its intellectual capital is affected by the extent to which collaborative activities can take place. For optimum collaborative knowledge management activities, organisations must seek collaborative support that extends the electronic meeting room into an electronic meeting space, enabling any time any place collaboration.

While authors such as Peppard and Rylander [38], Sveiby [54] and Rylander *et al.* [44] identify a need for new frameworks that would address issues related to value creation from intellectual capital in knowledge intensive organisations, it is the following fundamental research question requires serious consideration: What causes value to be created when it did not exist before?.

This paper addresses this fundamental research question by investigating the notion of creating value from intellectual capital in the context of collaboration. It develops a model to describe and explain the causes and effects of value creation. In doing so, this paper distinguishes between key constructs and the

infrastructure within which these constructs can be ascertained. The key contribution of this paper is in uncovering specific testable constructs that appear to influence value creation and the infrastructure within which value creation may be increased.

2. Ascertaining Value Creation

This research draws upon the major research contributions on electronic collaboration, intellectual capital and value creation. It distills the key constructs that appear to influence the success of collaborative environments for value creation from intellectual capital. Relationships between these constructs are developed using results of prior research and experiential knowledge. As part of this process, additional factors were included that enabled the *social intellectual infrastructure* construct to be developed.

The model developed in this paper compares favourably to other models for measuring value creation. Cohen Calafut and Low [10] propose a model of value creation for measuring the impact of intangible (knowledge related) assets. They have identified the most critical categories of non- financial performance that determine corporate value creation as: innovation (measured by R&D expenditure, number and importance of patents), management quality, employee relations and quality of products and services. Kirchhoff et al. [28] have developed a model for measuring and managing R&D portfolio. The model consists of both quantitative financial factors (such as budgets for projects) and qualitative attributes (such as strategic initiatives, intellectual property classes and market categories) focusing on future value creation as opposed to traditional accounting that focuses on past results. The model developed in this paper operates on a yet higher level and provides insight into the infrastructure for value creation.

The constructs developed in this paper require infrastructure within which intellectual capital may be created and used. Examples of other measurement systems that focus on intellectual capital include: The Scandia Navigator (a type of balanced scorecard) and its value creation model [17]; The Intellectual Capital Index (IC Index) that considers flows of knowledge from human into structural capital [49]; Karl Erik Sveiby's Intangible Assets Monitor which divides intangible assets into external structure, internal structure and competence of people [54]; and the Inclusive Value Methodology (IVM) of Professor Philip M'Pherson that combines financial and non-financial hierarchies of value using combinatorial mathematics [52]. Tissen *et al.* [57] introduce the Knowledge Value Factor (KnoVa) which measures the service level of companies and the degree to which a company uses knowledge to produce services or products. All of these methods consider isolated variables without consideration to the context within which these variables operate.

At the same time, there s a sense that context matters. Lev [29] proposes a cost-benefit approach to the analysis of intellectual assets. He identifies two benefits (*nonrivalry* and *network effects*) and three cost drivers (*excludability*, *inherent risk* and *nontradability*) from knowledge assets. Nonrivalry means that knowledge assets are not scarce as different users can use them simultaneously. Network effects increase the benefits with the increase in the size of the network. For example, larger network of users of particular software product leads to larger investment in further software development, better user manuals, help facilities and lower prices [8]. Excludability means that owners of knowledge assets cannot effectively exclude others from using these assets. This suggests that a careful analysis of issues relating to the use of collaborative technologies and the environments that they enable is timely.

3. Value Creation from Intellectual Capital

As value appears to be created from intellectual capital, value can be defined as anything that someone might consider useful or important [35]. Creating value from intellectual capital involves gaining new insights or discovering new patterns of knowledge at the individual level, is likely to be useful for group (which a particular individual is part of) and subsequently for other two levels. Peppard and Rylander [38] claim that the intellectual capital perspective, with its origins in practice and its action-oriented focus has much to offer in illuminating how resources are used in creating value and in elaborating on the value creation process. Some authors divide intellectual capital into human and structural capital [17], [54]. Human capital refers to combined knowledge and skills of individual employees as well as company values and culture. Structural capital relates to for example, software, databases, organisational structures, patents and everything else in an organisations capacity to support its employees' productivity.

This leads us to suggest that *Intellectual Capital* is a key construct. Value creation from intellectual capital is influenced by concepts of data, information, knowledge and wisdom (debated in [13], [34], [52], [58]) and

others). For example, Davenport and Prusak [13] distinguish knowledge from information and information from data on the basis of value added process, whereby transformation from data to information occurs though contextualization, categorization, correction and condenzation. The transformation from information to knowledge happens through connection, comparison and conversation. The literature however, offers no consensus with regard the hierarchy of these terms, how they are related and how this relationship can be expressed [33], and some authors dismiss data to knowledge hierarchies as one man's knowledge is another man's data [53]. Tuomi [58] even suggests that data emerge only after we have information, and information is a prerequisite for knowledge. The terms "data", "information" and "knowledge" are used interchangeably [1]. It is worth noting that DeSanctis and Gallupe [15] ascertain that at a fundamental level a team accomplishes its goals by deliberating about information. The underlying assumption is that *Intellectual Capital brings about value creation*. The importance of this construct and related assumption for effective value creation is stated in the following proposition:

Proposition 1. *Value creation is a positive function of intellectual capital.*

Value creation is related to achieving a goal or desired outcome. Examples of goals to be accomplished in the context of intellectual capital include innovation (e.g. development of new product or service), market understanding [45], improving quality or management capabilities [10] or improving customer relationship management. Creation of value is limited by the capacity of people to reason, assimilate new knowledge or to take actions [33]. In order to address and overcome these limitations in value creation several approaches can be adopted. For example, using technologies and tools such as data mining or agent-based knowledge discovery tools [43] can reduce time and effort needed to discover useful patterns of data and knowledge.

In addition to using adequate tools, it is becoming increasingly important for individuals to collaborate and work in groups (or teams) [12], [33]. Team productivity appears to be direcrtly linked to value creation. The Focus Theory of team productivity [5] suggests that in order to be productive, team members must be able to engage in three processes: communication, deliberation and information access which all require (limited) cognitive effort over time. In this context, productivity is defined as the degree to which a team achieves its goal, where team could be productive and move closer to goal attainment without necessarily creating a value (by goal achievement). The model of Focus Theory explains how teams seek to attain goals by joint mental effort. Examples of other studies related to team productivity include [41], [31] and [19]. This suggests that *Team Productivity* is a key construct that appears to have a direct impact on value creation. The underlying assumption is that *Value creation is related to team productivity*. The importance of this construct and related assumption for effective value creation is stated in the following proposition:

Proposition 2. *Value creation is a positive function of team productivity.*

4. The Collaborative Context

Collaboration is the degree to which people in an organization can combine their mental efforts so as to achieve common goals [34]. The act of collaboration is the act of shared creation and/or discovery in which two or more individuals with complementary skills interact to create shared understanding that none had previously possessed or could have come to on their own [50], [27]. Schrage [50] adds that collaborative technologies have changed the contexts of interaction completely. Many conversations can take place at the same time. Ideas generated by different people on a shared screen for all to see inspire conversations within the group. Ideas are both external and manipulable. People can create icons to represent ideas and concepts, which others can modify or manipulate until they become both community property and a visual part of the conversation.

Collaboration is a third key construct. The underlying assumption is that *Collaboration causes value to be created.* The importance of this construct and related assumption for effective value creation is stated in the following proposition:

Proposition 3. *Value creation is a positive function of collaboration.*

Electronic collaboration has made it possible to harness intellectual resources across space and time. It has given the concept of work a new meaning: anytime, anywhere, in real space or cyberspace [7]. Such collaboration is characterised by higher decision quality, more alternatives generated, and more democratic participation [62]. Venkatraman and Henderson [69] suggest "*information technology now enables knowledge and expertise to become drivers of value creation and organisational effectiveness"*. This suggests that

harnessing the intellectual capital of an organisation to create value cannot be achieved without the assistance of collaborative technologies. Collaborative technologies for the creation of shared spaces include message systems, computer conferencing systems, procedure processing systems, calendar systems, shared filing systems, co-authoring systems, screen sharing systems, Group Support Systems (GDSS), advanced meeting rooms and finally team development and management tools. Groupware can be defined as to represent "computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment" [18]. In recent years the term Group Support Systems (GSS) is being widely used to denote a socio-technical system consisting of software, hardware, meeting procedures, facilitation support, and a group of meeting participants engaged in intellectual collaborative work [16], [26]. Such collaborative technologies are employed to focus and structure group deliberation, while reducing cognitive costs of communication and information access among teams working collaboratively towards a goal [14]. Nunamaker *et al.* [33] suggest that "*we are moving towards an age of any time any place collaboration*".

However, there appears to be a level of agreement in that value of using certain collaborative technologies depends on the collaborative task at hand and the group productivity requirements. Support for coordination among individuals carrying out a collaborative work process requires a different combination of technologies than do concerted collaboration efforts. Collaborative (or group) task is defined as the behaviour requirements needed to accomplish stated goals (i.e. create value), via an explicit process, using given information [62]. A theoretical model of GSS effects on group roles proposed by Zigurs and Kozar [62] identifies task outcomes and group outcomes as components resulting from collaboration process. A task outcome refers to a group product that results from performing the original objectives of the task (e.g. correctness of decision or innovation), whilst a group outcome is a group product that is related to the continued functioning of the members as a group (e.g. satisfaction with task outcomes, perceived conflict, trust and motivation.

Task / Technology Fit is a fourth key construct that appears to have a direct impact on value creation. The issue of technology/task fit has been a subject of much research (e.g. [63], [15], [20], [51], [55]). Task/technology fit can be defined as ideal profiles composed of an internally consistent set of task contingencies and collaborative technology elements that affect group performance [63]. An influential paper by DeSanctis and Gallupe [15] suggests that achieving a fit between a group's task and collaborative technology is a principle for effective use of collaborative technology. Tan *et al*. [55] discovered that intellective tasks are best supported by decision aids that that enhance reasoning and promote informational influence, whilst decision making tasks require support for consensus and the support for normative influence.

An important study on task/technology fit in the context of collaborative technology by Zigurs and Buckland [63] identifies five main types of tasks: *simple tasks* (that have single desired outcome*), problem tasks* (focused on finding a best solution amongst alternatives), *decision tasks* (focused on finding a solution that best satisfies multiple outcomes), *judgement tasks* (focused on resolving a conflict and uncertainty in information associated with the task) and *fuzzy tasks* (that have very little focus and most group efforts are spent on structuring the problem). Table 1 illustrates types of tasks and required collaborative technology configurations that can achieve desirable task/technology fit for different types of tasks. For example, decision related tasks could be best supported by software capable of multi-criteria analysis that supports evaluation of alternative outcomes. Further examples and justification of task/technology fit classification used in this paper are provided in [63].

Type of Tasks	Desirable Collaborative Technology Configurations
Simple tasks	Emphasis should be on communication support
Problem tasks	Emphasis should be on information processing
Decision tasks	Emphasis should be on information processing and process structuring
Judgement tasks	Emphasis should be on communication support and information processing
Fuzzy tasks	Emphasis should be on communication support, information processing and some process structuring

Table 1: Task/GSS Technology Fit Classification (source: Zigurs and Buckland [63])

The underlying assumption is that *Fit between the task and collaborative technology is essential for creating value.* The importance of this construct and related assumption for effective value creation is stated in the following proposition:

Proposition 4. *Value creation is a positive function of task / technology fit.*

5. Social Intellectual Infrastructure

Each of the above constructs operates within a social intellectual infrastructure. This is the context of communication and interaction among individuals, in groups and in organisations. Courtney *et al.* [11] suggest that in order to support communication it is necessary not only to have proper media with which to communicate, but also a social network or "community of minds" whose members know one another and speak the same language. This means that a culture of communication enables effective collaborative effort. In addition, Holsapple and Whinston [24] add that as organisations will be increasingly regarded as joint human-computer knowledge processing systems, they will be viewed as societies of knowledge workers who are interconnected by computerised infrastructures. This suggests that management of intellectual assets will be most effective when conducted collaboratively. Value can be considered from different perspectives or levels: individual, group, organizational or inter-organizational [6], [2]. The social intellectual infrastructure is represented in the context of three perspectives: individual, group and organisational as summarised in table 2.

Individual aspects	Group aspects	Organisational aspects
Knowledge relevant for task	Goal congruency	Collaborative culture
Communication skills	Perception congruency	Collaborative processes
Negotiation skills	Trust	Resource constraints

Table 2: Issues identified social intellectual infrastructure aspects

At *individual* level, adequate skills and knowledge of individuals are needed for the accomplishment of a collaborative task, although high-level relevant skills can restrict new perspectives. According to Polanyi [40] tacit knowledge is personal, context specific and therefore hard to formalise. This personalised knowledge is subjective, experiential and lies in mental models containing cognitive elements such as paradigms, perspectives and beliefs that help individuals perceive and define their world and lies in mental models containing technical elements such as skills and expertise. This knowledge is also seen to form the core competence or intellectual capital of the intelligent enterprise [45]. Ability of people to communicate and negotiate is an important part of collaborative work and the achievement of common goals [4]. Communication in organisations is defined as the process by which messages are transmitted from one person to another [60]. The human relations theorists have a view that communication should be open which is achieved by building foundations based on mutual trust [39]. Interestingly, Mankin *et al.* [30] discovered in their research that "seven times out of ten" when something goes wrong on a project, the cause is a breakdown in communication – not a breakdown in technology.

At the *group* level, several issues have been identified. The conditions necessary for successful collaboration in electronic environments are described by Qureshi *et al.* [47] to be the following: There must be a shared space where different perspectives may be shared and shared understandings generated; There must exist one or more congruent purposes (such as to solve a problem, create or to discover something) or goal-oriented virtually organized activities that have to be managed; It must occur within constraints including limits of expertise, time, money, competition and cultural considerations and there must be a need to share these resources. According to Qureshi *et al.* [48] and Briggs and Nunamaker [5], the effective management of personalised knowledge also requires *goal congruence.* If these two conditions are absent, then electronic collaborative technologies may be of little use or even have an adverse effect on the organisation. If goals do converge and resources can be exchanged through collaboration, then the use of electronic collaboration can add value – even bring about significant gains. Team related motivation is also included within goal congruency as team members should be motivated to share common goals. Intrinsic motivation is viewed as the key driver for knowledge creation and sharing whereby creativity and innovation are more easily achieved than in the case of extrinsic motivation (based on rewards and evaluation) [1]. Once the need for collaboration is clear, then shared spaces where different perspectives may come together in physical face to face or virtual environments will enable collaboration to take place. In order to create value, the perceptions of the different participants have to have some similarity or overlap. This shared meaning of knowledge that needs to take place is defined for the purpose of this paper as *perception congruency*.

Another important factor, trust, appears to be one of the main components of successful collaborative environments [25], [1]. Coordination of virtual teams is accomplished via trust and shared communication systems [25]. According to O'Hara-Devereaux and Johansen [37] trust is the glue for workspaces as technology does not do much to create relationships. Jarvenpaa *et al.* [25] ascertain that trust is based on the expectation that others will behave as expected, whereby

the main attributes of trustee are his/her perceived ability, benevolence and integrity. Trust defines the degree of emotional safety in working relationships [9] and high level of trust corresponds to greater quantity of ideas generated and shared [57]. A comprehensive study on trust in global virtual teams conducted by Jarvenpaa *et al.* [25] discovered that virtual teams could deploy a number of strategies to reinforce trust and improve team process outcomes and hence value creation: proactive behaviour, empathetic task communication, rotating team leadership, task goal clarity, time management and frequent interaction with detailed responses to prior messages.

At *organisational* level, a collaborative *culture* is seen as important factor that enables electronic collaboration to be effective [6]. Culture constitutes the beliefs, values and attitudes pervasive in the organisation and results in a language, symbols and habits of behaviour and thought [21]. According to Hofstede [23] the core of culture is formed by values, whereby in organisations that have formalised intellectual capital management activities the common component that drives those activities is value alignment. Another important element of culture in the context of intellectual capital is supporting "knowledge sharing" as opposed to "knowledge hoarding". Ahmed *et al.* [1] identify the main issues that support collaborative and knowledge sharing culture in organisations. Some of these issues include: challenge and belief in action, freedom and risk taking, external orientation, trust and openness, cross-functional interaction and freedom, leadership commitment and involvement, time and training given to employees and autonomy and flexibility of organisational structure. Barney [3] claims that organisations that have a culture that support and encourage co-operative innovation should attempt to understand what it is about their culture that gives them a competitive advantage and develop and nurture those social attributes.

As knowledge is normally created and shared in the context of teams, it is perceived that company's culture must be team-based to manage intellectual assets effectively [57], [32] and teamwork should assist in diffusing best practice and benchmarking [36]. Collaborative environments normally involve virtual teams that communicate within and among network organisations [2] that need to be motivated by management, trained for the task, and collaborate on beneficial tasks [46] and collaboration must be seen as a legitimate way of working and must be part of the organization's accepted work practice. The need to overcome *resource constraints* in organisations increases the necessity to collaborate. Structured (problem-solving or decision making) methods to guide collaboration processes are also important [33]. These work practices and methods relate to organisational *collaborative processes* in the context of our analysis.

Social Intellectual Infrastructure provides the conditions under which intellectual capital, team productivity, collaboration and task/technology fit can have a direct positive effect on value creation. It is assumed that *an increase social intellectual infrastructure will bring about an increase in value creation.* Increases in the social intellectual infrastructure may be brought about by, for example, training of team members to increase their knowledge and skills, or increasing goal congruency by implementing performance related motivation measures. Training should increase the effectiveness of the intellectual capital construct and its direct impact on value creation. The following proposition embodies that relationship between this construct and value creation:

Proposition 5. *Increased social Intellectual Infrastructure will increase the level of value created.*

6. A Theoretical Model for Value Creation

Together, the above constructs and propositions relate to provide a view of forces that bring about value creation in collaborative contexts. Table 3 summarises the constructs, related assumptions and propositions identified:

Constructs	Assumptions	Propositions
Intellectual Capital	*Intellectual Capital brings about value creation.*	*Value creation is a positive function of intellectual capital.*
Team productivity	*Value creation is related to team productivity*	*Value creation is a positive function of team productivity.*
Collaboration	*Collaboration causes value to be created*	*Value creation is a positive function of collaboration.*
Task /Technology Fit	*Fit between the task and collaborative technology is essential for creating value*	*Value creation is a positive function of task / technology fit.*
Social intellectual infrastructure	*An increase in social intellectual infrastructure will bring about an increase in value created*	*Increased social Intellectual Infrastructure will increase the level of value created.*

Table 3. Summary of Constructs, Assumptions and Propositions

The relationships between the constructs are illustrated in the model in Figure 1. This simple model depicts the fundamental relationships between key constructs that influence value creation. This model paves the way for emprirical examination of the constructs that bring about value creation.

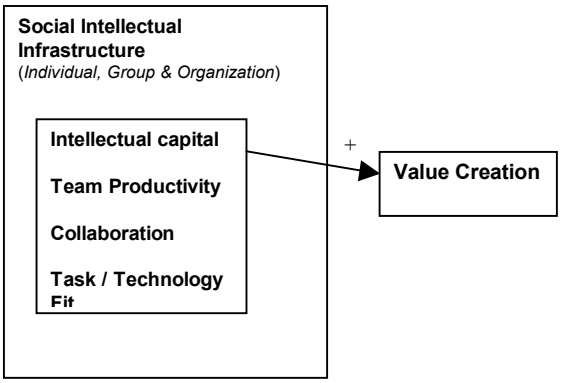

Figure 1: Model of Value Creation

The relationship between constructs depicted in Figure 1, illustrates that Team Productivity, Intellectual Capital, Collaboration and Task / Technology Fit have a direct positive impact on value creation. In addition to these key constructs, the fifth construct Social Intellectual Infrastructure provides the context that further increases value creation: improved Social Intellectual Infrastructure at individual, group and organizational levels will increase value creation. All these five constructs have a positive impact on value creation.

The constructs are related in the following ways: Team productivity is influenced by factors such as communication skills and individual knowledge, goal congruency, and resource constraints which all relate to social intellectual infrastructure. Intellectual capital is related to the intellectual bandwidth of teams (collaborative groups) that participate in goal attainment and value creation. Task/technology fit interacts with social intellectual infrastructure as better fit will result in improvement of individual, group and organisational aspects of this construct (e.g. adequate task/technology fit can improve knowledge needed for the accomplishment of tasks, facilitate communication amongst group members and goal congruency as well as organisational collaborative processes). Individual, group and organisational aspects of social intellectual infrastructure are also interrelated. For example, better individual skills lead to better group performance, which then can further influence organisational collaborative culture and processes.

This model relates to the intellectual bandwidth model [33] by distilling the key constructs that enable the potential to create value to be realised. It also provides a value creation context for addressing the issues raised by Thakor [56], Por [42], and Peppard and Rylander [38]. It does so by addressing the *sources of value creation*. These can include, for example, proven methodologies and guidelines that organisation can use to support groups in achieving their goals with consistent and predictable quality [35], or an organisation's intellectual bandwidth, its collective potential to acquire information, make sense of this information and take relevant action with respect to an important goal [33]. Ability of team members to understand and apply relevant information and/or discover new relevant knowledge (normally with the help of tools) and to effectively collaborate influences the intellectual bandwidth of an organisation and as such represent important causes of value creation.

Thakor [56] identifies five important issues that contribute to value creation: understanding what value means for individual and organisation (e.g. shareholder value structure is typical for profit driven organisations); understanding four dimensions of value creation (control, collaboration, competing and creating); knowing value creation strategy (defined as a roadmap of value creation and resource allocation); developing appropriate measures of success and focusing on task intensely without sacrificing quality. According to Por [42] new technologies (such as collaboration tools) and new organisational paradigms are in a positive feedback loop that drives creation of new value. According to Peppard and Rylander [44] the understanding of transformations between resources and the realisation that they are the key to value creation is important.

The Value Creation Model provides further insight into the main obstacles for value creation: lack of adequate tools and task/tool fit that support collaboration and goal achievement, inability of individuals to make sense of exchanged information, inability of individuals to interact and collaborate, lack of techniques/guidelines that support collaboration process, problems with goal congruency and objectives of collaboration process, and lack of trust among group members. When adequate tools are used by individuals capable of collaboration and interpretation of exchanged information, using proven techniques to achieve congruent and important goals, value creation is facilitated and enhanced. In order to assure value creation, adequate collaborative technology

should be applied to particular tasks within an appropriate collaborative environment. This view is supported by Davenport [12] who claims that if an organization is focusing on KM tools, it is neglecting the content, organizational culture and motivational approaches that will make the tool useful. Tools can be utilized and goals achieved if people with right knowledge and skills, aware of goals to be accomplished, use them and engage in effective collaborative interaction.

7. Conclusions and Further Research

In order to create value, collaboration is important as it allows individual group members to combine their mental efforts, and though the effect of synergy (where the output of the group is larger than the sum of its individual components) and effective interaction achieve common important goals. In the words of Briggs and Nunamaker [4] people must work in teams and collaborate when no one person has all the experience, insight, information or resources to accomplish a goal alone. Through the process of interaction amongst group members, complementary ideas and knowledge can be utilised to achieve different (and normally greater) value than it would be possible to achieve though individual isolated efforts. For example, group interaction and exchange of ideas usually produce steeper learning curves for individual members), and ideas generated and displayed by other team members can trigger new inspiration for individual members of such a team [52]. In this way, an understanding of the social intellectual infrastructure may provide further insight into how value may be created by increasing learning at individual, group and organisational levels.

To conclude, it is apparent thus far that managing knowledge in a collaborative context enables organisations to create value through the use of their intellectual capital. The use of the knowledge and expertise of an organisation's employees requires a careful understanding of the collaborative context, the type of knowledge required for the task to be accomplished and an alignment of goals and resources required to complete the task. The vast arrays of collaborative technologies available for use in collaborative knowledge management efforts are poised to meet the challenges of growing globalisation of work environments and the need to manage geographically dispersed expertise. This research model provides powerful insight into factors that contribute to value creation. An understanding of the structure and relationships in value creation should enable a better understanding of how value can be created through designing better processes, technology and organizations.

Further research related to this paper should include empirical testing in the field. This could lead to refinement and further development of propositions related to factors that contribute to value creation in collaborative context. In particular, instrumentation for surveys and interviews is required to collect data in organisations, groups and individuals interacting in their respective social intellectual infrastructures.

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