BEYOND TECHNOLOGY ACCEPTANCE MODELS: A CASE OF COLLABORATIVE TECHNOLOGY

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Abstract

A central theme in information systems research is th

1 INTRODUCTION

A central theme in information systems research is the study of user acceptance and use of information technology. The importance of this stream of research can hardly be exaggerated. Increasing access to various information technology applications without adequately understanding the task requirements and the potential change in the way of work may lead to information overload, frustrations with the technology and thus may not benefit the user. Information technology has become an important medium of task execution especially in the last ten years or so, mainly due to the proliferation of personal computers and the rapid dissemination of network based techno.8(with)6.4(t8sh)o

technologies few have paid attention to secondary adoption, continued use and assimilation (Gallivan, 2001; Burton-Jones and Gallivan, 2007; Van den Hooff, Groot and de Jonge 2005). It is therefore important to examine extent of use of IT and the factors which influence such use. However, authors cautioned researchers that evaluating people using technology is "a complex socio-technical phenomenon defined by the **interaction** of people and technology in an organisational context" (emphasis added) (Doll and Torkzadeh, 1998).

If one were to present a quick overview of the predominant themes in IT use research, over the last few decades, it would be close to the following. IT use research till early 1980s has dominantly focused on motivation and perceptions regarding the technology and its potential (Trice and Treacy 1986). With the coming of a simple yet presumably powerful Technology Acceptance Model (TAM) in the mid 80s, the shift to technology characteristics and the attitudinal and behavioral effects of

the DoI theory in the context of collaborative technology has also been quite common (Turner and Turner, 2002; Sarker, Valacich and Sarker, 2005).

In order to gain from a technology it is important that the purposes or the structure of the tasks underlying the technology and the hidden assumptions be understood. It is important to examine the emotional, cultural and symbolic assumptions underpinning the group's interaction and the process of task execution, in a study of technology meant to support groups (McLeod, 1999).

Task characteristics including complexity of task, nature of the task and uncertainty of the task (in respect of the consequences of the decision task

into a need for collaboration among members of different departments or members of the same department who share some physical resource. Such resource sharing also results in an increased complexity of the coordinating task.

Different parts of the organisation may depend on each other (for reasons other than resource sharing), for execution of their respective tasks. In such cases, there is a definite need to coordinate and communicate. This requires the various personnel to collaborate in order to ensure smooth operations. Such a need to coordinate may also arise from inter-dependencies across tasks of multiple individuals in the organisation resulting in increased task complexity and uncertainty (Kwon and Zmud, 1987).

When information in the organization is dispersed among many individuals and such information needs to be gathered and collated, groups are likely to be used as coordination mechanisms (Cummings, 2004). Such information dispersion gives rise to certain task ambiguities and complexities.

When groups engage in information intensive tasks, it is imperative that they look for tools and technologies that either enable them to perform such tasks, thus resulting in the use information technology especially collaborative technology. Thus,

> *Proposition 1: Greater the information intensity of the group task, greater is the use of collaborative technology.*

3.2 Collaborative Orientation

Unlike technologies and applications used by individual's for supporting their own tasks such as word processors, spreadsheets or applications used at the organizational level such as ERP, CRM, collaborative technology is a network-based technology where the extent of use is also determined by the existing or potential members on the network. A group's use of such technologies is therefore influenced by peers' and superior's use of it (Kang, 1998; Turner and Turner, 2002; Lerouge, Blanton and Kittner, 2004). This construct is akin to the social influence (Venkatesh et. al. 2003) and subjective norm (Taylor and Todd, 1995) constructs that exist in literature but in the context of collaborative technology.

Considering a task group within an organizational environment, the tendency of the group to be collaborative in their approach to task execution will have an impact on their extent of use of collaborative technology to execute the group task (Li, et. al., 2003). Some groups have a tendency to be more collaborative in their approach to task execution than others. While the group sub-culture has a more dominating influence, Collaborative Orientation is influenced also by the culture of the organisation in which the group is embedded.

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is not identical to the group members' orientation. How the group perceives the group leader's influence or power, along with the group leader's orientation towards collaboration and collaborative technology (Jones and Kochtanek, 2004), thus determines whether the group has a positive orientation towards collaboration, especially for the specific task.

A group's propensity to collaborate is reflected in the extent of collaborativeness exhibited by the group in a natural manner, the group leader's preference towards encouraging or discouraging collaboration to execute the task and the culture of the organisation in which the group is embedded. This Collaborative Orientation thus impacts the behavioral intention to use collaborative technology to support the group task. Hence,

> *Proposition 2: Greater the collaborative orientation of the group, greater is the use of collaborative technology.*

3.3 Technology Drive

A group's orientation towards information technology depicts the general tendency of the group to apply and use information technology for various organisational activities. This tendency affects the group's propensity to use collaborativopadpart8(r)-5rom6 0 TD3.99765 Tc0.1561 Tw[ati5.3(h)1(e)5.8(extentor

3.4 Performance Pressures

A group may experience pressure to use collaborative technology if there is an inherent performance pressure to execute the task well or if there is a pressure to support a collaborative task using technology.

A group which performs a task which is more significant in the organization scheme of tasks (Campion, Medsker and Higgs, 1993) is likely to experience greater pressures to perform and hence to use IT support for task execution. Task significance is manifested in the authority provided to the group, priority given for allocation of resources, access to information and ease with which the group can export or import information related to the group task . Alternatively, if the group members perceive that the task under consideration is a very important task in comparison to its other tasks, the members are likely to perceive greater performance pressures, either (or both) in terms of efficiency of the task performed or the effectiveness of its outcomes. This is akin to the performance expectancy construct in UTAUT (Venkatesh et. al. 2003). A highly motivated group with an innate drive for excellence and keenness to produce an efficient and effective output of the group task may also experience inherent pressures to perform.

When the spatial differentiation of the organisation is high and as a result, internal processes of the organisation are spread geographically, then there is a great need for members of the organisation to use technology to collaborate and communicate laterally. It is also common to find members of a group being temporally dispersed either due to locational (time-zones) difference or due to differences in working hours. Both geographic and temporal dispersion necessitate use of collaborative

the imagination of the user. We therefore suggest a combination of the following two measures of use (Vaidya and Seetharaman, 2005)

- Frequency of Use of collaborative technology for the task
- Proportion of task performed using collaborative technology

Frequency of use refers to the regularity of utilization of collaborative technology by the group for performing the group task. In other words, it attempts to capture the answer to the question— 'how often does the group use the collaborative technology to perform the task or parts of the task'. While there is no consensus in the literature as regards the measure of the scale of use of a particular IT application or infrastructure, it is possible to describe possible task environments when a particular measure would be more suitable.

Measure of Frequency of Use	**Suitable Group Task Environment**
Duration of Use (minutes/hours)	The task cannot be segregated into smaller components and requires a specific kind of use of the technology, such as instant messaging or video conferencing. Such a measure also tries to imply the level of dependency of the group on the technology to perform the task.
Number of Times Used	The task can be subdivided into numerous smaller components
Number of Messages Sent/Received	The task is mainly focused on information sharing between members of the group and the information shared can be identified as individual elements or cues related to the overall group task
Number of Transaction Sets	The task is composed of different types of activities and each can be individually considered a unique transaction
Proportion of Total Time Spent	The task cannot be divided into smaller tasks but can be done through a varying time duration depending on the group or environment
Perceived Frequency of Use	Absolute or objective measures cannot be used and hence it is only possible to use perceived measures or when available objective measures are not appropriate

Table 1. Frequency of Use and Suitable Task Environments.

'Proportion of task performed using collaborative technology' refers to that portion or share of the task performed on the technology. An organisational group task often consists of multiple smaller tasks or activities. While a group may choose to perform some constituents of the task through collaborative technology, it may also perform some others through other media such as face-to-face or telephone. It is possible hence, to list the lowest level constituents of the group task and analyze the use of collaborative technology with respect to each of these group task constituents.

3.5.2 Sophistication

The term sophistication refers to 'refinement' or exhibition of higher level of knowledge. In the context of collaborative technology use, it refers to the use of the general collaborative technology infrastructure and specific collaborative technology applications, at various levels of refinement, as reflected in the information activities performed using the technology. It is possible to define use of collaborative technology in the context of following types of group information activities - Information sharing, Information Management, Group Information Management and Synchronous Group Activities. A detailed description of these information activities with increasing level of task complexities has appeared in Vaidya and Seetharaman (2005). It is possible to create a typology of groups based on their collaborative technology use such as Amateurs (low scale/low sophistication), Satisficers (high scale, low sophistication), Passive Experts (low scale/high sophistication) and Active Experts (high scale/high sophistication).

The choice of these measures is based on two factors. First, the measure 'proportion of task' is incorporated mainly to neutralize the perceived quantum of use captured in the frequency variable. It also reflects the importance given to the collaborative technology in the context of the group task.

Second, multi-level research theory (Burton-Jones and Gallivan, 2007) has emphasized the need for a measure for each possible interaction between the elements in the theoretical framework (in our case

No.	Group	Task	Coll. Orientation	Tech Drive	Performance Pressures	Frequency	Prop. Task	Sophistication
1	**FIN**	High	High	High	High	High	High	High
2	**INS1**	Low	Low	Low	High	High	Low	Low
3	**INS2**	High	Low	Low	Low	Low	Low	Low
4	**EDU1**	High	High	High	Low	Low	High	High
5	**EDU2**	Low	Low	Low	Low	Low	Low	Low
6	**COT**	Low	Low	Low	Low	Low	Low	Low
7	**ELE**	High	High	High	Low	High	Low	High
8	**PET1**	High	High	High	High	High	High	High
9	**PET2**	High	Low	Low	Low	Low	Low	Low
10	**MED1**	High	High	Low	High	High	High	Low
11	**MED2**	High	High	Low	Low	High	Low	Low
12	**SOF1**	High	High	High	Low	High	Low	High
13	**SOF2**	High	High	High	High	High	High	High
14	**SOF3**	High	High	High	High	High	High	High
15	**DET**	High	High	High	High	High	High	High
16	**CAS**	High	High	Low	High	High	High	Low

Table 4. Summary of Findings

4 DISCUSSION

The framework presented in this paper essentially attempts to understand and describe the possible differences in the use of collaborative technology by different organisational task groups. In the process of doing so, it identifies the factors that influence collaborative technology use by groups and the nature of impact of these factors on collaborative technology use. It can be seen from the summary of the exploratory survey that a group experiencing high pressures to perform combined with an orientation towards collaboration (such as MED1 and CAS) display a high scale of use. On the other hand, groups which posses a drive to use technology and experience high performance pressures (such as FIN and DET) use collaborative technology actively and in a sophisticated manner. Comparing these with groups who posses the technology drive but do not experience pressures to perform (such as EDU1 and ELE) display a high sophistication but lower scale in their use of collaborative technology. But to draw any concrete conclusions and the precise nature and quantum of impact of various factors, further study is essential both in the form of detailed longitudinal in-depth case studies and large sample surveys. While longitudinal cases would help establish the interaction amongst various factors over time, large sample surveys would aid in greater generalization of the findings.

In summary, the features used in a collaborative technology and the information activities that are supported by such use are largely a result of the technology drive of the group members, while the dominant effect of task related factors and performance pressures are on the scale of technology use. The collaborative orientation of the group may be a catalytic construct the presence of which may enhance both extent and intensity of technology use.

The prescriptive value of the framework lies in aiding a group move to that level of use which may best suit the environment it functions in, using certain specific management mechanisms (Vaidya and Seetharaman, 2007). For instance organizations can use technology champions, who, using informal one-to-one modes to 'teach' *Amateurs*, thus creating **awareness**. Information centers and help desks which provide online **support** to end-users are essential for *Satisficers*. **Incentives** for regular use and/or support for identifying opportunities are two possible mechanisms for *Passive Experts*. *Active Experts* often tend to be dependent on collaborative technology infrastructure to meet their everyday task needs. The key aspect of technology management for active experts is therefore **maintain and enhance**.

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