EXPLORING INTERACTIONS OF DIFFERENT FACTORS OF KNOWLEDGE SHARING TASK WHICH LEADS TO PROCESS AND PRODUCT SATISFACTION IN VIRTUAL TEAMS: A LITERATURE REVIEW

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ABSTRACT

*Purpose***:** This study investigates how knowledge between different team members in a virtual team (VT) could be transferred which results in process and product satisfaction. The main aim of this paper is to present a model which could illustrate how different factors are aggregated in a special sequence to make a knowledge sharing task in a virtual team (VT) successful. *Method***:** This study follows a literature research approach. Different models are analyzed to identify models consistencies and inconsistencies. Then, a new model is suggested which is tried to cover previous ones shortcomings. *Results***:** For a VT to be successful the shared knowledge should be applied in a way which results in productivity and team members should be psychologically satisfied with the outcome. Productivity and psychological satisfaction are reachable by mutual trust, mutual understanding, mutual communication and mutual conflict avoidance between team members. These mutual issues are made plausible via an appropriate communication tool. Designing the communication tool should be done with regard to contextual nature of knowledge and providing high media richness and social presence.

*Keywords***:** *Virtual Teams, Knowledge Sharing, Product Satisfaction, Process Satisfaction, Communication Tool*

INTRODUCTION

Virtual teams

The concept of virtual teams is emerged through the continuously need for learning and innovation, Sole and Applegate (2000).

Considering the competitive atmosphere of nowadays markets, improvement of processes and products are among the most crucial ones in every company's agenda. Since, improvement demands knowledge, organizations are looking for it regardless of where it is. This issue causes companies to go beyond organizational and national boundaries to find the special knowledge, irrespective of its placement, for the specific task improvement.

Grasping knowledge wherever it exists, is possible with the favor of recent advances in IT.

Since the main characteristic of virtual teams is telecommunication, with progress in IT, the VTs are spreading more. The other reason for boosting VTs is their significant contribution with regard to emergent needed knowledge for problem solving which is a significant grantor in nowadays competitive market. For example according to Andres (2002) using virtual teams speed up the process of problem solving. Moreover, virtual teams are providing an appropriate support for lack of knowledge which is created by downsizing, mergers and acquisition (Sole and Applegate, 2000).

Also virtual teams are becoming a preferred mechanism for harnessing, integrating and applying knowledge across organizations in pockets of collaborative network (Alavi and Tiwana, 2002).

Through reviewing related literatures, what came out with regard to virtual teams' definition is that there is a wide range for its definition. Although, the rationale behind all of them is not maybe identical but it is more or less the same. Here just the selected one will be presented, since discussion regarding different definitions are out of the scope of the article. According to Andress (2002) virtual teams are groups of individuals collaborating in the execution of a specific project while located at multiple individual sites or

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multiple group sites. This definition will be the basis for what the authors mean by virtual teams in the rest of the article.

Knowledge Barriers

Although, virtual teams are looking like a strong tool for knowledge management, Alavi (2002), knowledge creation and learning (Hendriks, 1999) through IT, there are barriers associated with this phenomenon. Considering the process of knowledge sharing, irrespective of the reasons behind, it usually involves two parties. One party gives the knowledge and the other gain it, Andress (2002). The problematic phenomenon in this vein is the way that knowledge will transfer through it, always associated with barriers. However, these barriers are introducing more problematic conditions when communication is made through ICT in comparison with face-to-face communication, Andress (2002).

Figure 1, taken from Alavi's article (2002) with minor modifications, illustrates what is discussed above in graphical manner. Also, a differentiation is considered between knowledge and information in the picture. The person who gives the knowledge and the one who gains it are coined as knowledge owner and reconstructor respectively.
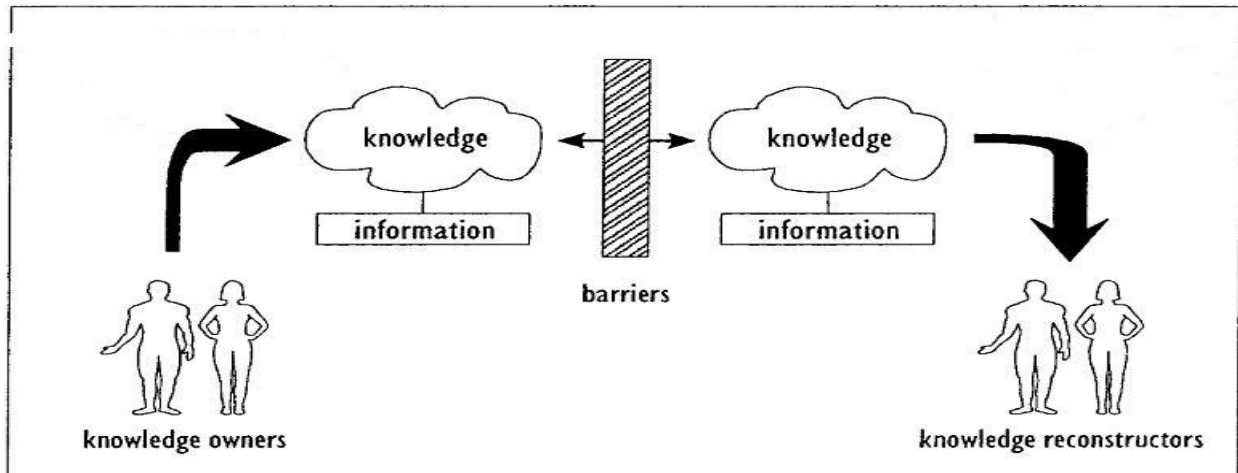

Figure 1: knowledge Barriers

Problem Definition

According to the findings through literature review and analyzing the different articles, the emerged hypothesis is that so far the researchers are more focused on some special aspects of knowledge sharing in VT and the interdependencies that the separated factors have are somehow neglected. For example there is a huge concentration on VT's productivity, media richness of communication tool and matter of trust separately. However, it is hard to find a comprehend research which study how aforesaid factors should interact to make a knowledge sharing task successful. Although, partial factor analysis is crucial for more detailed researches, the fact is that this is the aggregation of all the factors which build the virtual teams, its performance and associated problems. On the other hand, focusing mostly on details could cause losing the whole picture. As a result, what is exposed here is that concentrating on more factors and their interactions and interdependencies could shed more lights on the subject.

Here it is worthy to say that what is considered by successful knowledge sharing in this article is not just increasing the productivity. The other important output of knowledge sharing process which is usually ignored by both academia and industry is the psychological effect that sticks to practitioners' mind, Andress (2002). According to Alavi and Tiwana (2002) having bad picture in the minds of practitioners could result in leaving the virtual team. It means losing one asset from the company. Although psychological effect is not the main focus here, it will be discussed wherever it is needed.

The last word is gathering the whole factors which influence virtual teams' task performance is not that easy. As a result, it is better to put the effort on factors that significantly affecting VT's task performance

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and are sometimes neglected. The factors that influence VT task performance in a small extent will be ignored in this study. Thus, it is never claim this paper covered the whole issues.

Method

As it is mentioned in the introduction part the aim of this research is to find an appropriate model which can show the interdependencies and interactions of factors that affect knowledge sharing in an appropriate way that can consequently result in a successful task performance with regards to knowledge sharing in VTs.

This study started with searching scientific databases to find existing models which can clearly and appropriately illustrate the knowledge sharing procedure in VTs. Between existing models the one by Wu *et al.,* (2006) considered more comprehensive and sophisticated.

The criteria that lead to choose the aforesaid model were, being up-to-date, relevancy to the topic of this article, clear description and justification regarding related model and etc.

Basically, this study is an extension of the study by Wu *et al.,* (2006). To explore Wu and his colleagues' line of thought the aforesaid article's references were explored. Among references the ones which were appropriate for this study were selected and reviewed. On the other hand, extra articles are used to work as a supplementary to neglected aspects in Wu *et al.,* (2006) work such as effect of motivation in knowledge sharing.

Developing Knowledge Sharing Model

Task Success Criteria

According to Alavi and Tiwana (2002) knowledge sharing could be considered as successful when knowledge can be applied. Further in the same article they were arguing that knowledge sharing is not completed since the integration process takes place. Integration process is defined as the synthesis of individuals' specialized knowledge into situation-specific systemic knowledge. Same researchers indicate that appropriate understanding, trust and accessibility of information are the key to reach knowledge application and integration.

Andress (2002) argues that a task regarding knowledge sharing is successful when both task outcomes and psychological outcomes are satisfactory. Task outcomes and are considered as being in estimated schedule and budget and optimal productivity in terms of allocated resources.

And psychological outcomes is the degree of experienced friendliness and support, positive feelings associated with interactions, acquires knowledge and skills, enjoyment of participation, and sense of pride and value resulting from participation in project implementation process, for the latter.

In this study satisfactory knowledge integration is taken same as a satisfactory task outcome. Since if knowledge integration process happens successfully by the definition individuals' knowledge are mixed and converted to a situation specific knowledge which hopefully solves the given problem in budget and schedule which is successful task outcome by definition.

Wu *et al.,* (2006) indicated the effective knowledge sharing task is result of interaction of some sub-processes such as mutual communication, mutual commitment, mutual trust and mutual conflict prevention which eventually cause a successful knowledge sharing task. These sub-processes will be discussed in the following section.

Since the knowledge will be transferred via a communication tool, the appropriate design of communication tool has a significant importance. The communication tool affects mutual sub processes which consequently stimulate task and psychological satisfaction.

Sole and Applegate (2000) argued that for designing a suitable communication tool occupational, contextual and situated nature of knowledge have to be taken into account. It also has to be kept in mind individuals' specific expectations and understandings about using IT are playing crucial role in this vein. Media richness and social presence are two concepts which determine the quality of communication medium to a large extent.

To sum up, a knowledge sharing task is successful firstly if task outcomes and psychological outcomes are satisfactory. To reach these aims a knowledge sharing tool have to be designed considering contectual nature of knowledge with aim of enhancing media richness and social presence in a way that basically can

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motivate mutual communication, understanding, trust and conflict prevention. What is discussed here is reflected in the figure 2.
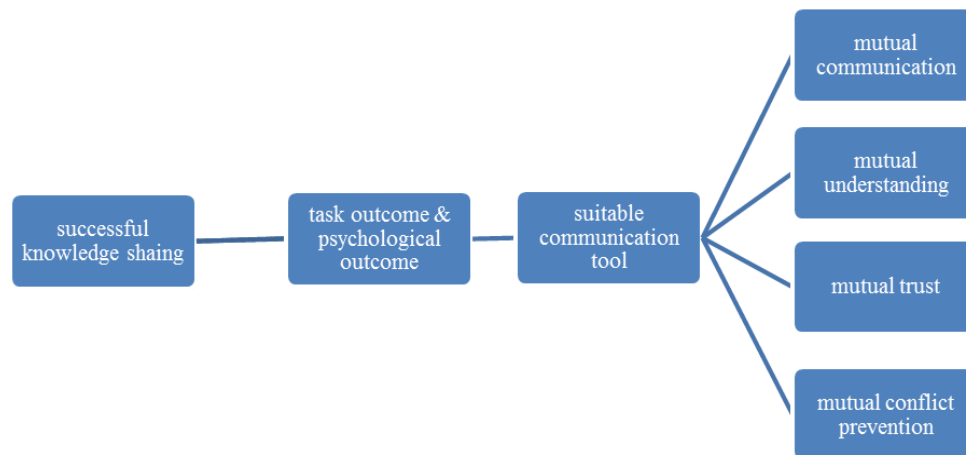

Figure 2: Interacting factors which shape a successful knowledge sharing task

Mutual Sub-Processes

Knowledge sharing in a virtual team starts with mutual communication and understanding and hopefully will bring mutual trust. Reviewing the literature it is apparent that there is an interaction between mutual understanding, mutual communication, mutual trust and mutual conflict resolution. However, there is disagreement in the cause effect relationship of them. For example, Wu *et al.,* (2006) believes knowledge sharing process starts with mutual communication and if it is handled properly it will result in mutual influence and mutual trust. According to Alavi and Tiwana (2002) mutual understanding will result to mutual trust and conflict prevention. Andress (2002) argues that mutual communication is related to mutual understanding and trust also can lead to mutual understanding if it is handled appropriately. Achrol (1991) and Hrebiniak (1974) argued that mutual trust ultimately can result to mutual commitment and conflict prevention.

Regardless of which one of the above said mutual sub-processes is cause and which one is the effect, the crucial point is that for a successful knowledge sharing task all of them are needed. For example, as Alavi and Tiwana (2002) indicated mutual understanding enhance team performance and as a result brings a better task outcome. Mutual understanding decrease ambiguities and equivocality, since ambiguities of task and roles will not result in conflict. Thus, a pleasant psychological outcome is materialized because of mutual trust and conflict prevention, Symon (1998).

Communication Tool

In this study the communication tool is considered as a tool which knowledge is transferred through which and passes spatial and temporal boundaries. Hendrik (1999) argued that the communication way has to be designed in a way that motivates a successful knowledge sharing by enhancing what is coined as mutual sub-processes in this study: mutual commitment, understanding and information accessibility. There are some considerations that have to be taken into account in designing a communication tool to reach the goal of successful knowledge sharing which will be discussed in following paragraphs.

According to Sole and Applegate (2000) in designing a communication tool occupational and contextual nature of knowledge of each member of virtual team has to be taken into account. The other issue is the situated nature of knowledge which is derived from specific social or contextual context will result in specific local point of view regarding expectations, ambiguity clarification and so on.

As matter in this case, individuals' expectation from technology use is affected by combination of local, role-related and organizational level influences. As an example for this ascertain is what is mentioned in

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Sole and Applegate article from Markus research on which showed that the usage pattern of early adaptors can substantially influence subsequent users' expectations and practices. The above issues could lead to misunderstanding, ambiguity and accordingly conflict.

Media richness and Social Presence

Media richness and social presence are two theories which are trying to bring mutual trust and understanding with preventing misunderstanding and conflict. Also in following paragraphs it will be argued that how higher quality of media richness and social presence cause high satisfaction with process and product.

The extent of social presence associated with a communication medium is a function of the amount of communication channels available to transmit rich information (Andress, 2002). Social presence at least is necessary in the sense of interaction with high quality and its consequently advantageous results. Verbal cues and facial expressions are two simple example of social presence. However, such simple examples will prevent not otherwise a language that could be considered as hostile, thus, conflict prevention could be made. Accordingly, a medium with high social presence is associated with high process satisfaction. Here, it is worthy to say that email is determined as one of weakest medium in sense of social presence. On the other hand, a medium with high social presence quality is attributed to high productivity (Andress, 2002). As a result, media richness is a contributor for product satisfaction.

The other concept is information richness which is derived from media richness. Information richness content was rated on the availability of immediate feedback, the number of verbal and non-verbal cues, and interpersonal interaction associated with a communication medium, (Andress, 2002). Of course having a rich media will increase the pace of decision making, since information is transferable faster. As a result, maybe not directly but at least indirectly, the productivity and the degree of satisfaction about how problems were solved will be higher. This way, it is one contributor for process satisfaction. On the other hand, since media richness is associated with information accessibility, thus, it is a contributor for motivation and knowledge integration.

CONCLUSION

Virtual teams are more and more used owing to the fact that people from distant locations can execute a work without considerable spatial or temporal problems (Wu *et al.,* 2006). Indeed, organizations are facing problems which always need more precise and tough solutions. This sometimes leads to inability of finding the best talent in close vicinity. Crossing national boundaries is always associated with complexities. For stance, members of a VT might never meet face-to-face; it creates some particular problems for communication or trust within them. In this study it is considered that it is the burden of communication tool to compensate VTs' shortcomings.

This paper, after a brief presentation of what a virtual team is and its specific philosophy of creation, tried to review the criteria that make a knowledge sharing task successful in order to create a model which will be beneficial within virtual teams. In this study, the authors reviewed the factors that lead to a successful task performance both in the sense of productivity and psychologically effects. Also, from the point that the ultimate aim from knowledge sharing is knowledge application, knowledge application also considered.

It is found that mutual communication, understanding, trust and conflict prevention leads to successful task and psychological outcome. The communication tool acts as a mediator between mutual sub-processes and outcomes and it indicates its significance. Communication tool should be designed in a way to enhance social presence and media richness with considering contextual nature of knowledge.

Future Research

One possible future research field could be concentrating on extra factors that ultimately shape a successful knowledge sharing behavior. Other example is studying how components of knowledge sharing behavior, especially the components that are allocated less attention, are influencing each other in the supportive or determining manner. Likewise, factors like motivation absorbed less attention. Thus, it is worthy to study such a factor to see how it is shape the way that knowledge will be shared.

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