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DOES GROUP COHESION MATTER TO DECISION QUALITY IN INFORMATION SYSTEMS DEVELOPMENT TEAMS?

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Abstract: *Newer information systems development approaches such as agile methods, which emphasize a sense-and-respond approach, increase the number of operating decisions made regularly within the development team. These methods are being used by an increasing number of organizations as a means of improving the agility of the development process. Development teams are required to make regular group decisions and team members work closely with each other to develop software in time-boxed iterations. However, the literature lacks a clear understanding about how the cohesion of the development teams impacts the decisions made under the time pressures imposed on teams by the agile methodology. There is a paucity of literature examining the impact team cohesion has on the decision-making quality of an agile process. This research-in-progress paper seeks to fill this void by examining the impact the group cohesiveness of decision-making teams have on the relationship between time pressure and decision quality during the software development process. By reviewing and analyzing the literature on group decision making, time pressure, group cohesion and decision quality we begin to develop a group decision-making model for better predicting decision quality based on time pressures and group cohesiveness.*

Keywords: *Decision Making, Group Cohesion, Time Pressure, Agile, Software Development, Group Decision Making*

1 INTRODUCTION

The groundwork for the study of decision making in operational environments was laid when Herbert Simon first advanced the idea that the psychology behind decision making was a fundamental aspect of organizational management (Simon 1959; Simon 1979). Since then, scholars have continuously sought to understand the contextual factors surrounding the decision-making process (Nunamaker, Dennis et al. 1991; Brodbeck, Kerschreiter et al. 2007; Weber and Morris 2010; Appelt, Milch et al. 2011). Driven by the understanding that decision making is a major factor for organizational success (Ireland and Miller 2004), numerous theories of decision making have been put forward which attempt to describe the conditions under which the optimum decision-making environment can be achieved. As information becomes more readily available and decision-making scenarios become increasingly complex.

One major stream of research on decision making focuses on the behavioural features and cognitive abilities of the decision makers. Making informed decisions involves the gathering of all pertinent information and the processing of that information to establish an output choice from a number of possibilities. While there have been major technological advances in group decision support systems (GDSS), the behavioural side of the decision making process lags behind the technology, with many reporting that decision makers often do not use the technology at their disposal (Kayande, De Bruyn et

al. 2009; Appelt, Milch et al. 2011). It is imperative that researchers continue to gain greater understanding of the human behavioural aspect of the decision-making process. Humans and software agents complement each other during the decision-making process; however, the technological advances made may be underutilized if the human characteristics of the decision-making process are not fully embraced (Grudin 2002; Nissen and Sengupta 2006).

This paper focused on the behaviour aspect of decision making, in particular, we examine group decision making, a key part of modern software development processes (Cockburn 2007). Much of the extant research within group decision making highlights the positive affects of GDSS on decision outcomes, such as improved group cohesion (Dennis and Wixom 2001; Dennis and Garfield 2003). However, the premise for this study is that GDSS, while valuable in their own right, are of secondary importance to the cohesion of the group itself. That is, group cohesion should be antecedent of GDSS use rather than an outcome. In this study we attempt to explain how group cohesiveness moderates the relationship between time pressure and group decision quality for software development teams.

2 GROUP DECISION-MAKING

There is a rich body of literature on group decision making within the field of IS. Much of this research revolves the use of GDSS. Research shows that groups using GDSS exchange 50% more information than groups that verbally communicate information, however they do not accurately process this information (Dennis 1996). One explanation for this is that the information in the GDSS was less salient than verbally contributed information. When examining why GDSS often do not provide superior results, researchers have sought to explore the influence of moderators on this relationship. Dennis and Wixom (Dennis and Wixom 2001) investigated five moderators (task, tool, the type of group, the size of the group and the facilitation) and found that each moderator had an impact, suggesting that more research is carried out in each area to further understand the seemingly conflicting or equivocal results. Dennis and Garfield (2003) find that using GDSS improves participation and cohesion of group members. However, they recognize that increased participation may have little real effect when those in power hold different opinions to the rest of the group. Strong leadership can also negate the benefits of using GDSS; therefore group cohesion becomes a more important variable in successful group outcomes. The study by Dennis and Garfield (2003) suggests that group cohesiveness increases over time with use of GDSS but, as noted by the authors, this is based only on the study of three teams using GDSS and three teams using traditional approaches to decision making. The finding that GDSS improves cohesion is likely because the cohesion of the GDSS teams in this study is lower at the project initiation than the traditional teams. The cohesion at the end of the project of GDSS teams, although improved, is still actually lower than the traditional teams. These findings along with others such as (Mudrack 1989; Seers, Petty et al. 1995; Campion, Papper et al. 1996; Jordan, Feild et al. 2002; Stenmark 2002; Topi, Valacich et al. 2002) suggest that group cohesiveness may be as important as the GDSS used by the group, yet as stated earlier, research in IS tends to focus on the technological aspects of group decision making such as GDSS use, rather than the behavioural aspects such as group cohesion.

While group cohesiveness is considered an *a priori* condition for agile teams (McAvoy and Butler 2009), there is little evidence suggesting how cohesiveness may impact team performance. Researchers have called for more studies to examine how team cohesiveness will affect decision quality of agile teams, particularly under conditions of time pressure (Drury, Conboy et al. 2012; Moe, Aurum et al. 2012).

2.1 Time Pressure Affects

The importance of perceived time pressure is evident from the attention it has received in a variety of business related disciplines such as marketing, accounting and management. There is a relative scarcity of time pressure studies in IS (Topi, Valacich et al. 2005) and more surprisingly, given the nature of software development, very few studies examine time pressure in development environments.

The ability to make quick decisions and take fast actions is usually seen to be beneficial to organizations operating in changing environments (Forbes 2005). Previous studies show that quick decision making helps individuals and groups improve information processing and coordination (Kerstholt 1994). Others highlight the economic benefit to rapid decision making (Baum and Wally 2003). However, rapid decision making has also been shown to have a negative affect on decision quality (Waller, Zellmer-Bruhn et al. 2002). The tendency to rely on past decision making strategies is greater when there is time pressure to make quick decisions (Perlow, Okhuysen et al. 2002). This can result in the same mistakes being made and learning being inhibited.

Decision speed or time pressure is also known to impact decision quality. As shown by Perlow (2002), decision speed helps some groups but hinders the performance of others. The impact of decision speed is not fully understood and there appears to be a trade-off between decision speed and high quality decision-making. Despite the importance of group decision making within organizations and the current trend towards speedy decisions, there is a paucity of literature examining the affects that both group cohesion and decisions speed have on the decision quality (El-Shinnawy and Vinze 1998).

2.2 Group Decision-Making under Time Pressure

Research shows that group characteristics and cohesion will have an important impact on decision quality, yet, as highlighted earlier, research tends to focus on technology aspects and task complexity rather than group characteristics (Appelt, Milch et al. 2011) and group decision-making is one of the under researched areas within both the general decision-making literature and the information system development (ISD) literature in particular. Much of the research that does focus on group decision-making is conducted in a laboratory setting. While this is valuable in its own right, there is an alarming lack of real world evidence and data that explores the phenomena. Laboratory work is great at developing and testing hypothesis, however as noted by several researchers, laboratory experiments are a poor substitute for real industrial evidence. Whether using students or paid participants, the circumstances of a laboratory experiment cannot be expected to capture all the nuances of an industrial study. Group decision-making research is seriously lacking in actual real world implementations and replications of experimental hypothesis.

Previous research also shows that group cohesiveness may be detrimental to the group decision-making process and therefore negatively impacting group decision-making outcomes. Theories such as groupthink suggest that group cohesiveness is counter-productive and is not conducive to optimum decision-making. However, there are a number of reasons to suggest that this may longer be the case. Research on group decision-making highlights the interplay between the task complexity, collaboration system usage, the decision making environment and group composition, noting the affects these constructs have on decision quality (Nunamaker, Dennis et al. 1991). Given the developments in technologies, decision support systems and collaboration tools, the decision making process has changed considerably over the past decade. Newer tools help improve the transparency of the decision-making process, therefore issues such as groupthink may no longer have the same negative impact they had when they were first introduced into the decision-making literature.

Organizational departments are increasingly becoming project based, using inter organizational cross functional groups. Many of these groups are made up of individuals from different areas of expertise and often haven't had time to develop a cohesive working relationship with other group members. As yet, the literature doesn't have an understanding of the impact of forming groups constituted with members from these different knowledge bases. The literature doesn't show if we should consider building cohesiveness in newly formed cross-functional groups, or if there are ways in which we can accelerate the process of cohesion building.

Given the gaps in the literature discussed above, this study seeks to explore the impact of group cohesion on decision quality under conditions of time pressure. To do this we will examine the impact of time pressure on decision quality and explore how group cohesiveness affects this relationship. Therefore the research question this study will answer is:

How does group cohesiveness impact the relationship between time pressure and group decision-making quality?

3 DECISION-MAKING IN ISD

Given the ambiguous nature of decision-making and infinite number of decision choices, it is important to firstly outline the boundaries of where this study will be applicable. We find that ISD is one area that is particularly suited to furthering our understanding of time pressure and group decision-making. ISD is long associated with group work and ISD projects are common in many organizations. Time pressure is also an important consideration in ISD projects and developing systems on time is a critical component of ISD success.

Indeed, modern ISD methods such as agile information systems develop (ASD) emphasize group decision-making under conditions of time pressure. In contrast to traditional software development teams, the agile team has decentralized and shared leadership, and team members work together to make important decisions throughout the development process (Moe, Aurum et al. 2012). While in a traditional development environment the project manager usually made the critical decisions within the team, in an agile team, decision-making is an interactive process involving many people. In ASD, teams use time slots (measured in minutes or hours) to make decisions about upcoming development tasks. Typically, in non-experimental conditions, positivist research does not have control over the time-scales allowed to make decisions. However, in an agile environment this is possible given the time-boxed iterations of the agile process. Teams in an agile environment operate within temporal structures during which they make decisions (Orlikowski and Yates 2002; Drury, Conboy et al. 2012). We can use these existing temporal structures as a measurement of the time to be used in this study.

4 THEORETICAL DEVELOPMENT

4.1 Time Pressure

In complex tasks, groups can become more concerned with reaching a consensus or reaching a decision quickly and less concerned with other goals such as decision quality or systematically evaluating alternatives or more creative decisions (Kelly and Loving 2004). Measuring time pressure and decision speed has received a lot of attention in both the management and management information systems literatures (Zaheer, Albert et al. 1999; Ancona, Goodman et al. 2001; Mitchell and James 2001; Arrow, Poole et al. 2004; Saunders and Ahuja 2006; Street and Ward 2012).

The widely accepted inverted-U-model (Chong, van Eerde et al. 2012) shows that superior performance can be associated with time pressure up to a certain level. At some point along the inverted-U, the time pressure results in inferior performance levels. However, much of the research on time pressure has focused on the affects of time pressure on individuals. The literature is not clear on how time pressure affects the performance of groups.

Chong et al. (Chong 2011) argue that most decisions are made under some form of time pressure but some time pressure can have either a positive or detrimental affect on decision quality. They introduce and validate the constructs of hindrance and challenging time pressure. Challenging time pressure is the degree to which a team perceives time pressure as a stressor that promotes goal achievement, while hindrance time pressure is the degree to which a team perceives time pressure as a stressor that constrains goal achievement. In their study of new product development groups, they found that challenging time pressure improves team performance while hindrance time pressure deteriorates performance. These relationships were mediated by group cohesion.

4.2 Group Cohesion

Many meta-analyses have been published on the cohesion–performance relationship (Evans and Dion 1991; Beal, Cohen et al. 2003). The general conclusion stemming from these quantitative studies is that the correlation is moderate, positive, and highly dependent on intragroup processes (Chicocchio and Essiembre 2009). However, a study by El-Shinnawy et al. (1998) found that group cohesion had no impact on the decision quality. Their study does not rule out the importance of group cohesion as they control for factors such as group size and history and call for future research to further examine the group cohesion construct. So while early work on group cohesion revealed no relationship between

group cohesion and group performance, recent work has found that there is, indeed, a relationship between group cohesion and task performance with members of established groups formulating varying levels of cohesion over time (Schwarz and Schwarz 2007). Others have used the group attitude scale (Evans and Dion 1991) to measure group cohesion and the results indicate a positive impact it has on group consensus (Yoo and Alavi 2001) and user satisfaction of group support system technology (Chidambaram 1996). Schwarz and Schwarz (2007) show that group cohesion predicts enjoyment and effectiveness but did not have an impact on the efficiency of the group. Efficiency was measured by the time it took to come to a decision. In an ISD environment, teams have a deadline in which to arrive at a decision. However, there is a scarcity of literature examining the impact of time pressure on decision quality and the moderating affect group cohesion has on this relationship.

4.3 Decision Quality

Three major indicators of decision quality are decision confidence (Schwarz and Schwarz 2007) decision consensus (Yoo and Alavi 2001; Cooper and Haines 2008), and decision satisfaction (Dennis 1996; McNamara, Dennis et al. 2008). Decision confidence relates to how the group view the choice they have made. It is often not be possible to measure the actual final outcome of that decision but measuring the decision confidence should provide a good indication about how positively the group feels about a decision. Decision consensus relates to how the group as a whole understood the reasons for the decision. High consensus will result in complete group buy in and represents high group participation in the decision making process. Decision satisfaction indicates how the group felt about the decision making process as a whole. A high degree of process satisfaction indicates that group members are happy with the entire decision making process. Based on this theoretical overview we developed our conceptual framework for this study (Figure 1.).

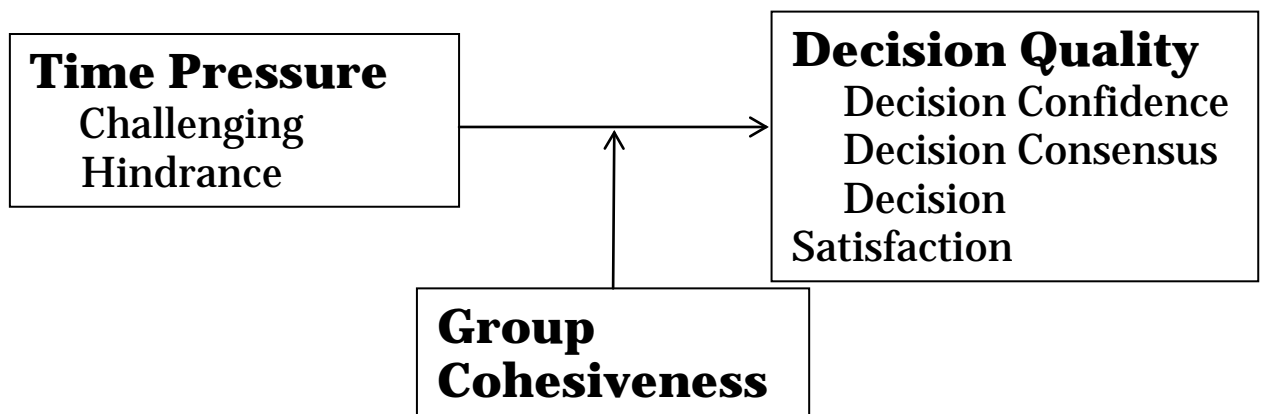


Figure 1 Conceptual Model

4.4 Hypothesis Development

Challenging time pressure is the degree to which a team perceives time pressure as a stressor which promotes goal achievement (Chong, Van Eerde et al. 2011). Insights from goal-setting theory (Locke and Latham 2002) show that challenging goals are a strong motivator and help a team focus its activities on achieving the goal they perceive are attainable. Other studies have shown that challenging time pressure is seen as a positive stressor and enhances team performance (Podsakoff, LePine et al. 2007; Chong, Van Eerde et al. 2011; Chong, van Eerde et al. 2012). Under conditions of challenging time pressure (i.e. a pressure that promotes goal achievement) we hypothesize that teams will work with each other to produce the required decision. Therefore we hypothesize the following: *Under conditions of challenging time pressure, decision quality is positively affected*

Hindrance time pressure is the degree to which a team perceives time pressure as a stressor which constrains goal achievement (Chong, Van Eerde et al. 2011). Once a team perceives that the goal is no longer achievable within the allocated time, motivation drops and performance suffers. Under conditions of hindrance time pressure (i.e. a pressure that constrains goal achievement) teams will tend to accept the choice of a single team member and polarize quickly around that choice to produce the

required decision (Cheng and Chiou 2008). Therefore the majority of the team members will not actively participate in the decision-making process and will be less confident of the decision-making quality. Bearing this in mind we hypothesize: *Under conditions of hindrance time pressure, decision quality is negatively affected*

Group cohesiveness is the extent to which a group is attracted to the group and to each other (Chidambaram 1996). When groups members have a strong attraction to their group they will place emphasis on shared group commitment to tasks and group membership (Beal, Cohen et al. 2003). This may indicate that, regardless of the time pressures placed on the group tasks, group members will share the commitment to group decisions and outcomes, regardless of the levels of participation in the decision-making process. We therefore hypothesize that: *High/low levels of group cohesion positively/negatively moderate the impact of time pressures on decision quality*

5 RESEARCH METHODOLOGY

This study is a quantitative study involving a large scale survey to determine the affects of group cohesion on decision quality under differing degrees of time pressure.

5.1 Measures

All items will be assessed using adapted measures from published works.

Hindrance and challenging time pressure will be measured using a scale from Chong et al. (2011).

Group cohesiveness is the extent to which a group is attracted to the group and to each other and will be measured based on a scale from Chidambaram (1996), El-Shinnawy and Vinze (El-Shinnawy and Vinze 1998), and Yoo and Alavi (Yoo and Alavi 2001).

Decision Confidence: The degree to which the individual is bound to the decisions made by the group and will be measured based on a scale from Schwarz and Schwarz (2007).

Decision Consensus: Group consensus regarding a decision reflects members' support for the decision and their willingness to follow it during subsequent task execution. Consensus indicates that members are in accord with the decision made, and can come from the fact that the decision adequately reflects members' views. We will measure consensus based on a scale from Cooper and Haines (2008).

Decision Satisfaction: The affective evaluation of the decision making process by the individual and will be measured based on a scale from Schwarz and Schwarz (2007).

We are currently piloting the survey instrument in three software development departments. Following on from this the survey will be distributed via the web to over 300 software development departments across Europe and the U.S.

6 CONTRIBUTION

We intend to make the following contributions. Firstly, we wish to further our understanding of the affects of time pressure on decision-making quality. Previous results show that time pressure and decision speed is often positively associated with decision quality. However, practitioners in particular, should note that in certain situations, time pressure will often have a detrimental affect on group decision-making quality. We will discuss both the positive and negative affects of time pressure on group decision-making quality.

Secondly, when examining group cohesion, previous research has used validated measurement instruments such as the strength deployment inventory (SDI) (El-Shinnawy and Vinze 1998) and the group attitude scale (Yoo and Alavi 2001). We adapt these instruments and use them in a time pressured, decision-making environment, exploring the affects of group cohesion on decision quality under conditions of rapid decision-making. To date, no other study has attempted this important step in developing our understanding of group decision making in rapidly changing environments. We will

offer advice on how group cohesion can aid in balancing the negative affects associated with rapid decision-making.

Thirdly, while prior ISD literature has not explicitly defined the optimum group cohesiveness required for ISD projects, we propose that team cohesiveness has an important affect on decision quality, particularly under conditions of rapid decision response time. We will discuss our findings and offer advice for the ISD field on group cohesiveness for ISD projects.

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