The effect of using group decision support systems in value management studies: An experimental study in Hong Kong

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Abstract

A group decision support system (GDSS) can be helpful to VM users overcome difficulties in value management (VM) workshops. A web-based GDSS known as interactive value management system (IVMS) is introduced in this paper. A comparative experimental study is undertaken to investigate the extent to which the use of IVMS can improve the performance of VM workshops by using a competing value approach (CVA). This study compares and contrasts the performance of a traditional VM workshop with an IVMS-supported VM workshop in three aspects: (1) process measures, (2) outcome measures, and (3) participants’ satisfaction. The process measures indicate that IVMS is helpful in improving the efficiency, information reliability and supportability of decision and participation process, while the outcome measures show groups supported by IVMS perform better in ideas generations. The results also indicate that the use of GDSS results in increasing participant satisfaction.

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Keywords: Value management (VM); Group decision support system (GDSS); Competing value approach (CVA)

1. Introduction

Value management (VM) is a structured and analytical process that seeks to achieve value for money by providing all necessary functions at the lowest cost consistent with required levels of quality and performance (AS/NZS, 1994). VM, which has been widely used in many developed countries for several decades, is a useful tool that can help the industry to meet these challenges. However, reluctance to use VM often stems from the time that an expensive team has to be employed to undertake the VM process (Shen and Chung, 2002). It would therefore be helpful to find a way that can make the process more efficient and effective to make the cost of undertaking VM decrease. VM faces more difficulties when employer–employee and superior–subordinate are in the same team, due to member dominance and conformance pressure (Shen et al., 2004), as shown in Table 1.

A group decision support system (GDSS) or group support system (GSS) combines communication, computer and decision support technologies to facilitate the formulation and solution of unstructured problems by a group of people (DeSanctis and Gallupe, 1987). For almost 20 years, researchers have been studying the effectiveness and efficiency of GDSS that support synchronous and asynchronous teams working in both field and laboratory settings. Many research studies have demonstrated that it is successful in improving the efficiency, reliability and quality of the group decision-making process (Dennis et al., 1990; Greenberg, 1991; Nunamaker et al., 1996; Adkins et al., 2002), but on the whole the findings related to the effectiveness of GDSS have been relatively inconsistent (Benbasat and Lim, 1993; Dennis and Gallupe, 1993; Fjermestad and Hiltz, 1999). However, although inconsistent results do indeed relate to variations in the experimental settings and methodology adopted in experimental studies, the common findings of a number of field studies have proved the
effectiveness of GDSS in practice. These field studies have consistently shown positive results, and many “real world”
users are satisfied with GDSS applications. These findings
demonstrate the effectiveness of GDSS in supporting the
group decision-making process (e.g., Dennis and Gallupe,
1993; Chun and Park, 1998).
Since the above research findings show that GDSS has
the potential to improve the group decision-making pro-
cess, GDSS was proposed to overcome the above problems
in VM workshops. A series of studies have already been
conducted to investigate the effectiveness of using GDSS
in VM workshops (Fan and Shen, 2004; Shen and Fan,
2005; Shen et al., 2006; Fan et al., 2006, 2007). During
the above studies, comparative experimental studies were
taken as the main research method. Workshops conducted
in traditional ways have been compared with workshops
with GDSS support in several aspects (i.e., the decision
quality, the quantity of ideas, and the perceived satisfac-
tion). The results of these experimental studies show that
GDSS is a useful tool in facilitating information exchange
process, encouraging interaction, and promoting active
participation in VM workshops. However, these findings
were only based on the assessment of outcomes, and pro-
cess effectiveness was overlooked. Now the question is
how to evaluate the performance of GDSS in VM work-
shops comprehensively. Researchers have different view-
points on what is or how a performance factor should be
measured. Following the approach of Draizin and Van de
Ven (1985), Benbasat and Lim (1993), and Dennis and
Kinney (1998), Dennis and Wixom (2002) defined perfor-
mance in terms of three major factors: (1) effectiveness as
defined by decision quality or number of ideas generated;
(2) efficiency as defined by the time to complete the task,
and (3) participants’ satisfaction. This paper further revised
this framework by integrating with a competing values
approach (CVA) which is mainly used to measure the pro-
cess performance. After the introduction of the frame-
work, this paper turns to describe the design and process
of the experimental study. Finally, the results of this exper-
iment are presented and discussed.

2. Evaluating performance

In the three factors (efficiency, effectiveness and partici-
pants’ satisfaction), efficiency falls into process, and effec-
tiveness falls into outcomes correspondingly. Likewise,
Fjermestad and Hiltz (1999) after reviewing approximately
200 published papers on GDSS found that among the out-
come factors, group effectiveness and participants’ satisfac-
tion were the two factors most studied. Group effectiveness
was measured in terms of decision quality and creativity,
while participants’ satisfaction included process satisfac-
tion, decision satisfaction and general satisfaction (Fjer-
 mestad and Hiltz, 1999; Paul et al., 2004). Whereas no
one conception of performance is perfect, the above three
factors comprising group effectiveness (outcomes), group
efficiency (process) and participants’ satisfaction can be
considered as a reasonable set of factors to triangulate on
the performance construct (Dennis and Wixom, 2002).
The outcomes can be measured by the quantity of ideas,
the quality of decisions, and the satisfaction is usually mea-
sured through a questionnaire survey, while evaluating the
effectiveness of the decision process is problematic.

2.1. Evaluating the performance of the group decision
process: the competing values approach

Normally, the effectiveness of the decision process will
be measured by the outcomes. However, it is quite possible
for a most unreasonable method of information integration
to be linked over time with coincidence, while in another
instance for a most reasonable method of collective choice
subsequently to fall far wide of the mark (McCartt and
Rohrbaugh, 1989). Also, on many occasions, the decision
process of a group, unlike the decision itself (made as a

### Table 1

Problems of VM implementation in Hong Kong’s construction industry (Shen et al., 2004).

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<tr>
<th>Problems</th>
<th>Reasons</th>
<th>Impacts</th>
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| Lack of information                                | • Poorly organized project information in the pre-study stage
                                                       • Difficulty of retrieving project information in meetings | Increases "uncertainty" in the outputs of VM studies                      |
| Lack of participation and interaction              | • Shy about speaking in public
                                                       • Pressure to conform
                                                       • Dominated by a few individuals
                                                       • Poor team spirit | Member’s contributions are reduced                                      |
| Difficulty in conducting evaluation and analysis   | • Insufficient time to compare analysis                                    | Members have difficulty in responding to the “what if” question in meetings |
|                                                    | • Insufficient information to support analysis                             |                                                                         |