Marketing Management Support Systems: When Help is not Recognized

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Abstract

Marketing Management Support Systems (MMSS) are designed to improve managerial decision making, but to be able to do so these systems have to be used in practice. Perceived usefulness is an important driver of MMSS use intentions. Prior research suggests that decision makers may have difficulty recognizing objective improvements in task performance due to the MMSS. This lack of connection between subjective evaluation and objective performance may hamper MMSS adoption and use.

In a large-scale study with prospective users, we investigate the drivers of perceived usefulness and the conditions under which the "lack of connection" phenomenon is likely to occur. To test our hypotheses, we set up a 2 (prior task experience) x 4 (MMSS quality) between-subject experiment with repeated measures. This study should lead to recommendations for interventions that result in greater acceptance and utilization of MMSS.

Keywords: Marketing Management Support Systems; Subjective Evaluations; Objective Performance

Preferred Tracks: Marketing Research and Research Methodology; New Technologies and E-Marketing

1. Introduction

Marketing Management Support Systems (MMSS)[1] are designed to improve managerial decision making. To realize such improvements, it is necessary that MMSS are being used in the decision-making process. Some authors argue that the use of MMSS in practice remains below potential (Lilien and Rangaswamy 2008), even though the situation has clearly improved since the early days of decision support systems when Little (1970) made the remark that "the big problem with marketing science models is, that managers practically never use them" (p. B466). The Technology Acceptance Model (TAM; Davis, Bagozzi, Warshaw, 1989) conceptualizes perceived usefulness as an important driver of MMSS use intentions. Prior research, however, suggests that decision makers sometimes have difficulty recognizing (or acknowledging) the improvements in decision quality as a result of support system usage (Lilien, Van Bruggen, Rangaswamy and Starke 2004; Van Bruggen, Wierenga and Smidts 1996). This may hamper the adoption and use of MMSSs.

The objectives of the present study are (1) to investigate the drivers of the perceived usefulness of MMSSs, and (2) to examine the conditions under which the help that MMSSs provide is most likely to be recognized. A more in-depth understanding of the drivers of perceived usefulness, including the mediators and moderators of its relationship with the objective quality of an MMSS, should lead to recommendations for interventions that result in greater acceptance and utilization of MMSSs in practice. In this paper, we propose a conceptual framework and propose an experimental study to test our hypotheses.

2. Conceptual Framework and Hypotheses

User evaluations of MMSSs, such as perceived usefulness, play a central role in the well-known models of Information System (IS) Success (DeLone and McLean, 1992; 2003) and Technology Acceptance (Davis, Bagozzi, Warshaw, 1989). User evaluations can be defined as elicited beliefs or attitudes regarding the use of MMSSs (Goodhue, 1995). Davis (1989, p. 320) defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived usefulness has been found to be the most important driver of the intention to use a support system in various business contexts (see, for example, Adams, Nelson and Todd, 1992; King and He, 2006; Segars and Grover, 1993). Besides the role user evaluations play in theoretical models, they are also practical in field settings as they are relatively easy to collect (Goodhue, Klein, and March, 2000; O'Keefe, 1989), which is especially important when MMSS performance needs to be monitored on a continuous basis. Although subjective evaluation measures are commonly used in research and practice, it remains to be seen whether, and under which conditions, they are acceptable indicators of objective MMSS quality and performance.

The existence of a positive connection between user evaluations and objective MSS quality and decision-making performance is conditional on the decision maker's ability to recognize the quality of the decision and to attribute (part of) that quality to the impact of the MMSS (Goodhue, 1995). Research has shown, however, that human judgment is subject to numerous biases (e.g., Tversky and Kahneman, 1974) and that decision makers may erroneously discount the contribution of an MSS to the quality of their decision (Davis and Kotteman, 1994; Fildes, Goodwin, and Lawrence, 2006). Without accurate and timely

[1] We use the term "(marketing) management support system" to denote any device combining (1) information technology, (2) analytical capabilities, (3) (marketing) data, and (4) (marketing) knowledge, made available to support one or more managers in their decision-making activities (adapted from Wierenga and Van Bruggen, 2000).

performance feedback from the market (as is the case for most marketing mix decisions), the decision maker's understanding of what constitutes a good decision and what exactly contributed to the quality of the decision is limited (Einhorn and Hogarth, 1978; Tversky and Kahneman, 1986). A few MMSS studies that measured both user perceptions and objective performance suggest that the link between the two indeed may be weak or even non-existent (e.g., Lilien et al, 2004; Van Bruggen, Smidts, and Wierenga, 1996).

Conceptual Framework. Our framework of the drivers of MMSS support recognition is depicted in Figure 1. The ultimate dependent variable in the framework is the Perceived Usefulness of the MMSS. Ideally, the perceived usefulness of the MMSS should reflect the intrinsic or objective quality of the MMSS (as indicated by the dashed line). However, we have argued that this is not always evident. Consistent with the TAM, Perceived Ease of Use of the MMSS might also have an impact on usefulness perceptions, but our main focus will be on the hypothesized lack of connection between objective and subjective performance, i.e., Objective versus Perceived Decision Quality and Process Efficiency, which mediates the direct impact of MMSS Quality on Perceived Usefulness. We identify a number of potential moderators of the relationship between MMSS Quality and Perceived Usefulness, such as Prior Task Experience and MMSS Use Intensity. In this paper, we limit ourselves to a discussion of the main hypotheses.

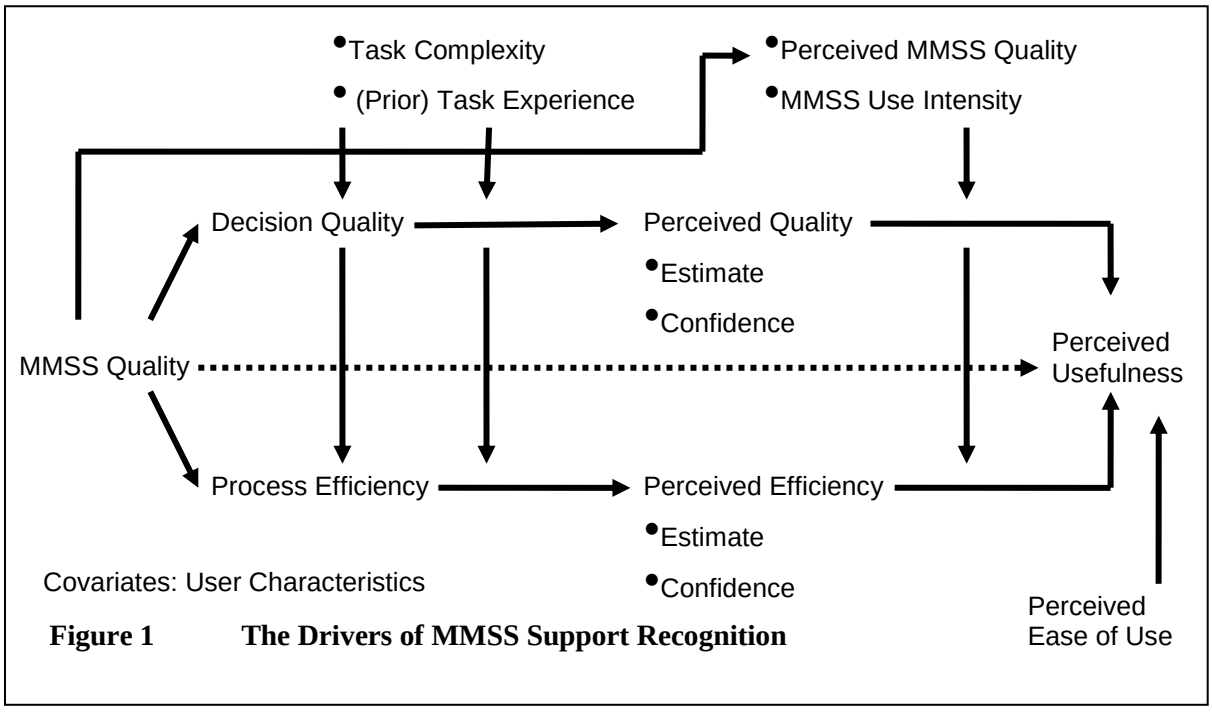

Figure 1 The Drivers of MMSS Support Recognition

Drivers of Perceived Usefulness. We propose that in order to be perceived as useful an MMSS should (1) improve decision-making quality and/ or efficiency, (2) decision makers should perceive this improvement, and (3) they should have confidence in the accuracy of their judgment. Following the work of Payne, Bettman and Johnson (1993), we assume that decision makers may trade off making accurate, high quality decisions against the effort it takes to realize such accuracy. Decision makers will find it often easier to assess efficiency gains (i.e., reduced cognitive effort or time saved) than to assess improvements in decision quality (Lilien et al. 2004). Efficiency gains are usually also more immediately observable than gains in decision quality. This may explain why decision makers use systems mainly to save cognitive effort and do not necessarily recognize the usefulness of MMSS for improving

decision *quality*, even though MMSS are often primarily intended to do so. Based on the previous discussion, we hypothesize the following.

H1 The relationship between subjective evaluation and objective performance of MMSSs is stronger when (1) the objective quality of the MMSS is higher, (2) process efficiency is considered rather than decision quality, and (3) decision makers have more confidence in their judgments.

Potential Moderators. The expected discrepancy between the actual and the perceived quality of decisions (cf. Mitra and Golder 2006) and, to a lesser extent, between the actual and the perceived efficiency of the decision-making process will hamper the adoption and use of MMSS in practice. We expect this gap to become larger when the complexity of the task increases and when decision makers lack experience in solving similar tasks. First, higher task complexity will increase uncertainty, which makes it more difficult for decision makers to assess the objective outcomes of MMSS use, and the quality of the decision in particular. Second, less experienced decision makers will have more difficulty assessing the objective quality of their decisions and the efficiency of the decision-making process, which will also weaken the relationship between the objective and the perceived outcomes.

We expect the relationship between the perceived outcomes of MMSS use and its perceived usefulness to be moderated by two variables. First, if the intrinsic quality of the MMSS is perceived as high, higher perceived decision quality will to a larger extent be attributed to the MMSS, which will strengthen the link between perceived decision quality and perceived usefulness. Perceived MMSS quality will have a similar, but probably weaker moderating effect on the relationship between perceived efficiency and perceived usefulness. Second, if decision makers use the system more intensively, they will have a more accurate idea of its potential to increase decision quality and again, to a lesser extent, efficiency.

H2 The relationship between subjective evaluations and objective performance of MMSSs is weakened by (1) perceived task complexity, and strengthened by (2) prior task experience, (3) perceived MMSS quality, and (4) MMSS use intensity.

3. Methodology

The empirical study to test the hypotheses can be described as a 2 (Prior Task Experience (without MMSS): low versus high) x 4 (MMSS quality: optimistic, realistic, pessimistic, no MMSS) between-subjects experiment with repeated measures, representing a single within-subjects factor (Task Experience (with and without the availability of the MMSS)).

3.1 Task and available support

Participants are asked to assume the role of a consultant for a charitable organization. The organization aims to improve their net margins (i.e., donation amount minus solicitation costs) and reduce the fundraising ratio (i.e., the cost-benefit ratio of soliciting potential donors). Decisions have to be made as to whom to solicit and how many times. The organization's database of potential donors (400,000) has been segmented based on the individual's past donation behavior, i.e., the amount and recency of donations. This resulted in the following six segments: *Active Top* (≥ 100 EUR past year), *Active* (< 100 EUR past year), *New* (made their first donation past year), *Warm* (last donation less than 2 years ago, but no donation past year), *Cold* (last donation less than 3 years ago, but no donation in past two years), *Lost* (have made a donation, but no activity has been recorded for past 3 years).

The costs of soliciting a potential donor, by mail, are fixed and are equal across segments. Participants are told that soliciting donors with a low potential can be expensive and unprofitable and that it is profitable to solicit the most recent and generous donors regularly. The organization's current fundraising strategy is as follows:

- **Active Top**, **Active** and **New** donors receive 6 solicitations per period (once a month);
- **Warm** donors receive 3 solicitations per period (one mail every other month);
- **Cold** donors receive 2 solicitations per period (four mails a year);
- **Lost** donors are abandoned, they are not solicited anymore.

This strategy has been applied quite successfully. The consultant has the financial results of the organization's current solicitation strategy at his or her disposal for the past three years, including the total donation amount, total mailing costs, total net margin, and the fundraising ratio. Results are also available for the average individual per segment.

The MMSS analyzes the donors' past behaviour in more depth. Not only their last donation, but their entire history is taken into account: when they donated, how much they donated each time, and with which frequency. Socio-demographic variables are also included to get a more precise estimate of the likelihood to donate. The MMSS allows the decision maker to run simulations to determine the financial impact (donation amount, costs, net margin) of alternative solicitation strategies. The MMSS also gives a recommendation as to the best solicitation strategy given the donors' past behavior.

3.2 Experimental manipulations

The MMSS outcomes and recommendations concern *predictions* based on the model that is estimated using past donation behavior and the donors' socio-demographics. What we manipulate is the quality of the MMSS. The optimistic MMSSs consistently overestimates the results of the simulated solicitation strategies, whereas the pessimistic MMSS consistently underestimates the results. The realistic MMSS perfectly predicts the results of the simulated solicitation strategies. A no-MMSS control condition is added to be able to tease out system effects and learning effects. Thus, the between-subjects factor MMSS Quality entails four conditions: optimistic, realistic, pessimistic, and no MMSS. Prior Task Experience is manipulated between subjects by varying the number of "training" periods in the first round when no MMSS is available, i.e., participants either go through two or six decision periods before the MMSS is introduced. As for our within-subjects factor, i.e., task experience, the first round consists thus of either two or six periods, whereas the second and third round both involve four decision periods. The experimental design is depicted in Table 1.

Table 1 Experimental Design

Round 1 (2 or 6 periods) (without MMSS)	Measures 1	Round 2 (4 periods) (with MMSS)	Measures 2	Round 3 (4 periods) (with MMSS)	Measures 3
Low Prior Task Experience		MMSS optimistic		MMSS optimistic	
Low Prior Task Experience		MMSS realistic		MMSS realistic	
Low Prior Task Experience		MMSS pessimistic		MMSS pessimistic	
Low Prior Task Experience		No MMSS		No MMSS	
High Prior Task Experience		MMSS optimistic		MMSS optimistic	
High Prior Task Experience		MMSS realistic		MMSS realistic	
High Prior Task Experience		MMSS pessimistic		MMSS pessimistic	
High Prior Task Experience		No MMSS		No MMSS	

3.3 Participants and procedure

The participants are MBA students of four sections of a core course on Marketing Management at a major business school in France (about 150 students in total). The course content comprises lectures and assignments on the use of analytics and decision support tools

in marketing. The experimental task is part of the course requirements and constitutes 10% of the final course grade. The students' grade for the task will be based on their performance within the experimental conditions. The task will be performed during a 1-hour session in the school's computer lab under supervision of the experimenter and the teachers of the different course sections. The participants will be debriefed after the experiment and will have the opportunity to provide qualitative feedback in a 15-minute class discussion.

In the lab, participants are randomly assigned to one of the four experimental conditions as soon as they click on the link to the online study. Before performing the task, the participants are asked to provide some personal information, i.e., gender, age, year of education, and their area of specialization. Next, they are given a description of the task and go through a tutorial that explains the available information and demonstrates how to submit a solicitation strategy. The task consists of three decision-making rounds (see Table 1). Each round comprises a number of consecutive periods in which decisions have to be made as to which potential donors to solicit and how often in a six-month period. After each decision round, the financial results over the whole round are displayed, with green number denoting an improvement over the previous round and red numbers denoting a deterioration (the result are displayed in absolute numbers as well as percentages). Subjective evaluation measures are administered before showing the participants their overall financial results.

3.4 Measures

Following the conceptual framework, our measures concern a mix of objective performance indicators and subjective evaluations. Where possible, we use existing scales for the subjective evaluation measures from which we selected between two and four items per construct to reduce the length of the survey. We also include two marker variables to be able to correct for common method bias. We briefly summarize the two sets of measures next.

Objective Performance Measures. Objective Decision Quality is operationalized as the realized net profit for the decision period that immediately precedes the survey containing the subjective evaluation measures and as the average net profit across all decision periods in a round. Similarly, *Objective Process Efficiency* is defined as the time needed before making a decision in the period that immediately precedes the survey containing the subjective evaluation measures and as the average time needed to make decisions across all periods in a round, which is registered by a timer included in the study. *MMSS Usage Intensity* is measured as the number of simulations that are conducted by the participants before making a decision, which are recorded by a counter included in the study.

Subjective Evaluation Measures. Before the financial results are displayed after each round of decisions, the participants have to complete a short survey including the following measures: *Perceived Decision Quality* (2 items), *Perceived Decision Quality Confidence* (2 items), *Perceived Decision Efficiency* (2 items), *Perceived Decision Efficiency Confidence* (2 items), *Perceived Usefulness* of the MMSS (4 items, see Davis 1989), *Perceived Ease of Use* (3 items, see Davis 1989), and *Perceived MMSS Quality* (3 items). The measures related to the MMSS are only measured in rounds 2 and 3. At the end of the experiment, participants are asked to indicate their future *Use Intentions* (2 items), their *Willingness to Pay* for the MMSS (single item), how much they enjoyed performing the task (*Intrinsic Motivation*, 2 items), how much effort they spent on the task (2 items), and how complex they found the task (*Task Complexity*, 2 items).

4. Concluding Remarks

A pilot study with 48 MBA students has been conducted in June and resulted in a number of improvements in the study design. The data for the main study, as described in the present paper, are collected in November and the results will be presented at the conference.

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