CHAPTER FIVE

The Influence of the Quality of the Marketing Decision Support System

5.1 INTRODUCTION

In Chapter Four we studied the effects of the availability of a high-quality MDSS. We found that the availability (and use) of such an MDSS increases the market share of a marketing decision-maker. It may be expected, however, that the effects, as reported in Chapter Four, are dependent on the characteristics of the specific MDSS used. One important characteristic of an MDSS is the quality of its simulation models. The quality of the simulation models in the high-quality MDSS as used in Chapter Four was very good (see Chapter Three). In real-world situations, MDSS will differ with respect to the quality of these models. We may expect, on the whole, that the quality of the simulation models in the MDSS will not be as good as the ones in the high-quality MDSS. Therefore, in this chapter we study whether and how an MDSS, in which the quality of the simulation models is not as good as in the high-quality MDSS, also increases the performance of marketing decision-makers. This probably gives a more realistic picture of the benefits of MDSS in real-life situations.

For this purpose, we study the effects of the QLMD-variable, which has three levels, i.e. no MDSS at all, a medium-quality MDSS and a high-quality MDSS. This way we investigate which differences exist between the results of a high-quality MDSS and a medium-quality MDSS, but also whether the availability of a medium-quality MDSS still increases the effectiveness of marketing decision-makers when compared with the situation where no MDSS is used at all.

As described in Chapter Three, the two types of MDSS differ with respect to the quality of their forecasts. The high-quality MDSS produces forecasts with a mean absolute prediction error (MAPE) of 3 percent while the medium-quality MDSS has a MAPE of 23 percent. The effects of QLMD are studied with respect to the same five dependent variables as investigated in Chapter Four: market share (SHARE), decision-making time (DMTIME), number of simulations made with the MDSS (SIMUL), decision-confidence (CONFIDENCE), and perceived usefulness of the MDSS (USEFUL). These variables are studied for the six experimental groups as described in the second experimental design (Table 3-3).

Furthermore, we investigate whether the effects of the quality of the MDSS differ for the different values of the intervening variables i.e. field dependence (FIDE), attitude towards MDSS-in-general (ATTI) and time-

pressure (TIPR). This is why we also investigate the interaction effects between these intervening variables and QLMD. To study whether the effects of the quality of the MDSS change over the four periods the effect of the number of periods played (PERI) is also analysed.

Only inexperienced subjects participated in this part of the research. The main reason for this was that recruiting experienced marketing decision-makers would have been very time-consuming. In Chapter Four we did not find first-order interaction effects between the availability of the MDSS and marketing decision-making experience; therefore, we do not expect the direction of the QLMD-effects to differ for experienced subjects when compared to inexperienced subjects. For this reason, the lack of a group of experienced subjects is not considered to be a serious threat to the internal validity.

In this chapter the results of the decision-makers using the medium-quality MDSS are compared with the results of inexperienced decision-makers using the high-quality MDSS and with the results of inexperienced subjects not using an MDSS at all. These last two groups consist of subjects which were also used in the analyses in the previous chapter. For these two groups the same data, as analysed in Chapter Four, are analysed in this chapter.

The organization of this chapter is as follows. In § 5.2 the market share effects of QLMD are analysed. In § 5.3 decision-making time effects of QLMD are analysed. In § 5.4 we study which way QLMD influences the number of simulations made with it. In § 5.5 the influence of QLMD on decision-confidence and the perceived usefulness of the MDSS are studied. Finally, in § 5.6, we summarize the most important findings.

5.2 EFFECTS ON MARKET SHARE

In this section we study the relationship between QLMD and SHARE, and in which way this relationship is dependent on the field dependence (FIDE) and the degree of time-pressure (TIPR). In Table 5-1 the mean market shares of the six experimental groups are presented. In Table 5-2 the results of the ANCOVA are presented.

Table 5-1 *Mean Market Share (in percentages) for the six experimental groups in the four periods (each group: n=20), standard deviations in parentheses*

		Time-Pressure	
		Low	High
	NO MMSS	GROUP 1 1. 17.42 (2.28) 2. 17.49 (3.76) 3. 19.30 (5.61) 4. 21.70 (6.83)	GROUP 2 1. 17.15 (1.99) 2. 16.54 (3.07) 3. 17.65 (4.48) 4. 20.30 (4.84)
Marketing Management Support System	MDSS medium-quality	GROUP 3 1. 21.73 (4.24) 2. 19.69 (5.91) 3. 20.98 (6.98) 4. 22.84 (6.23)	GROUP 4 1. 20.19 (4.47) 2. 19.05 (5.65) 3. 20.14 (6.73) 4. 22.25 (6.60)
	MDSS high-quality	GROUP 5 1. 24.69 (3.29) 2. 25.40 (5.60) 3. 25.62 (6.93) 4. 28.13 (7.45)	GROUP 6 1. 21.42 (3.90) 2. 19.35 (5.36) 3. 21.10 (6.31) 4. 24.56 (7.81)

Table 5-2 *ANCOVA-statistics[21] for the analysis of Market Share (F-statistic, significance of F-statistic) (n=120, four periods)*

	Main Effect
FACTOR	
QLMD	14.31 (0.000)
FIDE	4.40 (0.038)
TIPR	7.49 (0.007)
PERI	9.34 (0.000)

The results in Table 5-1 and Table 5-2 show a significant difference in SHARE between the three levels of QLMD *(F=14.31, p=0.000)*. Separate comparison tests show that marketing decision-makers using the high-quality MDSS outperform decision-makers using the medium-quality MDSS *(F=7.48, p=0.008*[22]*)* while decision-makers using the medium-quality MDSS still outperform the decision-makers not using an MDSS at all *(F=5.54, p=0.021)* (see Figure 5-1).

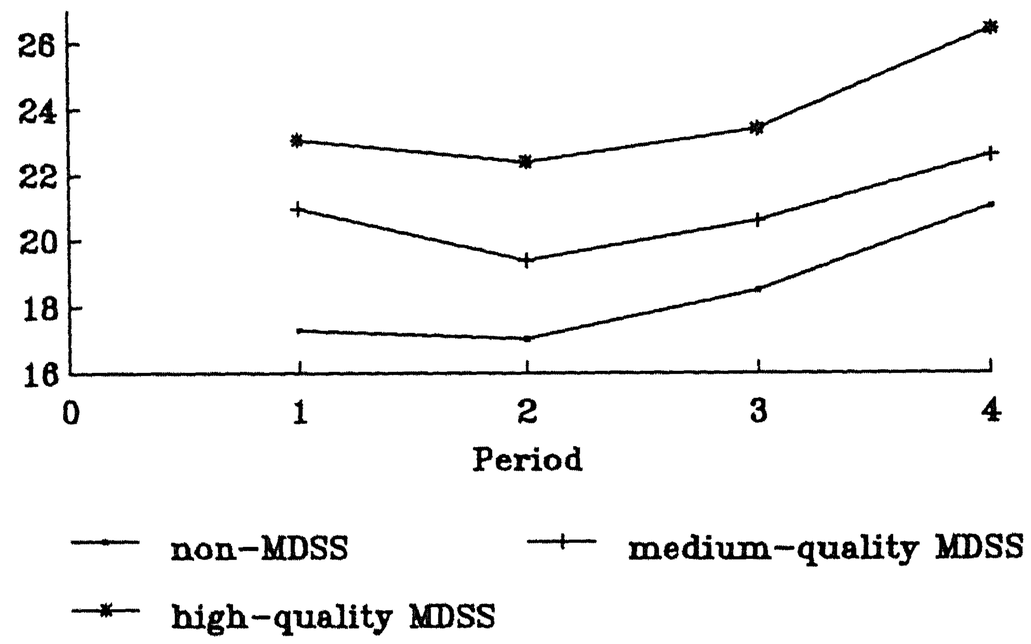

Figure 5-1 SHARE for subjects not using an MDSS (n=40), subjects using the medium-quality MDSS (n=40) and subjects using the high-quality MDSS (n=40)

The mean difference between the decision-makers using the high-quality MDSS and the decision-makers using the medium-quality MDSS is 2.42 percentage points, while this mean difference is 2.92 percentage points between the group of decision-makers using the medium-quality MDSS and the group of decision-makers not using any MDSS at all. This means that even the availability of an MDSS that does not make perfect forecasts

---

[22] Since the QLMD factor has three levels we can make three between group comparisons. The *Bonferroni Inequality* (Stevens, 1986) states that if k hypotheses, are tested separately with type I error rates of

$\alpha_1, \alpha_2, \ldots \alpha_k$, then

Overall $\alpha \leq \alpha_1 + \alpha_2 + \ldots\ldots + \alpha_k$

where overall α is the probability of one or more type I errors (false rejections) when all the hypotheses are true. Therefore, if 3 comparisons are tested at $\alpha = 0.03$ each, then the probability of one or more spurious results can be no greater than 0.09 for the *set* of 3 tests.
From here onwards, for the interpretation of the p-values of the separate comparisons, more conservative critical values will thus be used ((overall α)/k).

increases the performance of marketing decision-makers. Furthermore, it means that improving the quality of the simulation model can be profitable.

As in Chapter Four, we find the mean value of SHARE to vary over the four periods *(F=9.34, p=0.000)*. No difference exists, however, in this effect between the three levels of QLMD (as was described in § 4.6, the variation in the overall mean SHARE-score is caused by the model underlying the MARK-STRAT program).

Next, we examine whether the QLMD-effect differs between analytical and non-analytical decision-makers. Overall, like in Chapter Four, we find analytical decision-makers perform better than non-analytical decision-makers *(F=4.40, p=0.038)*. We find that the differences between the three levels of QLMD do not differ between analytical and non-analytical decision-makers, that is: no significant interaction effect between QLMD and FIDE shows up.

Finally, we examine whether the QLMD-effect differs between low time-pressure and high time-pressure conditions. Overall, like in Chapter Four, we find marketing decision-makers perform worse when working under high time-pressure, compared to working under low time-pressure *(F=7.49, p=0.007)*. No significant interaction effect between QLMD and TIPR shows up. This means that the QLMD-effect does not differ for the two different time-pressure conditions.

Summary of Findings

The amount of the increase in market share due to the availability of an MDSS is dependent on the quality of the MDSS. Users of the high-quality MDSS outperform the users of the medium-quality MDSS, while the users of the medium-quality MDSS outperform the unaided decision-makers. The difference between the three levels of decision support is neither dependent on the analytical capabilities of the decision-makers nor on the amount of time-pressure they are working under.

5.3 EFFECTS ON DECISION-MAKING TIME

In Chapter Four we found the availability of the high-quality MDSS to cause more decision-making time. In this section we examine whether the quality of the MDSS influences the extra amount of decision-making time used to make a decision and, if so, under which conditions. We study

whether the magnitude of the effect of the quality of the MDSS on DMTIME is dependent on the values of FIDE.

Only the decision-making time of the groups working under low time-pressure was studied (for reasons, see § 4.3)

In Table 5-3 the mean number of minutes (DMTIME) used by the three experimental groups, working under low time-pressure, are presented. In Table 5-4 the results of the ANCOVA are presented.

Table 5-3 *Mean Decision-Making Time (in minutes) for the three experimental groups working under low time-pressure, in the four periods (each group: n=20), standard deviations in parentheses*

	NO MMSS	GROUP 1 1. 38.55 (2.62) 2. 22.13 (2.60) 3. 20.15 (2.73) 4. 17.57 (4.33)
Marketing Management Support System	MDSS medium-quality	GROUP 3 1. 38.99 (1.68) 2. 23.99 (1.79) 3. 22.67 (2.25) 4. 21.02 (3.24)
	MDSS high-quality	GROUP 5 1. 39.42 (1.18) 2. 24.47 (1.08) 3. 23.47 (1.95) 4. 22.87 (3.25)

Table 5-4 *ANCOVA-statistics for the analysis of Decision-Making Time (F-statistic, significance of F-statistic) (n=60, four periods)*

	Main Effect
FACTOR	
QLMD	13.49 (0.000)
FIDE	1.30 (0.259)
PERI	221.66 (0.000)

The results in Table 5-3 and Table 5-4 (see Figure 5-2) make it clear that the amount of decision-making time does significantly differ for the three levels of QLMD *(F=13.49, p=0.000)*. Furthermore, we find this difference to vary over the four periods *(F=4.27, p=0.002)*. Overall, a decrease in the

amount of decision-making time over the four periods shows up *(F=221.66, p=0.000)*.

In Chapter Four, a difference in DMTIME between decision-makers using the high-quality MDSS and unaided decision-makers was reported. Here also a difference shows up between decision-makers using the medium-quality MDSS and unaided decision-makers *(F=11.40, p=0.002)*. This difference increases over the four periods *(F=3.11, p=0.038)*. The difference between unaided decision-makers and decision-makers having one of the two MDSS at their disposal increased from 0.66 minutes in period 1 to 4.38 minutes in period 4. No significant difference can be found between the decision-makers using the medium-quality MDSS and the decision-makers using the high-quality MDSS *(F=1.90, p=0.177)*. This situation does not change over the four periods *(F=1.12, p=0.330)*. We expected users of the high-quality MDSS to use more decision-making time than users of the medium-quality MDSS. Probably, a difference should only be expected if the way the two types of systems were used were to be very different. The two types of systems used here were not very different. The availability of an MDSS thus causes extra decision-making time, independent of the quality of the MDSS.

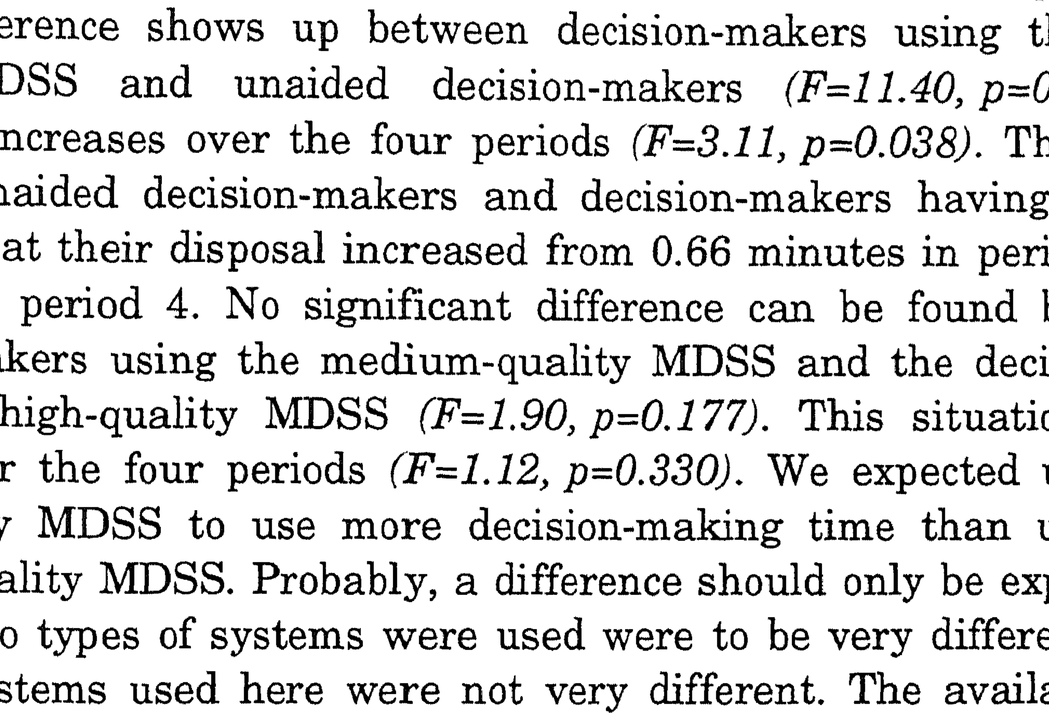

Figure 5-2 *DMTIME for subjects using no MDSS (n=20), subjects using the medium-quality MDSS (n=20) and subjects using the high-quality MDSS (n=20)*

Finally, we examine whether the QLMD-effect differs for analytical decision-makers when compared to non-analytical decision-makers. Like in Chapter Four, no significant difference *(F=1.30, p=0.259)* in the amount of decision-making time between non-analytical and analytical decision-makers shows

up here. Furthermore, we do not find the QLMD-effect to be different for analytical and non-analytical decision-makers.

Summary of Findings

No significant difference in the amount of decision-making time is found between decision-makers using the medium-quality MDSS and decision-makers using the high-quality MDSS. The availability of both types of MDSS results in more decision-making time when compared with a situation of not using any MDSS at all. The difference is not found to differ between non-analytical and analytical decision-makers.

5.4 NUMBER OF SIMULATIONS MADE WITH THE MDSS

In this section we study whether the quality of the MDSS (QLMD) influences the number of simulations made with the MDSS, and whether this is dependent on the analytical capabilities of the decision-makers (FIDE), their attitude towards MDSS (ATTI) and the amount of time-pressure (TIPR) they are working under. The QLMD variable contains only two levels here, i.e. the medium-quality MDSS and the high-quality MDSS.

In Table 5-5 the mean numbers of simulations made by the four experimental groups, using an MDSS, are presented. In Table 5-6 the results of the ANCOVA are presented.

Table 5-5 *Mean Number of Simulations for the four experimental groups using an MDSS, in the four periods (each group: n=20), standard deviations in parentheses*

		Time-Pressure	
		Low	High
Marketing Management Support System	MDSS medium-quality	GROUP 3 1. 23.1 (20.6) 2. 17.4 (15.3) 3. 18.5 (12.1) 4. 18.6 (12.2)	GROUP 4 1. 17.7 (15.9) 2. 10.2 (7.4) 3. 8.6 (6.2) 4. 9.0 (6.1)
	MDSS high-quality	GROUP 5 1. 17.6 (12.4) 2. 16.1 (10.6) 3. 23.3 (13.7) 4. 25.8 (15.0)	GROUP 6 1. 12.8 (11.1) 2. 10.0 (7.6) 3. 13.2 (6.8) 4. 14.0 (8.2)

Table 5-6 ANCOVA-statistics for the analysis of the Number of Simulations made with the MDSS (F-statistic, significance of F-statistic) (n=80, four periods)

FACTOR	Main Effect
QLMD	0.85 (0.360)
FIDE	4.21 (0.044)
ATTI	0.50 (0.480)
TIPR	16.83 (0.000)
PERI	1.17 (0.318)

First, we examine whether the quality of the MDSS influences the way the MDSS is actually used. The results in Table 5-5 make it clear that an interaction effect between QLMD and PERI exists *(F=6.81, p=0.001)* (see Figure 5-3). In period 1 the medium-quality MDSS is used more intensively than the high-quality MDSS. In period 2 only a small difference exists in the use of the two systems while in the periods 3 and 4 the high-quality MDSS is used more than the medium-quality MDSS. An explanation for this pattern might be that users of the high-quality MDSS see more opportunities to optimize their decisions with help of the MDSS than decision-makers using the medium-quality MDSS. Therefore, ultimately they make more simulations. This finding is in conformity with results of research of Deshpande and Zaltman (1982) on factors affecting the use of market research information. They find that high quality of this information enhances its use. The finding that in period 1 users of the medium-quality MDSS make more simulations than users of the high-quality MDSS, is probably because of the fluctuations the medium-quality MDSS produces in its forecasts. By making a large number of simulations in this first period, the decision-makers try to get some idea of the magnitude of the fluctuations in the forecasts. In the later periods, decision-makers using the medium-quality MDSS see a larger difference between the predictions of the system and their results than decision-makers using the high-quality MDSS. This is probably why they make fewer simulations at a later stage.

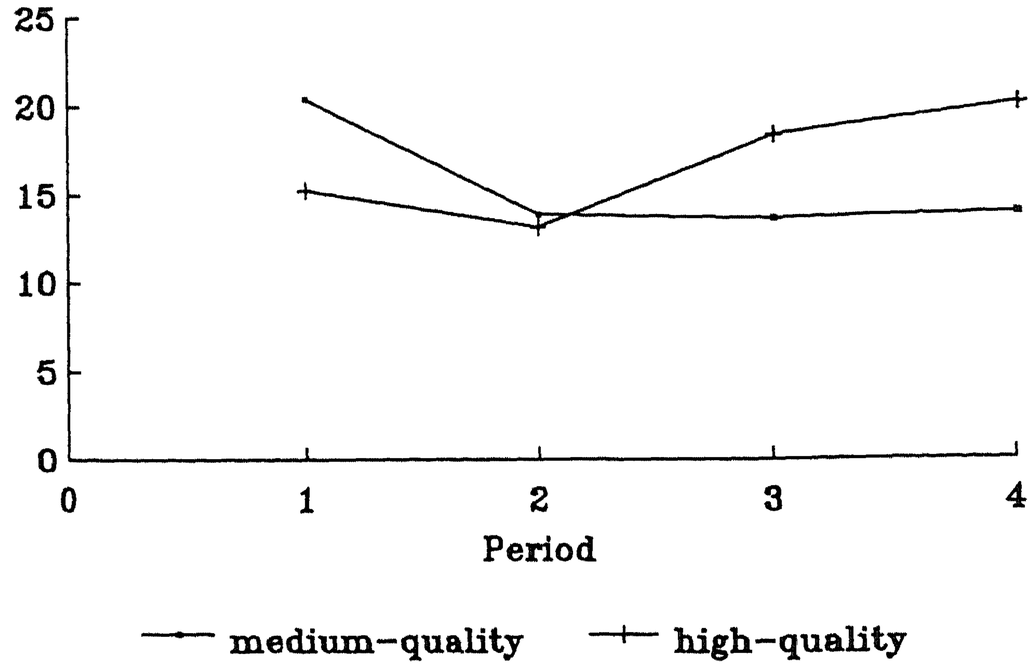

Figure 5-3 *SIMUL for subjects using the medium-quality MDSS (n=40) and subjects using the high-quality MDSS (n=40)*

Next, we examine whether the QLMD-effect differs for analytical decision-makers when compared with non-a Four nalytical decision-makers. We do not find a difference here. For both the medium-quality and the high-quality MDSS, we find analytical decision-makers make more simulations *(F=4.21, p=0.044)* than non-analytical decision-makers although the difference decreases (see Figure 5-4) over the four periods *(F=3.11, p=0.036)*. This finding is in accordance with the results reported in Chapter Four.

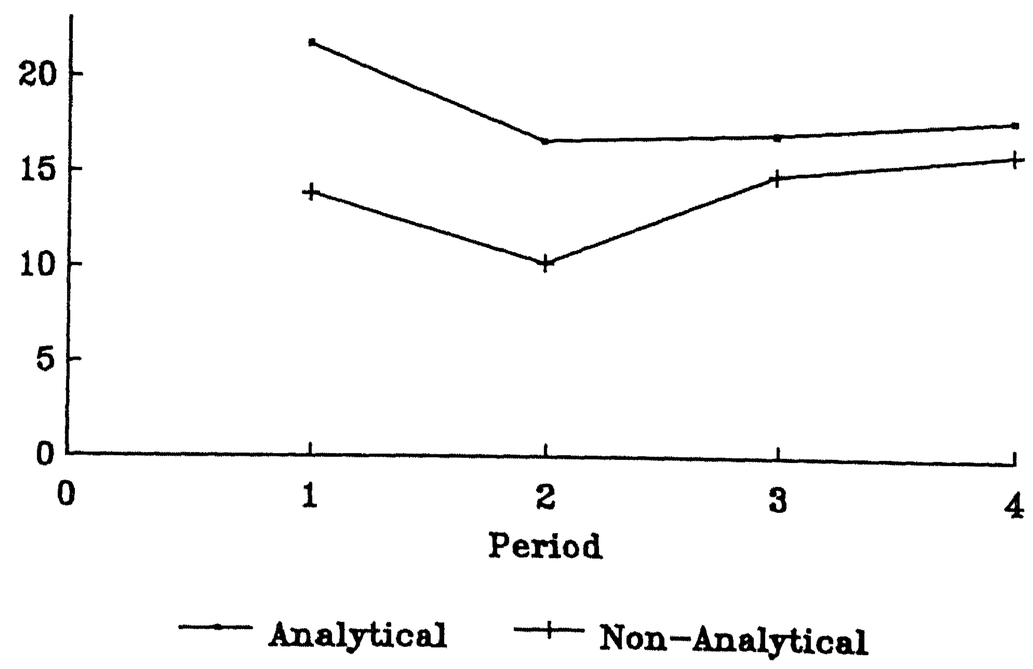

Figure 5-4 *SIMUL for non-analytical subjects (n=40) and analytical subjects (n=40)*

Next, we examine whether there is a difference in the QLMD-effect between decision-makers with a positive attitude and decision-makers with a negative attitude towards MDSS-in-general. Like in the case of a high-quality MDSS we do not find a relationship between the attitude towards MDSS-in-general and the number of simulations made with the medium-quality MDSS *(F=0.50, p=0.480)*.

Finally, we look for SIMUL differences between the two quality levels of the MDSS, in the two time-pressure conditions. We do not find a difference in the QLMD-effect between the two time-pressure conditions. Overall, as reported earlier in Chapter Four, decision-makers working under high time-pressure make fewer simulations with the MDSS than decision-makers working under low time-pressure *(F=16.83, p=0.000)*.

Summary of Findings

The high-quality MDSS is found to be used more than the medium-quality MDSS. This difference is found to appear from period 3 onwards. Only in period 1 is the medium-quality MDSS used more than the high-quality MDSS. This effect is the same for analytical and non-analytical decision-makers; decision-makers with a positive and negative attitude towards MDSS-in-general; and decision-makers working under low time-pressure and high time-pressure.

5.5 DECISION-CONFIDENCE AND PERCEIVED USEFULNESS OF THE MDSS

In this section we investigate in which way the quality of an MDSS affects the decision-makers evaluation of the decision-making process and how useful the MDSS itself is perceived to be. Two dependent variables are studied, i.e. decision-confidence (§ 5.5.1) and the perceived usefulness of the MDSS (§ 5.5.2).

5.5.1 Effects on Decision-Confidence

We start by studying whether a relationship exists between the quality of an MDSS and the decision-confidence of marketing decision-makers and, if so, under which conditions. Therefore, we study whether the relationship between the quality of the MDSS and CONFIDENCE is dependent on the values of FIDE and TIPR. In the case of the high-quality MDSS the gap between the predictions and the results is smaller than in the case of the medium-quality MDSS. Therefore we may expect the high-quality MDSS to

cause more decision-confidence than the medium-quality one since decision-makers using the high-quality MDSS are better able to estimate the results of their decisions.

CONFIDENCE was measured twice. After making decisions in the second and in the fourth period the subjects were asked to assess the confidence in their decisions on five items (5-point Likert items, ranging from strongly disagree / strongly agree). One decision-confidence factor was constructed from the ratings on these five items (see Chapter Three). In Table 5-7 the CONFIDENCE results of the six experimental groups are presented. In this Table high scores stand for high decision-confidence. In Table 5-8 the results of the ANCOVA are presented.

Table 5-7 *Mean Decision-Confidence for the six experimental groups in the four periods, two measures (each group: n=20), standard deviations in parentheses*
High Scores stand for High Decision-Confidence

		Time-Pressure	
		Low	High
Marketing Management Support System	NO MMSS	GROUP 1 2. 2.04 (0.81) 4. 2.42 (0.63)	GROUP 2 2. 1.88 (0.76) 4. 2.14 (0.63)
	MDSS medium-quality	GROUP 3 2. 1.91 (0.86) 4. 2.13 (0.78)	GROUP 4 2. 1.69 (1.05) 4. 1.99 (1.12)
	MDSS high-quality	GROUP 5 2. 1.84 (0.81) 4. 2.28 (0.86)	GROUP 6 2. 1.59 (0.99) 4. 2.16 (0.89)

Table 5-8 *ANCOVA-statistics for the analysis of Decision-Confidence (F-statistic, significance of F-statistic) (n=120, two measures)*

	Main Effect
FACTOR	
QLMD	0.69 (0.504)
FIDE	0.00 (0.990)
TIPR	1.93 (0.168)
PERI	16.68 (0.000)

The first question we examine is whether the quality difference of the MDSS influences the decision-confidence of the decision-maker. The results in Table 5-7 and 5-8 show no significant difference in CONFIDENCE between the three levels of QLMD *(F=0.69, p=0.504)*. We expected the high-quality MDSS to cause more decision-confidence. The results are no different when compared to the unaided decision-makers. Probably, factors other than the availability of an MDSS influence decision-confidence.

Overall, the decision-confidence increases between period 2 and period 4 *(F=16.68, p=0.000)*. This does not differ between the different QLMD levels *(F=1.37, p=0.258)*. In Chapter Four, we found the CONFIDENCE of decision-makers with the high-quality MDSS at their disposal increased faster than the CONFIDENCE of unaided decision-makers.

Next, we examine whether the lack of a QLMD-effect on CONFIDENCE is in force for both non-analytical decision-makers and analytical decision-makers. No interaction effect between QLMD and FIDE shows up, meaning that the QLMD-effect is not significantly different for non-analytical decision-makers when compared to analytical decision-makers. For all levels of QLMD an interaction effect between FIDE and PERI shows up *(F=4.17,p=0.044)*. In period 2, non-analytical decision-makers show as much decision-confidence as analytical decision-makers while between period 2 and period 4 the amount of decision-confidence of the analytical decision-makers shows a larger increase than the amount of decision-confidence of the non-analytical decision-makers. A possible explanation for this finding might be the fact that analytical subject perform better relative to non-analytical decision-makers and that this higher SHARE causes more confidence in period 4. In § 4.6 we also found a positive relationship between an increase in SHARE and (an increase in) CONFIDENCE which showed up only at the end of the experiment. It is likely that at the beginning of the experiment an increase in the market share is not enough to increase decision-confidence.

Finally, we examine whether the QLMD-effect differs for different values of TIPR. In Chapter Four we found decision-makers working under low time-pressure showed more decision-confidence than decision-makers working under high time-pressure. Here, the low time-pressured decision-makers also show more decision confidence than the high time-pressured decision-makers. However, we do not find the difference to be significant, independent of the quality of the MDSS.

Summary of Findings

No difference in the decision-confidence is found between users of the high-quality MDSS and users of the medium-quality MDSS. Furthermore, users of both types of MDSS are not found to differ in the amount of decision-

confidence compared to the unaided decision-makers. These results are the same for analytical vs. non-analytical decision-makers and for decision-makers working under low time-pressure vs. decision-makers working under high time-pressure.

5.5.2 Perceived Usefulness of the MDSS

In this section we study whether decision-makers perceive MDSS with different predictive qualities as differently useful. We may expect that a very good predicting system will be perceived as more useful than a worse predicting MDSS. We also examine whether the perceived usefulness of the two systems differs for the different values of FIDE, ATTI and TIPR.

USEFUL was measured twice. After making decisions in the second and the fourth period, the subjects were asked to assess the usefulness of the MDSS, as they perceived it, on six items (7-point likely-unlikely scales). One perceived usefulness factor was constructed from the ratings on these six items. In Table 5-9 the USEFUL results of the four experimental groups using an MDSS are presented. In this table high scores stand for high usefulness. In Table 5-10 the results of the ANCOVA are presented.

Table 5-9 *Perceived Usefulness of the MDSS for the four experimental groups using an MDSS, two measures (each group: n=20), standard deviations in parentheses*

		Time-Pressure	
		Low	High
Marketing Management Support System	MDSS medium-quality	GROUP 3 2. 3.89 (0.84) 4. 3.96 (0.66)	GROUP 4 2. 4.43 (0.71) 4. 4.41 (0.72)
	MDSS high-quality	GROUP 5 2. 4.20 (0.59) 4. 4.17 (0.70)	GROUP 6 2. 3.96 (0.90) 4. 4.01 (0.96)

First, we examine whether the usefulness of the MDSS as perceived by the user of it, is dependent on its quality. Results in Table 5-9 and Table 5-10 show no significant USEFUL-difference as a result of quality differences of the MDSS *(F=1.23, p=0.271)*. The results show that the USEFUL-difference between the two types of MDSS tends to increase a little between period 2 and period 4, meaning that subjects using the medium-quality MDSS show an increase in their USEFUL score relative to decision-makers using the high-quality MDSS *(F=3.12, p=0.082)*. However, this effect is very small and hardly significant. Thus subjects perceive both systems as useful. The

quality of the MDSS does not influence this. Differences in USEFUL probably only appear when quality differences are very large. In all likelihood, as long as the quality of the MDSS is reasonable, the system is perceived as useful.

Table 5-10 ANCOVA-statistics for the analysis of the Perceived Usefulness of the MDSS (F-statistic, significance of F-statistic) (n=80, two measures)

FACTOR	Main Effect	First Order Interaction of factors with: QLMD
QLMD	1.23 (0.271)	
FIDE	0.01 (0.934)	3.66 (0.060)
ATTI	26.96 (0.000)	0.44 (0.512)
TIPR	0.00 (0.979)	3.21 (0.077)
PERI	1.54 (0.219)	3.12 (0.082)

Next, we question whether this absence of the QLMD-effect is in force for both non-analytical and analytical decision-makers. The results in Table 5-10 show a small interaction effect between FIDE and QLMD *(F=3.66, p=0.060)* (see Figure 5-5). The analytical decision-makers perceive the medium-quality MDSS as more useful than the high-quality MDSS. The non-analytical decision-makers perceive the high-quality MDSS as a little more useful than the medium-quality MDSS. It is likely that the use of the medium-quality MDSS made particularly the non-analytical decision-makers aware that it is very difficult to determine decision-outcomes since these are very uncertain. Therefore, in the case of using the medium-quality MDSS, the availability of an MDSS was perceived as very useful.

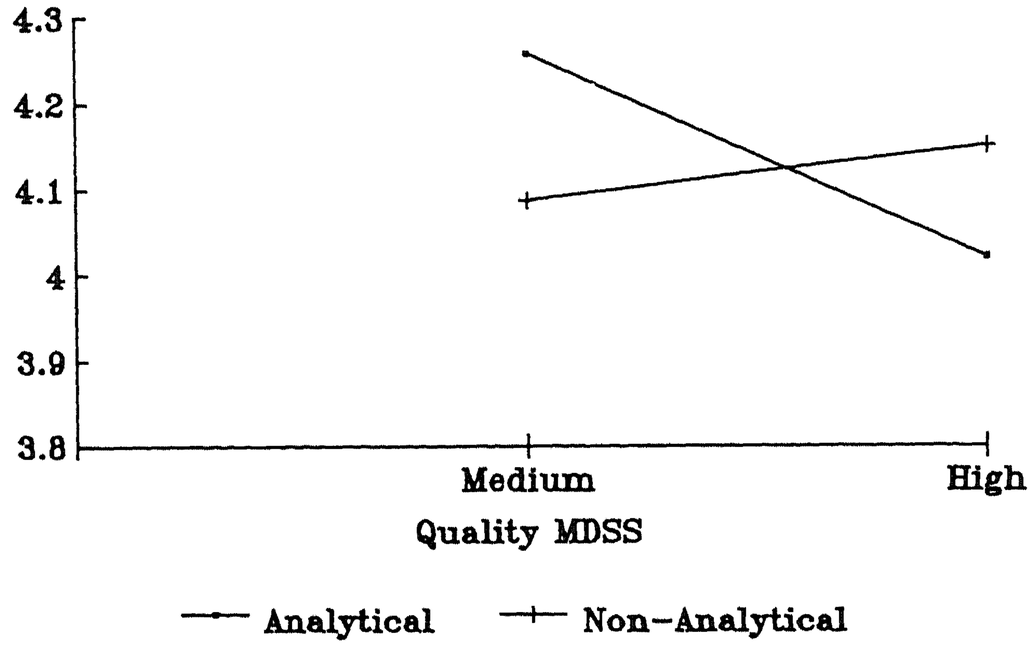

Figure 5-5 *USEFUL for analytical subjects and non-analytical subjects, both groups using the medium-quality MDSS and the high-quality MDSS*

Next, we examine whether the QLMD-effect differs for decision-makers with a positive attitude towards MDSS when compared with decision-makers with a less positive attitude towards MDSS. In Chapter Four we reported a very strong relationship between the attitude towards MDSS-in-general and the USEFUL score. The results in Table 5-10 show a similar picture. Here again, a strong relationship exists between ATTI and USEFUL *($F=26.96$, $p=0.000$)* which is independent of the quality of the MDSS *($F=0.44$, $p=0.512$)*. The correlation coefficient between ATTI and USEFUL is 0.48 *($p=0.000$)* for the first measure and 0.57 *($p=0.000$)* for the second measure of USEFUL. Decision-makers with a positive attitude towards MDSS-in-general, perceive both the medium and the high-quality MDSS as more useful than decision-makers with a less positive attitude.

Finally, we examined whether the QLMD-effect differs for decision-makers working under low time-pressure when compared with decision-makers working under high time-pressure. The results in Table 5-9 and 5-10 show a small interaction effect between TIPR and QLMD *($F=3.21$, $p=0.077$)* (see Figure 5-6). Decision-makers working under low time-pressure perceive the high-quality MDSS as more useful than the medium-quality MDSS. When working under high time-pressure, the situation is just the opposite. Here the medium-quality MDSS is perceived as somewhat more useful. A possible explanation might be that under high time-pressure, decision-makers are less able to judge the usefulness of the system. In high time-pressure conditions they make fewer simulations and therefore are less well able to judge whether the forecasts of the system are reasonable. Furthermore, high time-pressure probably makes it difficult to compare the predictions of the

system with the results in the MARKSTRAT world. This also makes it difficult for decision-makers to judge the usefulness of an MDSS.

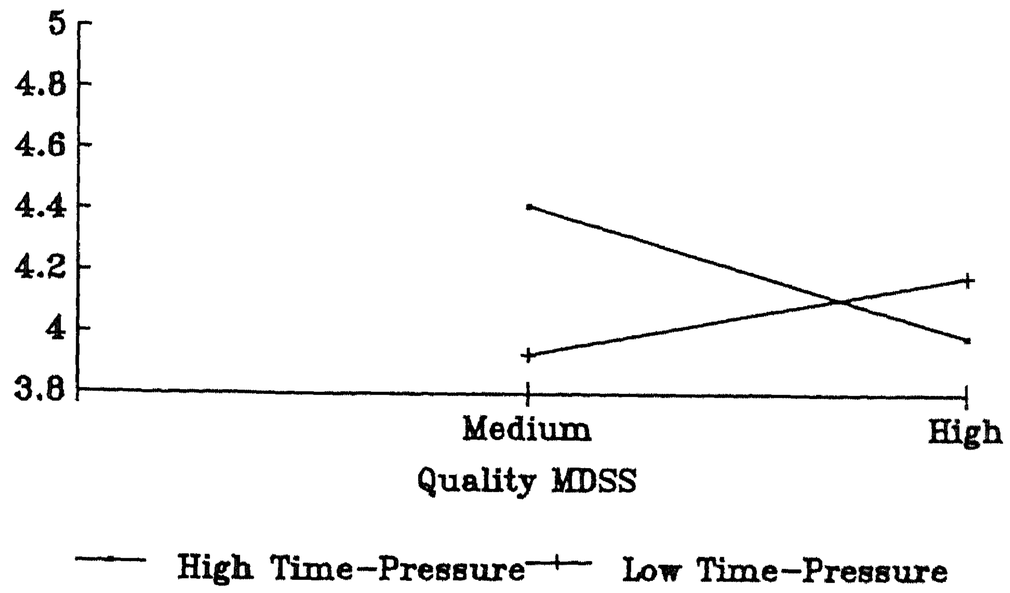

Figure 5-6 *USEFUL for subjects working under low time-pressure (n=40) and subjects working under high time-pressure (n=40)*

Summary of Findings

Overall, the medium-quality MDSS and the high-quality MDSS are perceived as equally useful. The high-quality MDSS is perceived as more useful than the medium-quality MDSS by non-analytical marketing decision-makers and decision-makers working under low time-pressure. The analytical decision-makers and the decision-makers working under high time-pressure perceive the medium-quality MDSS as more useful than the high-quality MDSS. The differences between these groups are, however, small.

For both the medium and the high-quality MDSS we find the attitude towards MDSS-in-general strongly influences the perceived usefulness of the systems. Decision-makers with a positive general attitude towards MDSS also perceive the specific systems used in this study as more useful, independent on its quality.

5.6 SUMMARY OF FINDINGS

Results reported in this chapter show that the increase in market share caused by the availability of an MDSS is dependent on the quality of this MDSS. Decision-makers using the high-quality MDSS outperform decision-makers using the medium-quality MDSS. Decision-makers using the medium-quality MDSS still outperform decision-makers not using any MDSS at all.

The amount of decision-making time used by decision-makers using the medium-quality MDSS does not differ from the amount of time used by high-quality MDSS users. Users of the medium-quality MDSS also use more decision-making time than decision-makers not using an MDSS at all.

Taking both findings together implies that the high-quality MDSS users thus perform better in the same amount of decision-making time as the medium-quality MDSS users. Decision-makers having an MDSS at their disposal always use more decision-making time than decision-makers not using an MDSS, independent of the quality of the MDSS.

When looking at the use of the system, measured by the number of simulations made with it, ultimately the high-quality MDSS is used more intensively than the medium-quality MDSS. However, this difference does not appear before period 3 and period 4. In all probability, decision-makers need some time to realize which opportunities the system offers. When they do so, they will also try to exploit these opportunities. For both the high-quality and the medium-quality MDSS, analytical marketing decision-makers are found to make more simulations than non-analytical decision-makers, although the difference decreases over the four periods.

When looking at the decision-confidence, the availability of an MDSS does not show effects, independent of its quality.

Although the actual MDSS-using behaviour thus differed for the medium and the high-quality MDSS, overall, both types of systems are perceived as equally useful. Between the different experimental conditions some small differences exist. The high-quality MDSS is perceived as more useful by the non-analytical decision-makers and by decision-makers working under low time-pressure. The medium-quality MDSS is perceived as more useful by the analytical decision-makers and by the decision-makers working under high time-pressure. As in Chapter Four, especially the a-priori attitude towards MDSS-in-general is found to determine the perceived usefulness of a specific MDSS. This is independent of the quality of the MDSS.

In this chapter we thus found the quality of the MDSS to influence its effectiveness. An MDSS supports the decision-makers in the design and in the choice phase (Simon, 1977) of the decision-making process. In the next chapter we study which way a decision-aid, which supports the decision-makers in the intelligence phase of the decision-making process, influences the performance of a decision-maker. For this purpose the effects of a marketing knowledge-based system (MKBS) are studied.