CHAPTER SIX

The Effectiveness of a Marketing Knowledge-Based System

6.1 INTRODUCTION

In Chapters Four and Five we studied the effects of the availability of two types of marketing decision support systems (MDSS), i.e. a medium-quality MDSS and a high-quality MDSS. We found that the availability of both types of MDSS increased the market share of marketing decision-makers. Both of these MDSS are systems that manipulate *quantitative* data and are particularly useful for the planning of, and the prediction of outcomes of, alternative decisions. These systems are less suited to support marketing decision-makers in *monitoring* and *diagnosing* markets.

A relatively new development in the application of information technology to marketing management are marketing knowledge-based systems (MKBS). These systems are the result of the application of artificial intelligence (AI) technology to the field of marketing management. Research carried out by Benbasat and Nault (1990) indicates that at the time of their review no studies on the effects of knowledge-based systems (they call them expert systems) on decision-quality had been conducted. No studies on the effects of marketing knowledge-based systems had been conducted either. In this chapter we will investigate the effects of the availability of an MKBS for monitoring and diagnosing markets. The relatively "simple" system of the kind that we have developed, which was described in more detail in Chapter Three, assists the marketing decision-makers in the interpretation of events in the market by means of *qualitative* reasoning.

We study: (1) whether the availability of the MKBS increases the market share (SHARE), (2) whether the availability of the MKBS costs extra decision-making time (DMTIME), (3) whether the availability of the MKBS increases decision-confidence (CONFIDENCE), and (4) which factors influence the perceived usefulness of the MKBS (USEFUL) and whether the perceived usefulness of the MKBS differs from that of the two types of MDSS.

Furthermore, we investigate whether the effects of the availability of the MKBS depend on the different values of the intervening variables as described in Chapter Three, i.e. field dependence (FIDE), attitude towards MDSS-in-general (ATTI) and time-pressure (TIPR). We investigate the interaction effects between these intervening variables and MKBS. Finally, to study whether the effects of the availability of the MKBS change over the four periods, the effect of the number of periods played (PERI) is also analysed. One could speculate that the MKBS is especially helpful in the early

period. Then, the decision-makers have not yet acquired the necessary experience in searching for the right information and they do not have a clear idea of the relationships between the relevant variables. The MKBS can provide the decision-makers with this information.

The organization of this chapter is as follows. In § 6.2, the market share effects of the availability of an MKBS are analysed. In § 6.3, decision-making time effects of MKBS are analysed. In § 6.4, the influence of MKBS on the decision-confidence and the factors that influence the perceived usefulness of the MKBS are studied. Finally, in § 6.5, we summarize the most important findings.

6.2 EFFECTS ON MARKET SHARE

In this section we study whether the availability of an MKBS (MKBS) influences the market share and, if so, under which conditions. In Table 6-1 the mean market shares of the four experimental groups are presented. In Table 6-2 the results of the ANCOVA are presented. The ANCOVA was performed on the SHARE-results of the decision-makers with the MKBS at their disposal and the decision-makers working without any form of MMSS at all, both for low and high time-pressure conditions (the four groups as distinguished in the design in Table 3-4).

An examination of the results in Table 6-1 and Figure 6-1 makes it clear that the market share of marketing decision-makers with the MKBS at their disposal is higher than the SHARE of the unaided decision-makers in all periods. This main effect is not significant *($F=1.21$, $p=0.275$)*. Separate tests per period show that the difference is significant in period 1 *($F=7.30$, $p=0.008$)*. In the periods 2, 3 and 4 the SHARE-difference is not significant.

A possible explanation for these results might be that the MARKSTRAT environment that we have used appeared to be relatively well-structured. Only in period 1, when the decision-makers did not have any experience at all in the MARKSTRAT setting, the environment was new and therefore probably relatively unstructured to them. In this period they took advantage of the availability of the MKBS which helped them to structure their monitoring and diagnosing activities. From period 2 onwards, the decision-makers did have some MARKSTRAT experience, and were capable of performing monitoring and diagnosing tasks themselves. In those periods the availability of the MKBS did not have a significant influence on the effectiveness of the decision-makers anymore, although, as we have already seen, their performance is somewhat better than the performance of the unaided decision-makers.

Table 6-1 *Mean Market Shares (in percentages) for the experimental groups in the four periods (each group: n=20), standard deviations in parentheses*[23]

		Time-Pressure	
		Low	High
Marketing Management Support System	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)
	MKBS	GROUP 3 1. 19.09 (3.21) 2. 18.90 (5.43) 3. 19.27 (6.69) 4. 22.27 (6.19)	GROUP 4 1. 18.67 (3.01) 2. 17.75 (5.64) 3. 19.66 (8.21) 4. 21.72 (8.08)
	MDSS medium-quality	GROUP 5 1. 21.73 (4.24) 2. 19.69 (5.91) 3. 20.98 (6.98) 4. 22.84 (6.23)	GROUP 6 1. 20.19 (4.47) 2. 19.05 (5.65) 3. 20.14 (6.73) 4. 22.25 (6.60)
	MDSS high-quality	GROUP 7 1. 24.69 (3.29) 2. 25.40 (5.60) 3. 25.62 (6.93) 4. 28.13 (7.45)	GROUP 8 1. 21.42 (3.90) 2. 19.35 (5.36) 3. 21.10 (6.31) 4. 24.56 (7.81)

Next, we examine whether the absence of the MKBS-effect is in force for both non-analytical and analytical marketing decision-makers. We would expect the MKBS to be especially helpful for the non-analytical decision-makers because it provides them with the opportunity to systematically analyse information. However, in none of the four periods does an interaction effect between MKBS and FIDE show up. FIDE does not appear to have a major effect either. The MKBS thus functions neither as compensatory factor nor as a supplement to the analytical abilities of the marketing decision-maker. This is the opposite of the high-quality MDSS performance, which was found to have a compensatory function if used by inexperienced decision-makers. Apparently, non-analytical decision-makers were equally effective as analytical decision-makers in performing the monitoring and diagnosing

23 In the lower half of this table, to allow comparison, we have also reprinted the results of the groups with the medium-quality MDSS at their disposal and the results of the groups with the high-quality MDSS at their disposal (see Chapters Four and Five).

tasks in this MARKSTRAT environment. This means that the MKBS did not have to compensate for a lack of analytical skills.

Table 6-2 *ANCOVA-statistics for the analysis of Market Share (F-statistic, significance of F-statistic) (n=80, four periods)*[24]

	Main Effect
FACTOR	
MKBS	1.21 (0.275)
FIDE	1.75 (0.189)
TIPR	0.55 (0.461)
PERI	19.01 (0.000)

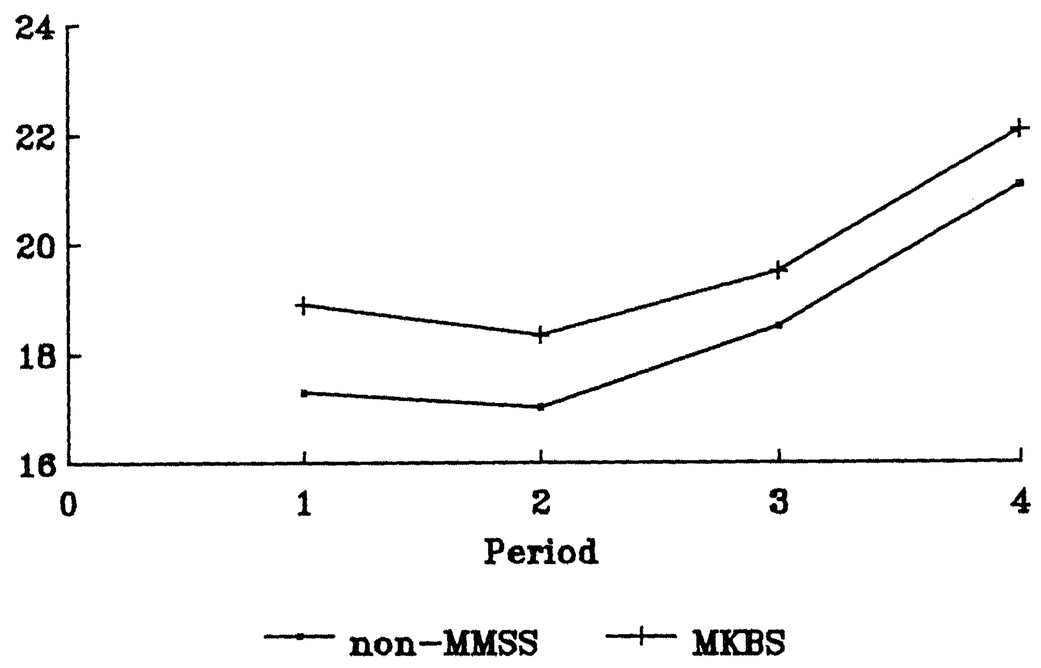

Figure 6-1 *SHARE for subjects not using any MMSS (n=40) and subjects using the MKBS (n=40)*

The absence of the MKBS-effect is found to be in force for both decision-makers working under low time-pressure and decision-makers working under high time-pressure. The results in Table 6-2 show no main effect of the amount of time-pressure *(F=0.55, p=0.461)*. Also no interaction effect appears between MKBS and TIPR. This means that for both decision-makers

[24] In table 6-2 only main effects are presented. Since no interpretable and significant interaction effects showed up, these interaction effects are left out of the table. From here onwards, interaction effects will only be presented when they are significant.

using the MKBS and for unaided decision-makers the higher time-pressure did not result in a lower market share.

When compared with the two types of MDSS we found that for both types of MDSS a higher amount of time-pressure results in a decrease in SHARE. This is not the case with the MKBS. Apparently, decision-makers using the MKBS suffer less from time-pressures than decision-makers using an MDSS. This might be caused by the fact that MDSS-using decision-makers are obstructed by a high degree of time-pressure in optimizing the design and the choice-phase of their decisions. Apparently, in the case of the MKBS, more decision-making time, which offers the opportunity of more extensive use of the system, does not increase the decision-quality.

Finally, when we compare the SHARE-results of the decision-makers using the MKBS with the decision-makers using one of the two types of MDSS (see Figure 6-2), we see that the high-quality MDSS performs best, followed by the medium-quality MDSS, and thirdly the MKBS. The results of MKBS-using decision-makers (see lower half of Table 6-1) are thus the closest to the results of the decision-makers using the medium-quality MDSS (see Figure 6-2).

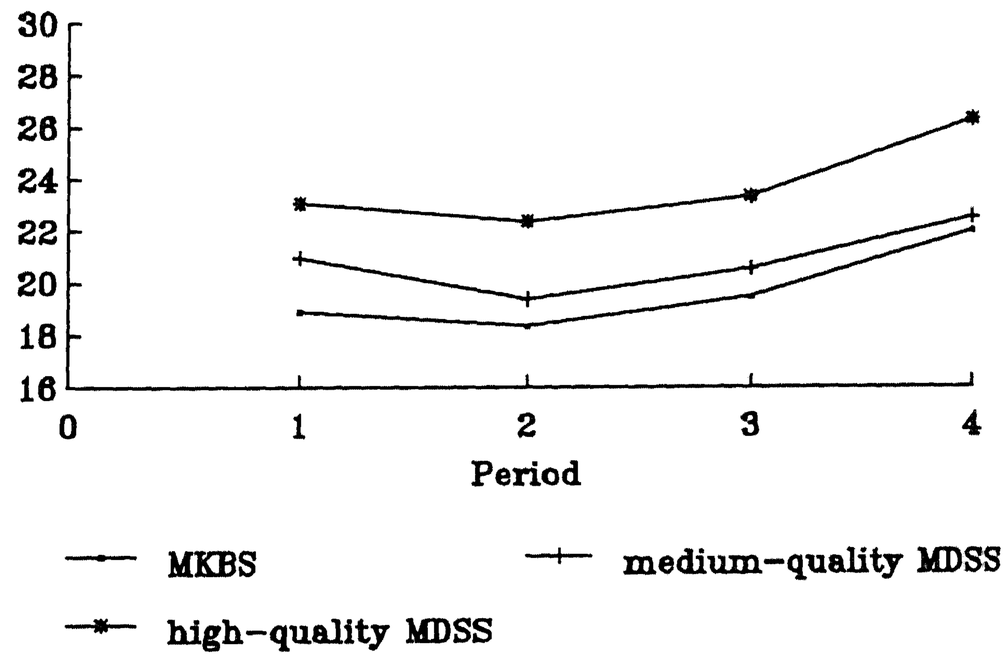

Figure 6-2 *SHARE for subjects not using the medium-quality MDSS (n=40), subjects using the high-quality MDSS (n=40) and subjects using the MKBS (n=40)*

The difference between the decision-makers using the MKBS and the decision-makers using the medium-quality MDSS is not significant *(F=1.08, p=0.302)*. The difference between the decision-makers using the MKBS and the decision-makers using the high-quality MDSS is a signi-

ficant one *(F=12.80, p=0.001)*, meaning that decision-makers using the high-quality MDSS perform better than decision-makers using the MKBS.

In the MARKSTRAT-world, supporting the design and the choice-phase of the decision-making process (Simon, 1977) is thus more worthwhile than supporting the intelligence phase, provided that the MDSS is a high-quality one. This may be caused by the fact that the MARKSTRAT-world probably is relatively well-structured which makes it possible to develop simulation models with high predictive powers. In such a situation it is possible to attune the various marketing instruments to each other very accurately. Probably, in less well-structured markets a system for supporting the intelligence phase would be more effective relatively to MDSS, since in this instance it might be more difficult to develop simulation models with high predictive powers than to develop a system which helps decision-makers in the intelligence phase by means of qualitative reasoning about cause-and-effect relationships. In such an unstructured situation an MKBS may help the decision-makers to structure the situation.

Summary of Findings

The availability of the MKBS is found to result in a higher market share in period 1, when the MARKSTRAT environment probably was relatively unstructured for the decision-makers. In the periods 2, 3 and 4 no differences between unaided decision-makers and decision-makers with the MKBS at their disposal is to be found. These results hold for both analytical and non-analytical decision-makers and for both decision-makers working under low time-pressure and decision-makers working under high time-pressure. When compared to the results of decision-makers with an MDSS at their disposal, the results of the MKBS-using decision-makers are the closest to that of the decision-makers with the medium-quality MDSS at their disposal and significantly below the results of the users of the high-quality MDSS.

6.3 EFFECTS ON DECISION-MAKING TIME

In Chapters Four and Five we found that the availability of both the medium-quality and the high-quality MDSS requires more decision-making time. In this section we examine whether the availability of the MKBS also influences the amount of decision-making time and, if so, under which conditions. Again, only the decision-making time of the groups working under low time-pressure was studied since these groups were relatively free in determining the amount of time they spent on making their decisions.

In Table 6-3 the mean number of minutes (DMTIME) used by the two experimental groups, working under low time-pressure, are presented. In Table 6-4 the results of the ANCOVA are presented. The ANCOVA was performed on the DMTIME-results of the decision-makers using the MKBS and the decision-makers not using any MDSS at all (the groups 1 and 3 in Table 6-3).

Table 6-3 *Mean Decision-Making Time (in minutes) for the 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	MKBS	GROUP 3 1. 38.42 (2.59) 2. 23.59 (1.23) 3. 22.30 (2.47) 4. 20.15 (3.20)
MDSS medium-quality		GROUP 5 1. 38.99 (1.68) 2. 23.99 (1.79) 3. 22.67 (2.25) 4. 21.02 (3.24)
MDSS high-quality		GROUP 7 1. 39.42 (1.18) 2. 24.47 (1.08) 3. 23.47 (1.95) 4. 22.87 (3.25)

Table 6-4 *ANCOVA-statistics for the analysis of Decision-Making Time (F-statistic, significance of F-statistic) (n=40, four periods)*

	Main Effect
FACTOR	
MKBS	6.63 (0.014)
FIDE	0.00 (0.996)
PERI	108.65 (0.000)

The results in Table 6-3 and 6-4 show a significant difference in DMTIME between the decision-makers using the MKBS and decision-makers not using any MDSS at all *(F=6.63, p=0.014)*. Although decision-makers using the MKBS, averaged over the four periods, do not obtain a significantly higher market share than unaided decision-makers, they do use more decision-making time. Decision-makers with the MKBS at their disposal use 6.2% more decision-making time than their unaided counterparts. Apparentntly, performing monitoring and diagnosing activities using the MKBS costs more DMTIME than performing these activities without using an MKBS. This might be caused by the fact that when using the MKBS, decision-makers perform their monitoring and diagnosing activities more extensively. Another possible explanation might be that performing monitoring and diagnosing activities with the help of an MKBS is less efficient when compared to performing these tasks unaided.

It is striking that the SHARE of the MKBS-using decision-makers is only higher than the SHARE of the unaided decision-makers in period 1, while in this period the amount of DMTIME does not differ between the two groups. In the other three periods the SHARE does not differ while the amount of DMTIME does, with the MKBS-using subjects using more DMTIME. Although the use of the MKBS is not effective in these periods, when the decision-makers have an MKBS at their disposal, they also use it at the cost of more decision-making time.

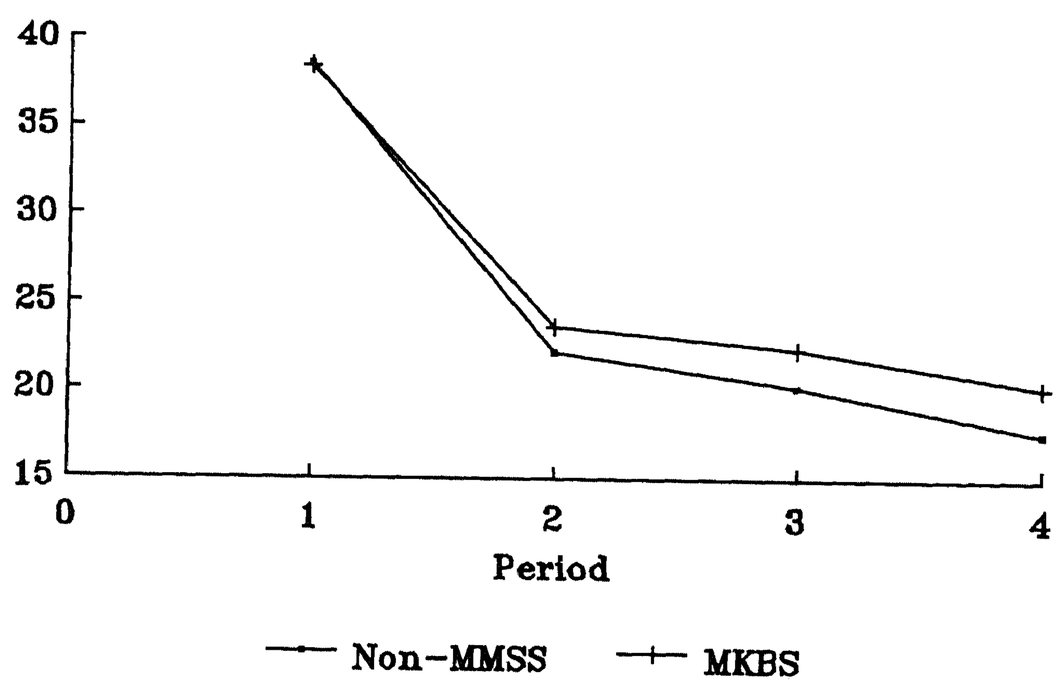

Figure 6-3 *DMTIME for subjects not using any MMSS (n=20) and subjects using the MKBS (n=20)*

Next, we examine whether the MKBS-effect changes over the four periods. For all decision-makers the amount of decision-making time decreased over the four periods *(F=108.65, p=0.000)*. Although the results in Figure 6-3

show a change (an increase) in the DMTIME-difference between decision-makers using the MKBS and decision-makers not using any system this difference is not significant *(F=2.03, p=0.122)*.

Finally, we examine whether the MKBS-effect differs between non-analytical decision-makers and analytical decision-makers. Neither a main effect of FIDE nor an interaction effect between FIDE and MKBS appears. Thus the influence of the MKBS on the amount of decision-making time, like the influence on SHARE, is the same for both non-analytical and analytical decision-makers. This result was also found in the case of the MDSS.

When we compare the amount of decision-making time used by the decision-makers using the MKBS with the decision-makers using one of the types of MDSS, the amount of decision-making time taken is closest to the amount of decision-making time used by decision-makers using the medium-quality MDSS. The difference in DMTIME between decision-makers using the MKBS and decision-makers using the medium-quality MDSS is not significant *(F=1.04, p=0.314)*. The amount of decision-making time required by the users of the high-quality MDSS is significantly higher than the amount of decision-making time required by the users of the MKBS *(F=7.65, p=0.009)*. It would seem that the system that objectively offers the best opportunities of increasing performance is also used most extensively, and therefore, as a result, costs the largest amount of decision-making time.

Summary of Findings

The availability of the MKBS is found to result in more decision-making time when compared with unaided decision-makers. This result is the same for both analytical and non-analytical decision-makers. Decision-makers using the MKBS use significantly less decision-making time when compared with decision-makers using the high-quality MDSS.

6.4 DECISION-CONFIDENCE AND PERCEIVED USEFULNESS OF THE MKBS

In this section we investigate in which way the availability of an MKBS influences the decision-confidence (§ 6.4.1) and which factors influence the perceived usefulness of the MKBS (§ 6.4.2).

6.4.1 Effects on Decision-Confidence

In this section we study whether a relationship exists between the availability of the MKBS and CONFIDENCE, and whether this relationship is dependent on the values of FIDE and TIPR.

CONFIDENCE has been 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, strongly disagree / strongly agree). One decision-confidence factor was constructed from the ratings on these five items. In Table 6-5 the CONFIDENCE-results of the four experimental groups are presented. In Table 6-6 the results of the ANCOVA are presented. The ANCOVA was performed on the CONFIDENCE-scores of the decision-makers using the MKBS and the unaided decision-makers (the groups 1 to 4 in Table 6-5).

Table 6-5 Mean Decision-Confidence for the eight 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
	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)
Marketing Management Support System	MKBS	GROUP 3 2. 2.13 (0.78) 4. 2.53 (0.69)	GROUP 4 2. 1.94 (0.91) 4. 2.30 (0.91)
	MDSS medium-quality	GROUP 5 2. 1.91 (0.86) 4. 2.13 (0.78)	GROUP 6 2. 1.69 (1.05) 4. 1.99 (1.12)
	MDSS high-quality	GROUP 7 2. 1.84 (0.81) 4. 2.28 (0.86)	GROUP 8 2. 1.59 (0.99) 4. 2.16 (0.89)

Table 6-6 *ANCOVA-statistics for the analysis of Decision-Confidence (F-statistic, significance of F-statistic) (n=80, two measures)*

	Main Effect
FACTOR	
MKBS	0.49 (0.487)
FIDE	0.04 (0.842)
TIPR	1.83 (0.180)
PERI	6.62 (0.012)

We start the examination of the results in this section by examining whether the availability of the MKBS results in a higher decision-confidence when compared with the CONFIDENCE-results of unaided decision-makers. Results in Table 6-5 show that decision-makers with the MKBS at their disposal show more decision-confidence than unaided decision-makers. However, this difference is not significant *(F=0.49, p=0.487)*. For all decision-makers, CONFIDENCE increases between period 2 and period 4 *(F=6.62, p=0.012)*. This increase does not differ between unaided decision-makers and decision-makers with the MKBS at their disposal *(F=0.15, p=0.702)*. Probably, since the MARKSTRAT-environment is relatively well-structured, the decision-makers do not gain extra CONFIDENCE because of the availability of an MKBS which offers insight into the relationships between the relevant variables in the MARKSTRAT-world. Without the MKBS they would probably have had this insight too.

Next, we examine whether the MKBS-effect differs between analytical and non-analytical marketing decision-makers. We expected the MKBS to help especially non-analytical decision-makers to increase their decision-confidence because the MKBS provided them with the means to analyse information systematically.

The results in Table 6-6 show no main effect of FIDE *(F=0.04, p=0.842)*. Neither was there an interaction effect between FIDE and MKBS. Thus the MKBS did not increase the CONFIDENCE of either the analytical or the non-analytical decision-makers.

We also examine whether the MKBS-effect differs between decision-makers working under low time-pressure and decision-makers working under high time-pressure. The results in Table 6-6 show no main effect of TIPR *(F=1.93, p=0.168)*. Neither was there an interaction effect between TIPR and MKBS.

Finally, we compare the CONFIDENCE of the decision-makers using the MKBS with the CONFIDENCE of the users of both the medium-quality and of high-quality MDSS (see Figure 6-4).

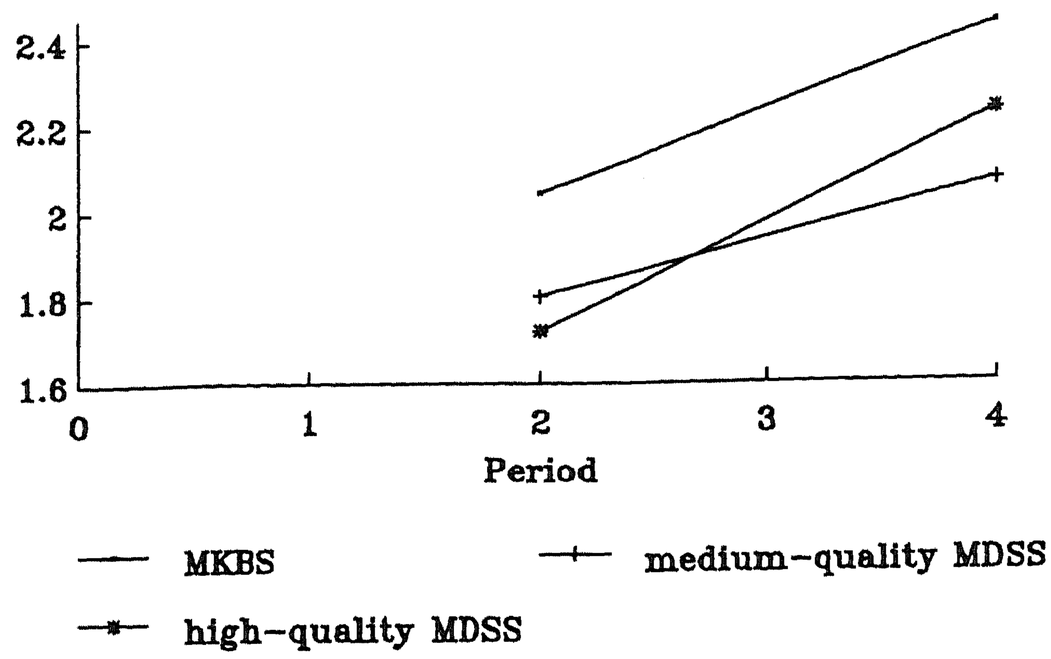

Figure 6-4 *CONFIDENCE for subjects using the MKBS (n=40), subjects using the medium-quality MDSS (n=40) and subjects using the high-quality MDSS (n=40)*

The CONFIDENCE of the decision-makers using the MKBS shows a tendency to be higher than both the CONFIDENCE of the decision-makers using the medium-quality MDSS *(F=2.69, p=0.105)*, and the CONFIDENCE of the decision-makers using the high-quality MDSS *(F=2.50, p=0.118)*. These differences are close to being statistically significant. In this MARKSTRAT-setting, decision-support in the intelligence phase (Simon, 1977) seems to be more effective for increasing the CONFIDENCE of decision-makers than decision-support in the design and the choice phase. Probably, decision-makers using the MKBS understand why they make their decisions the way they do better than users of the MDSS. The MDSS-using decision-makers maybe are more reliant on the system and do not know exactly why they make the decisions the way they do. Understanding the (MARKSTRAT) model thus might be more effective in raising confidence than simply using a "black box" mathematical simulation model, even though this last model results in better decisions.

Summary of Findings

The availability of the MKBS does result in more decision-confidence when compared to unaided decision-makers, however this difference is not significant. This result is the same for both analytical and non-analytical decision-

makers and for both decision-makers working under low time-pressure and decision-makers working under high time-pressure. There is a fairly strong tendency that decision-makers with the MKBS at their disposal show more decision-confidence than decision-makers with one of the two types of MDSS at their disposal.

6.4.2 Perceived Usefulness of the MKBS

In this last section we study which factors influence the usefulness of the MKBS as it is perceived by its users, and whether this usefulness differs from the other two types of MDSS. Furthermore, we also examine whether the perceived usefulness of the MKBS 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 6-7 the USEFUL-results of the two experimental groups using the MKBS are presented. In this table high scores stand for high usefulness. In Table 6-8 the results of the ANCOVA, performed on the results of the two groups (the groups 3 and 4), are presented.

Table 6-7 *Perceived Usefulness of the MMSS for the six experimental groups using an MMSS, two measures (each group: n=20), standard deviations in parentheses*
High Scores stand for High Perceived Usefulness

		Time-Pressure	
		Low	High
MKBS		GROUP 3 2. 3.50 (1.03) 4. 3.65 (0.98)	GROUP 4 2. 3.28 (1.25) 4. 3.21 (1.38)
Marketing Management Support System	MDSS medium-quality	GROUP 5 2. 3.89 (0.84) 4. 3.96 (0.66)	GROUP 6 2. 4.43 (0.71) 4. 4.41 (0.72)
	MDSS high-quality	GROUP 7 2. 4.20 (0.59) 4. 4.17 (0.70)	GROUP 8 2. 3.96 (0.90) 4. 4.01 (0.96)

Table 6-8: ANCOVA-statistics for the analysis of the Perceived Usefulness of the MKBS (F-statistic, significance of F-statistic) (n=40, two measures)

	Main Effect
FACTOR	
FIDE	0.17 (0.684)
ATTI	2.89 (0.098)
TIPR	0.49 (0.486)
PERI	0.00 (0.993)

The perceived usefulness of the MKBS, like the USEFUL score of both types of MDSS, is influenced by the a-priori attitude of decision-makers towards MDSS-in-general *(F=2.89, p=0.098)*. Decision-makers with a positive attitude towards MDSS-in-general also perceived the MKBS as used in this study as more useful than decision-makers with a less positive attitude.

Neither FIDE *(F=0.17, p=0.684)* nor TIPR *(F=0.49, p=0.486)* influences the factor USEFUL. Furthermore, the USEFUL score does not change significantly between period 2 and period 4 *(F=0.00, p=0.993)*. This was also found for the two types of MDSS. Useful scores are thus very stable over time.

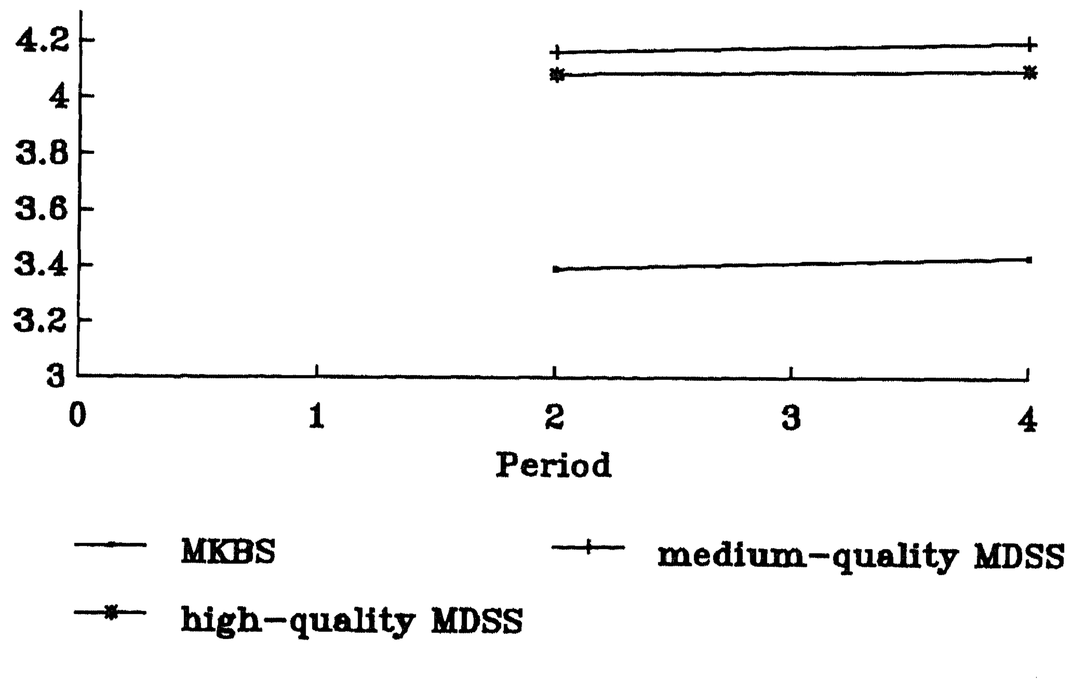

Figure 6-5 USEFUL for subjects using the MKBS (n=40), subjects using the medium-quality MDSS (n=40) and subjects using the high-quality MDSS (n=40)

The results in Table 6-7 and 6-8 (see also Figure 6-5) make it clear that the MKBS is perceived as less useful than both the medium and the high-

quality MDSS *(F=8.67, p=0.000)*. This is notwithstanding the fact that in an absolute sense the MKBS is still perceived as fairly useful[25]. Probably, because of the relatively well-structured quality of the MARKSTRAT environment, the decision-makers do not perceive the MKBS as very useful. They are capable of performing monitoring and diagnosing activities themselves. Predicting outcomes of marketing decisions, as the two types of MDSS do, is much harder and therefore the help of an MDSS is perceived as more useful. Furthermore, the USEFUL-scale measured the usefulness of the MMSS for increasing the decision-quality. It did not measure the usefulness for understanding the relationships in the MARKSTRAT-world. Probably, the MKBS studied here would have been perceived as more useful for that.

In Chapter Four we found a relationship between the perceived usefulness of the high-quality MDSS and the decision-confidence of the users of this system. Users of the MDSS who perceived the MDSS as more useful showed more decision-confidence than decision-makers who perceived the MDSS as less useful.

For the decision-makers using the MKBS we also examine the relationship between USEFUL and CONFIDENCE. Here we see for both period 2 *(r=-0.0201, p=0.902)* and for period 4 *(r=-0.0914, p=0.575)* no significant relationship. In all probability decision-makers with the MKBS at their disposal, do not attribute (part of) their decision-confidence to the usefulness of the MKBS.

Summary of Findings

The MKBS is perceived as significantly less useful than both types of MDSS. As in the case of the two types of MDSS, the a-priori attitude towards MDSS-in-general is also the strongest determinant of the perceived usefulness of the MKBS. The analytical capabilities and the amount of time-pressure do not influence the perceived usefulness of the MKBS. No relationship was found between the perceived usefulness of the MKBS and the decision-confidence of the users of the MKBS.

6.5 SUMMARY OF FINDINGS

In this chapter we investigated the effects of the availability of an MKBS. This MKBS was a relatively simple system which helped the decision-

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25 The mean USEFUL-score of the MKBS-using marketing decision makers was 3.41 on a scale which had a minimum of 0.97 (not useful at all) an a maximum of 5.54 (extremely useful).

makers in monitoring and diagnosing markets by means of qualitative reasoning.

The MKBS was found to increase the SHARE of marketing decision-makers. Analyses for the four periods showed that this difference was only significant in period 1, however. In the periods 2, 3 and 4 no significant SHARE-difference was found between MKBS-using decision-makers and unaided decision-makers. The results of the availability of the MKBS were the same for both non-analytical and analytical decision-makers and for both low and high time-pressured decision-makers. Probably, the MARKSTRAT environment was not unstructured enough for the MKBS to be effective in the later periods. We also compared the results of decision-makers with the MKBS at their disposal with decision-makers using one of the types of MDSS. The MKBS-using decision-makers were significantly outperformed by users of the high-quality MDSS. No significant difference existed between the users of the medium-quality MDSS and users of the MKBS. We concluded that in the MARKSTRAT-world the availability of an MDSS is more profitable than the availability of an MKBS, provided that the quality of the simulation models of the MDSS is high.

Averaged over the four periods, MKBS-using decision-makers used more DMTIME than unaided decision-makers. When analysing the results in the four periods separately we found that in period 1 only a small and not significant DMTIME-difference existed between decision-makers using the MKBS and the unaided decision-makers while in the periods 2, 3 and 4 the difference was larger and significant. Surprisingly this was just the opposite of the SHARE-results. The value of SHARE was only significantly larger for the MKBS-using decision-makers in period 1. In the periods 2, 3 and 4 the MKBS was used at the cost of significantly more decision-making time. However, it was not effective. So although decision-makers with the MKBS at their disposal only outperformed unaided decision-makers in period 1, they used more decision-making time in all of the four periods. This was the same for both non-analytical and analytical decision-makers. When compared to the users of the MDSS we found the users of the high-quality MDSS, not only to outperform users of the MKBS, but also to use more decision-making time. No significant DMTIME-difference was found between the users of the MKBS and users of the medium-quality MDSS. We proposed that the system that objectively offers the best opportunities for increasing the performance is also used most extensively and therefore also costs the largest amount of decision-making time.

With respect to the confidence in their decisions, MKBS-using decision-makers showed a little more CONFIDENCE than unaided decision-makers. However, this difference was not significant. Again, no difference in this effect showed up between non-analytical and analytical decision-makers and between low time-pressured and high time-pressured decision-makers. A

tendency showed up that decision-makers with the MKBS at their disposal showed more CONFIDENCE than decision-makers using the MDSS. We proposed that understanding the MARKSTRAT model probably was more effective in raising decision-confidence than using a "black box" mathematical simulation model.

Finally, with respect to the perceived usefulness of the MKBS, it was found that like for the two types of MDSS, the attitude towards MDSS-in-general was the strongest determinant. The MKBS was perceived as significantly less useful than the two types of MDSS. So besides the a-priori attitude, which is a very strong determinant of the perceived usefulness of an MMSS, experiences with a specific system is also a significant determinant. This means that decision-makers do not automatically perceive different types of systems as equally useful.