ABSTRACT

Business cases are used as a plea to elaborate on a project and to rectify its cost and benefits. A project with multiple stakeholders introduces conflicting interests. These conflicting interests are enforced by the tendency of the stakeholders to withhold sensitive information. To resolve this issue, one can make use of a Group Decision Support System (GDSS). Traditional GDSS’s have proven to be very costly and were only used by wealthy organizations or companies. Since the recent introduction of GDSS’s as a service, these systems have become better available for a broader population. This research shows how the GDSS as a service supports the negotiation process in a business case development scenario. In an experiment the GDSS service ‘Spliter’, is compared with a control group in a more traditional Business Case setting without the help of a GDSS. The experiment required four players to negotiate about an investment to be made. By the use of questionnaires, reports from the system and observations during the GDSS meeting it is shown that the GDSS prevents free riding, increases the perceived user satisfaction on decision quality, time and relative advantage. The GDSS also positively influences information pooling; arguments based discussions and the prevention of personal attacks. The results are promising but repetition of the experiments is needed to give a broader basis of data as a foundation for the conclusions.

Keywords

Group Decision Support System as a service, Business case development, complex negotiation

1. INTRODUCTION

Preceding a complex Information Technology (IT) investment decision, an IT business case is required to list the information and arguments whether to invest or not to invest in a project. This IT business case then can be used as a plea to convince investors or supervisors. Because IT business cases do not have a strict format which is generally used, every IT business case has its own way to represent information [11]. Inter-organizational IT business case scenarios include more than one stakeholder and therefore include more than one interest which almost guarantees conflicting opinions. Following the development of a shared IT business case where all costs and benefits are agreed upon by the different stakeholders is a complex challenging task. Not only because it cannot always result in a win-win situation in favor of all stakeholders, but also because each stakeholder will not reveal his entire business case; this might give away his advantage in the negotiation process [13]. Crossing organizational boundaries increases the complexity of reaching a mutual agreement between different stakeholders [6].

Although the complexity of IT investments increases and the development of a business case is a common practice, many companies admit their dissatisfaction with their ability to identify all the available benefits in an IT investment [13]. Therefore this study aims for the use of GDSS as a service to develop an IT business case with multiple stakeholders.

Much research has been done on IT business cases, negotiation and GDSS. But no research was identified on the combination of these three elements. We expect that the combination gives a new insight into the problem and will therefore focus on the intersection shown in Figure 1. This combination will give a new insight because many IT business cases made to evaluate IT investments fail to present a complete picture of the scenario [13].

Figure 1. The three research areas

The main research question reflects on GDSS as follows: “How can web-based GDSS’s effectively improve the negotiation process of developing an IT business case for projects with multiple stakeholders?”

The effective improvement, as stated in the main question, aims for the decision quality and time for parties to compromise. To be able to give an answer to the main research question, it was divided into two sub questions. Both questions will first be addressed by a short literature review. Afterwards, an experiment is conducted to also get empirical insights into the questions.

The first sub question focuses on the negotiation process; how is the current negotiation process structured, what differs from normal negotiation processes and what limits its outcomes?
1. What factors impact the negotiation process of the development of business cases?

To be able to point out how future web-based GDSS’s can aid in the negotiation process, one first need to know the current state of the web-based GDSS’s. This leads us to the second sub question:

2. How do web-based GDSS’s aid in the negotiation process of the development of business cases?

Both sub research questions were answered with a literature review and an experiment. The methodology on how the research questions were operationalized and how they answer the research questions is stated in section 3 research design.

The practical relevance of this paper is to explore the applicability of GDSS as a service to enhance business case development in a multi stakeholder context. With the recommendations that will follow from this research, the web-based GDSS’s can be elaborated and new tools can be developed which give greater support to the negotiation process. Next to that, the recommendations will indicate how a GDSS can be of use with the development of business cases with multiple stakeholders.

The paper is structured as follows. Section 2 will give an overview of the literature including previous research results and gaps in this research. Section 3 will state the approach for the research, the research design, the case used, the methods and the strategy of the analysis. Section 4 will follow up with the results recorded from the experiment. In section 5 the results will be discussed and related to the results of previous research. In section 6 the research questions will be answered, the limitations of this research will be elaborated and an indication for further research will be given.

2. LITERATURE OVERVIEW

A method to structure the process is needed when there are no fixed rules or procedures to deal with the opposing preferences such as the development of a single business case with multiple stakeholders [12]. There are several ways to deal with conflicting intents, but negotiation and mediation have proven to be the most successful. Yet too often people use struggle as their way out, because of several reasons [2]:

- Difficulty in communication
- No trust in the willingness of the other party
- It takes two to negotiate, one to struggle
- Both parties believe to achieve more through struggle

Empirical research has shown that Group Decision Support Systems (GDSS’s) are perfectly fit for high complex problems with a lack of structure [4] and can improve decision quality and time efficiency in negotiation [5]. “A GDSS is a computer-based technology designed to help committees, project teams, and other small groups with activities such as problem identification and analysis, decision making, planning, creativity, conflict management, negotiation, and meeting management” [5].

Although traditional GDSS’s and its web-based version are generally the same, not all current web-based GDSS’s have the same level of functionality available [7].

Previous experiments on GDSS’s have revealed several factors to measure the outcomes of an experiment. The decision quality is a pretty obvious factor but it can be measured in several ways. The objective measurement requires the case scenario to have a point system build in. With this point system an objective measurement of the decision quality can be made [1]. The other way of measurement is the subjective one, where a panel or a person distinct from the decision made evaluates the quality of the decision [5]. The satisfaction with the decision and the time efficiency are subject to improvement as well [1].

Research shows that the decision satisfaction is dependent on whether a person did have the feeling he had his share in the meeting. The time efficiency can improve because the communication is more structured which makes time management easier [9]. The functionality of a GDSS to give anonymous answers results in better pooling of the information of the group [9]. Persons do not feel a barrier to speak and are not influenced by other persons. The ability for parallel communication prevents the need for buffering of answers [9]. Persons do not have to remember their arguments but are able to directly fill in their argument into the system. This also prevents persons from forming a pre meeting group consensus.

Research has shown that once a part of a group has formed an opinion before the end of the meeting, they will be less open for new arguments brought in by another person [9]. The effect of a GDSS improves positively as the size of the group increases. A GDSS can provide structure to unstructured meetings with large groups. Business case development is one of the areas which can take advantage of the GDSS as many meetings for a common business case development lack structure. Business cases often do not have a complete overview of the benefits and the arguments for making the costs for the investment.

Employees in companies admit the importance of a good business case, but also admit that currently business cases lack the good support of arguments and benefits [13].

“Benefits are advantages provided to specific groups or individuals as a result of meeting the overall objectives. Provided the benefits to different groups or individuals do not give rise to conflict, all stakeholders do not need to agree to each benefit.” [13] According to the definition of a benefit it can belong to a person or to a group of persons but not everybody in the meeting has to agree upon the benefit. Meaning that the benefit does not provide everybody with the same level of advantage. During a meeting a benefit can get lost in the process of arguing about the relevance of the benefit. To prevent this loss of information (benefits), a GDSS captures all benefits posted by the participants.

3. RESEARCH APPROACH

This section will first elaborate on the experiments that were conducted for this research. The first subsection will state the design of my research, the second subsection states the Blackboard case used for the experiments, the third subsection states the protocol used for the experiments and the fourth subsection elaborates on what data was gathered and how.

For the design of the experiments, two different settings were used. The first setting, which will be called “the traditional meeting”, was in a room with a stretched oval shaped table with on the one side a beamer. All four participants were facing each other and had sight on the beamer were the current agenda item was being processed.

The second setting, which will be called GDSS meeting further on, was in a room with tables placed in a halve circular shape. The participants were facing a television screen with an overview of the agenda and the current agenda item processing. All participants were stationed behind a laptop with access to the online GDSS named Spilter.

The participants in the experiment were students all passed their first year. Most of them are studying BusinessInformationTechnology, but also Informatics and
Industrial Engineering and Management. So all students possess an advanced level of computer skills and therefore the participants have little to none relative advantage. Students were chosen for the experiment not only because they were easily accessible but also because their own affinity with problem given to them during the experiment (the problem is explained in subsection 3.2). The GDSS (Spilter) is web based and simple to get acquainted with. The participants did not receive any training up front; they were only given a short instruction on how to log in and on how the experiment would proceed. All students were as randomly as possible divided over the four experiments.

The participants of both the traditional meeting and the GDSS meeting were given four documents. The first two documents included a short introduction into the scenario, a script to create the necessary mindset for the experiment and a list of all the options to be chosen off. The third document elaborated on the protocol that gave structure to the meeting. And the last document was a questionnaire. All four documents will be discussed in the next sections. But first the research design will be discussed.

3.1 Research design

The research design can be divided into three levels of decisions; the knowledge claim, the strategy of inquiry and the method [3].

The knowledge claim states how and what the researcher wants to acquire at the starting of his or her project. There are four schools of thought within the knowledge claim; Post-positivism, constructivism, advocacy/participatory and pragmatism. This research can be situated in the “pragmatism” thought. The pragmatism way of thinking has four characteristics; consequences of actions, problem-centered, pluralistic and real-world practice oriented.

Consequences of actions within a pragmatism school of thought are characterized by claims out of actions, situations and consequences. The effect a GDSS system has on the participants have little to none relative advantage. Students were chosen for the experiment not only because they were easily accessible but also because their own affinity with problem given to them during the experiment (the problem is explained in subsection 3.2). The GDSS (Spilter) is web based and simple to get acquainted with. The participants did not receive any training up front; they were only given a short instruction on how to log in and on how the experiment would proceed. All students were as randomly as possible divided over the four experiments.

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3.2 Blackboard case

The experiment is required for this research to get empirical data on the difference between a traditional meeting and a GDSS meeting. The kind of scenario needed to find these differences is a scenario with a complex problem, open-ended solutions to the problem (not all solutions are predetermined), pre existing disagreement and the problem is unstructured. These requirements have been taken into account when the scenario was developed because previous research has shown differences in these requirements between the traditional meeting and the GDSS meeting [5].

For this experiment a new scenario and an IT business case game were developed. Although several other business case games were available, the choice has been made to develop a new game [8, 9]. The choice for a new game has been made because a real IT component could be placed in the game and the case could be written based on a real life project. The project took place within the University of Twente in the year 2008 and most of the information for the scenario came from the final report about Blackboard from the research committee [10].

Because the switch has only recently been made in summer 2009, all students had knowledge of both the Electronic Learning Environments (ELO’s). This pre-acquainted knowledge gave the students a real life feeling with the experiment and they were able to act from own experience. Since the problem is quite complex of itself the students did not need any training and the requirement for a complex scenario is met. The open-ended solutions requirement has not fully been met because it appeared to be difficult to anticipate budgets for unanticipated solutions. Therefore we chose for a set of options instead of an open ended solution. The preexisting disagreement requirement was implemented through the four different roles which all had their own interests. The last requirement about the unstructured problem is met because the scenario contains a lot of background information including secondary benefits, which can be interpreted differently by each participant. The requirements ensure that the written scenario is suited to be used for this experiment.

The game involved the decision that had to be made by the board of the University of Twente in 2008 concerning the choice of the ELO. In the game the decision had to be made by four persons; the teacher, the student, the system maintainer and person of the board. The purpose of the game was to pool as much relevant information from the participants as they would be able to come up with and then force them to make a
business case with which they would all agree upon. Important during this process was that functionality would be the main issue and not the funding. To increase the space for negotiation, some extra options were added to the game which could be chosen of independent from the choice for the system. These options existed of version control, mobile accessibility, group work module, plagiarism detection, portal, UT system connectivity and an increase in system performance. All were given a short description so the participants were self able to figure out whether it would fit in their decision or not. Concerning the general choice for Teletop, Blackboard 8 or 9 the participants were given the same freedom. Before the experiment took place, the case was tested twice with a pilot to remove the most important flaws in the scenario. The pilot was done the same way as the experiments were done. The participants of the pilot gave suggestions on how to improve the scenario and detected several inconsistencies.

3.3 Business case protocol and structure of the experiment

To give a structure to this otherwise unstructured process, the business case development was structured into six steps derived from theory [13]. In this section the six steps will be elaborated on and how this step was implemented in both experiments but before these steps took place, each participant was given time to read the information and to pick his stand. When everybody had chosen his stand they were given a short explanation about the protocol by the facilitator of the meeting.

The first step is about identifying investment drivers; why should the investment be made and what problems are we currently facing? With the traditional meeting a participant was asked to give a single problem at the time and then the next participant would be asked to give his problem, until no more problems were given. Each problem was noted in a single file and projected on the screen so all participants were given an overview of the answers. With the GDSS meeting all participants were asked to log in to the website and give all their problems at once. These problems were then summarized and displayed on the television in front of them. But the participants were also able to watch the results on their own screen.

The second step is concerning the improvement possibilities or the wishes of each of the participants. With this step all participants were asked to give wishes and potential benefits. The procedure does not differ from the previous step.

The third step includes the clustering and compilation of a list with problems and wishes from the first two steps. This step eliminates double answers and helps to get a single list with all problems important to the participants. The participants were asked to combine problems with the same scope and rephrase unclear problems. The actual rephrasing and clustering was done by the facilitator but on command of the participants, so the facilitator would not influence the process. This step was the same both for the traditional meeting and the GDSS meeting.

At the fourth step the participants were asked to prioritize the list of problems made at step three. They were asked to make a top ten. The rankings were combined and all problems that were not present in the total top ten ranking were eliminated from the list. With the traditional meeting, the participants were asked to give their most important problem a ten and their second important problem a nine and so on. With the GDSS experiment Spilter provided a tool in which they were able to drag and drop their problems into a top ten list.

After the top ten list of problems was compiled the fifth step was linking the problems to the solutions. At this step the participants were asked to take another look at the list of options they were given at the beginning of the experiment and then analyze the problems and link them to the list of options. If an option did not have a problem linked to it, the option was removed before the last step, because an option not solving a problem would be useless. The choice for the system went a little different then the choice for the options. If a problem would be solved by upgrading the system (choosing another ELO), then they were required to link this problem to the category ‘system innovation’. This process was the same for the traditional and the GDSS meeting, the participants indicated the linking of the problems and the facilitator dragged and dropped the problems under the options.

The last step included the negotiation about who would make what investment. After the ten most important problems from step four had been linked to the options in step five, only a few options remained. According to how many options remained and what the costs were for choosing the most expensive ELO, all participants were given an equal share of the budget to spend. But the budget in total, given by the facilitator, would be a few thousands too short to buy every option and the most expensive ELO. This to ensure that there was a need for negotiating. With the traditional meeting, each participant was asked to divide his budget over the options and the ELO. If they felt their budget was too big, they were given the option to withhold a share of their budget. Cases when somebody would have excessive money could be when a person would only want one or two options. The total spending of the budget would then be summarized by the facilitator on the screen. After every person had given his share of the budget, the results were presented so that the final conclusion was clear to everyone (which option had received enough money to be bought and what ELO did receive enough money). Then the participants were asked if they agreed upon this final decision and if not, how they wanted to change their investment. This process went on till everybody agreed upon the decision or they had reached an impasse. For the traditional meeting all information was again summarized on the screen by the facilitator. But in the GDSS meeting all participants spend their share of the budget through the system. This was all done anonymously. After the first decision was made, the participants were shown the results and asked if they would want to revise their first opinion. This process went on till everybody agreed upon the investment or if they would have reached an impasse.

When the six steps were taken, the results were summarized and shown to the participants. Then they were asked to fill in the questionnaire which was split up in three sections. The first section asked the participants to fill in general information about them and their role in the experiment. The second section asked about the user’s satisfaction with the experiment which was measured with a five point Likert scale, so the results are presented in a relative way. Next to that the section contained open questions about how they perceived the roles of the other participants. And the third section asked the participants to evaluate their decision preceding the experiment. This last section was filled in before the experiment and the other two sections were filled in afterwards.
3.4 Evaluation of the data Gathering process and the data analysis process

The data gathering process existed of several documents that were compiled. The documents were a short options list which they had filled in before the experiment, a report of the process itself, the questionnaire afterwards and the observations made by a single person in the room.

A questionnaire based on literature about GDSS experiment research [1, 5, 9] is used for data collection. This literature was selected on the fact that all provide a sort of framework or a set of criteria to use for the evaluation of a GDSS experiment. The literature was found through the search engine Scopus. With the keywords GDSS and Experiment 66 papers came up. Most of them could be eliminated based on their title as many papers focus on the influence of a facilitator guiding the experiment and not a passive facilitator as was the case with this experiment. The influence of the facilitator was held up to a minimum. Another article came up through tracking the referers to the papers found earlier. The combined frameworks and criteria of this literature led to the factors that might impact the negotiation process in the experiment. The factors taken into account in the experiment are the following:

- Perceived user satisfaction
  - On decision quality
  - On process time
  - On the meeting
  - On relative advantage
- Information (user opinion) gathering
- Pre experiment group consensus
- Process time
- Group communication

The perceived user satisfaction is covered in the questionnaire and the process time and the information are gathered through the report produced during the experiment, the pre experiment group consensus can be derived from the final decision of the report and the list of options chosen before the experiment and the group communication is analyzed by the observer. The factors were recorded for both the traditional meeting and the GDSS meeting. The factors that show different results for the traditional meeting opposed to the GDSS meeting will answer sub question one. The second sub question is answered through the observations made during the experiment, the influence the GDSS had on the step in the protocol and its correlation with the theory.

4. RESULTS

First the data from documents inspections and observations will be presented. Then observations will be discussed which were not anticipated, but which are important for the research.

Since the results of the second set of two experiments (traditional and GDSS meeting) were all far less positive than the first set, the results will be presented in two sets (traditional and GDSS meeting) were all far less positive than the second set. The perceived relative advantage was in both sets more leveled out with GDSS meeting opposed to the traditional meeting. Whereas the system maintainer received an average of three and the board an eight on the traditional meeting, with the GDSS meeting all roles were given an average around the seven.

4.1.2 Information gathering

The information gathered from the report of the meeting showed the results stated in table 1. The column ‘total problems’ shows the total amount of problems received from step 1 and 2 of the protocol. The problems after clustering column shows the clustering after step 3.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Total problems</th>
<th>Problems after clustering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Traditional)</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>2 (GDSS)</td>
<td>40</td>
<td>13</td>
</tr>
<tr>
<td>3 (Traditional)</td>
<td>31</td>
<td>17</td>
</tr>
<tr>
<td>4 (GDSS)</td>
<td>26</td>
<td>14</td>
</tr>
</tbody>
</table>

4.1.3 Pre experiment group consensus

The pre experiment group consensus was only measured with the last two experiments (one traditional and one GDSS meeting). With both meetings the board was the only one preferring Blackboard 8 and in both meetings the board got Blackboard 8 through to the final decision. With the traditional meeting there was hardly any group consensus; only one option was requested by everyone. Somehow the student was able to get four out of five options he requested. This happened because he the group consensus with the GDSS meeting was as well just one option. Again the student managed to get four out of the five options he chose preceding the experiment.

4.1.4 Process Time

The time recorded for the experiments are stated in table 2. The time includes the time for the explanation of the experiment. All participants were told they would have around one and a half hour, but no strict limit was given. The time recorded per step showed that with both traditional meetings the first five steps took about 15 minutes and the last step about 20 minutes. With the GDSS meeting the first five steps took about 10 minutes and the last step took about 30 minutes.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>1 (trad.)</th>
<th>2 (GDSS)</th>
<th>3 (trad.)</th>
<th>4 (GDSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (h:mm)</td>
<td>1:40</td>
<td>1:50</td>
<td>1:35</td>
<td>1:30</td>
</tr>
</tbody>
</table>

4.1.5 Group Communication

As said the experiment was structured by a six step protocol. The group communication with the traditional meeting was all vocal. The communication with the GDSS meeting was a mixture of vocal and text through the system. The observations from the first step showed that there was a lot of communication in the traditional meeting. People were rephrasing problems that others were suggesting and problems that were brought up by one person were sometimes acknowledged by others. Some problems mentioned made other
people think and come up with a related problem. The GDSS meeting showed no communication to each other, just through the system. This way some people who were less actively participating in the process, did get to state their problems. The second step showed the same structure.

The third step was done by telling the facilitator to cluster several problems. With both meetings the communication was vocal. The participants with the traditional meeting were very focused on remaining their own problems on the list. So if a problem of theirs was threatened to be removed from the list, he or she would try to defend it or try to get another problem removed from someone else. This did not occur with the GDSS meeting. People read the problems on the television screen and suggested their improvements. Often when a participant asked whose problem was stated on the screen, most participants would not answer or say that it might be from him or her.

The prioritizing (step 4) of the problems lead to a discussion with the traditional meetings, because they could actually see their points being eliminated from the process. With the GDSS meeting the prioritizing was done through Spliter according to the wishes of the participants. All the participants saw was the final list. Not the points being eliminated.

The fifth step went the same for both the traditional and the GDSS meeting. There was no need for the participants to defend themselves and the linking of the problems to the solutions was pretty straightforward for most of the problems. Therefore there was only little discussion about the placement.

The sixth and last step provoked quite some discussion with both the traditional and GDSS meetings. With the traditional meeting the participants were asked to state their share of their budget per option. When only little money was invested in something of which the others anticipated a bigger share, this called for provocations and personal attacks. After the first round, everybody would try to persuade the other to expend more on his option. It became a so called cat and mouse game. With the GDSS meeting everybody was asked to state their share of budget per option in the system. After that the preliminary results were given. This led to argue. Everybody would ask each other how much the other had invested per point and the same struggle for funding happened as with the traditional meeting. With this step the GDSS was not perceived to add much value.

Apart from the observations of the protocol, some more general observations have been made which were also found important for the experiment. When the last step was reached of the protocol some participants were surprised to see that some options could not be chosen anymore. They had not realized that if there were no problems linking to an option, the option would not be part of the negotiation process. It also happened that some problems at the last step were misinterpreted with the clustering and had been added under one name for the wrong reason. This happened with the GDSS experiment. The last observation came from the traditional experiment. The questionnaire asked how the process could be more improved. And the results for both the traditional meetings showed the requests for more time and more discussion in the process. The improvements suggested by the participants of the GDSS meeting were pointing out to persons who had (in their vision) obstructed the process.

5. DISCUSSION
The results from the previous section show conflicting results and need elaboration. The factors from the section ‘gathering data and analysis’ are partly derived from previous research. This section will explain the significance of each factor and compare it to previous research.

5.1 Perceived user satisfaction
The perceived user satisfaction is important because each participant in the meeting wants to give his opinion and make sure his opinion heard by the other participants. If every opinion would be taken into account and would be used in the decision making, there will never be a decision because different stakeholders have conflicting wishes. The literature states that everyone is willing to defend his own points even if they are less relevant [9]. Therefore it is important that everyone has had the chance to give his opinion. The results from the experiment show that the participants of the GDSS meeting perceived a high satisfaction with the decision quality, process time and relative advantage. This is because everyone had their share of participation in the process and everybody was heard. The satisfaction with the meeting as a whole was perceived less satisfying. This can be explained because the system forces to communicate via its input boxes; there is less room for small talk. The traditional meeting showed more personal interaction between the participants. Although the results look promising, a note has to be made because the results were only slightly better for the GDSS meeting.

5.2 Information gathering
The information gathering is significant because business cases often lack the support of sufficient arguments. Budgets are often given to fast while the benefits are not clear enough [13]. Because a GDSS enables asynchronous arguments there is no need to buffer answers because multiple people can give their opinion at the time. And this buffering often causes people to forget answers or answers are being influenced by other participants [9]. The results of the experiment showed no major improvements in the production of problems and wishes in the first two steps. This can be explained because of the scenario. The scenario was written based on a real life project were the participants were all acquainted with. But the problem which occurred during the experiments was that some participants were very advanced users of both systems. This caused some people to give a great amount of information while others were only able to come up with information they found in the script. For further research it is very important that the level of pre knowledge is not divided too crooked.

5.3 Pre experiment group consensus
The pre consensus on information amongst some of the participants causes new information brought in by another participant to be devaluated [9]. Therefore good arguments that come in during the experiment might be discarded because of this reason. The GDSS can improve this because the information entered into the system is entered anonymously. The results of the experiment however showed that there was hardly any consensus to begin with. Although the results do not clearly point out the improvement with a GDSS system, the observations showed the power of the group. The last step was often thwarted by a single person. This person would then receive a lot of criticism despite his arguments. The other participants would just wave aside his arguments. To improve the quality of these results, the scenario will have to have more pre group consensus build in.

5.4 Process time
The time required to finish a meeting with different stakeholders is often more than before the meeting was accounted for. The time exceeding is often the result of a lack
of structure, an overload on information and endless discussions [5]. The results from the experiment show no major differences in process time for the complete meeting. But the perceived usage of time was lower for GDSS and five of the six steps of the protocol were processed quicker with the GDSS. Only the last step took longer. The reason for this is the difference in what the protocol should be and what functionality the GDSS offers. Because the last step would not completely fit in the GDSS system, the negotiating over the costs could not be done through the system. This lead to endless arguing and personal attacks in all four experiments. If the GDSS would give complete support on this step, it is very likely that also this step would have been improved time wise.

5.5 Group communication

Personal attacks also cause some people to dominate others in meetings. Participants, who are less assertive than others, often have problems giving their opinion in meetings [2]. Next to that people often think they can achieve more through struggle than through negotiating; “it takes two to negotiate but only one to struggle [2]. This way of group communication leads to unhappy participants, especially those who were not able to give their opinion. Once the communication is lead through the GDSS system there is no place for personal attacks and everybody gets to give his say in the process. The observations from the experiment showed such behavior as mentioned above in both the traditional meeting and the GDSS meeting. But as said earlier the last step did not fit in the structure of the GDSS. And this step provoked a lot of struggle, because all participants let go of reasoning their actions. All actions in the form of shifting money from one option to the other, were done to force others in a direction. This led to a cat and mouse game. For further research it would be recommended to search for a better fit between the GDSS and the structure used or even more preferable, if the GDSS would provide this structure itself.

6. CONCLUSIONS

Extensive research has been done over the past few decades on Decision Support, Group Support Systems and Group Decision Support Systems. Experiments gave conflicting results; some pleading for the improvement with GDSS others implying the opposite. Only recently the first web-based versions of GDSS’s hit the market. Opposed to the traditional GDSS’s these systems do not require advanced training for participants and are far less expensive. This makes interesting for a far wider range of enterprises and companies. Businesses these days can often profit from a common investment but this requires concessions. A GDSS as a service is an option to improve this negotiation process of developing an IT business case for projects with multiple stakeholders.”

The anonymity of the answers makes the process also less personal. So when people bring in a suggestion they do not tend to defend this suggestion at all cost from being dismissed. This improves the argument quality of an IT business case, because arguments are not person related.

The advantage of asynchronous communication with a GDSS prevents the need for bufferring answers and the influence other participants have on the answer given by someone. Participants of the meeting will not forget answers because others are speaking and it again lowers the barrier for giving an opinion. Information can get lost during the process when using traditional methods, whereas this information is registered by the GDSS during a GDSS meeting. And as said in the introduction, IT business cases often lack a complete list of all benefits; a GDSS can improve the registration of benefits stated during the meeting.

The clustering and prioritizing of the GDSS prevents unfunded discussions; participants state the arguments in the system and are required to argue with these arguments. This helps forming an opinion and getting the right phrasing of the problem or argument and prevents misinterpretation. Because discussions are reduced to well supported arguing the process is less time consuming.

The strict structure of the GDSS keeps the participants from personal attacks but also from small talk or other distractions. Especially the prevention of personal attacks will improve the group communication and also the satisfaction with the final decision and the process as a whole.

Limitations of this research are the influence of the facilitator, the misfit between the last step of the protocol and the system and the quantity of experiments. Although the influence of the facilitator was held to a minimum, there was still some influence. When the clustering step went on too long, problems were combined and formulated in a more abstract manner which leads to the misinterpretation of the original problem. The misfit between the last step in the protocol and the GDSS provoked many struggles. Now the negotiating had to be done with less influence of the system. The last limitation is the number of experiments. To really draw firm conclusions, a broader basis of experimental results is necessary.

Future research can be done on how the facilitator can effectively improve the negotiation process. Now the strict research protocol was perceived as very useful by the participants, but it only supports the more structured problems. The highly unstructured problems require a facilitator that can react quickly on unpredicted situations.

7. REFERENCES


