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Make Vs Buy decisions in Software Acquisition

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ABSTRACT

In this modern era, software and IT have become ever prevalent in the work place. Although some may question the value of software and other IT tools, it cannot be denied that it fills a much needed role. With the age of ICT now in full swing, corporate software acquisition is becoming an increasingly important topic. There are now more software solutions for many different business needs than there have ever been before. This poses an important question, Make or Buy?

It is the purpose of this study is to investigate the factors which motivate individuals or organisations in Make or Buy decisions in software acquisition. As well as the motivational factors, this study aims to investigate the perceived positive and negative effects of the decision. As so few studies on the subject of Make Vs Buy deal solely with the perception of individuals, this study hopes to shed some light on the subjective opinions of those making the decision.

Key words: Make Vs Buy, Information Technology, Software Acquisition

CONTENTS

1 INTRODUCTION

Advances in ICT have allowed for the development of complex software solutions that can and do add persistent business value in a plethora of different ways (Soh and Markus 1995, 39), ranging from the mundane to the vitally important. As a result of these advances, a vast market for pre-made software has opened up, leading to strong competition between software developers. As more and more businesses venture into the world of IT, software that would have once fulfilled a specialist role in a single company are now being commonly developed as standalone products for use across entire sectors. As with the specialized and targeted software of yesterday, so too will the specialized and targeted software of today become more and more commonplace. This trend poses a particular problem. Should a company purchase a ready-made software solution, or would a custom-made solution be more fitting to the situation? This is a very tough question, and obviously heavily dependent on the situation at hand. There are some situations where a ready-made, commercially available solution is absolutely the best choice. In these situations, the software usually fills a well-defined, common role in the business, such as an email system. There are also some situations where a custom-made solution is absolutely the best choice. This typically occurs when the software fills a more specialized role that is either unique or less common than usual.

The decision to Make or Buy in software acquisition is often made, in spite of our best efforts, subjectively. Many different factors play into the decision making process and it is the purpose of this study to find out what exactly these factors are. Some of these factors may include:

- Availability of ready-made solutions
- Cost of ready-made solutions
- Past success or failure in software acquisition
- Perceived risk

Since it is the perceived effectiveness and efficiency of the decision, something that is inherently subjective, that is being investigated and the study is interpretive and descriptive, qualitative research methods are used.

The focus of this study, Make Vs Buy decisions, falls under the subject of software acquisition. Many of the principles of software acquisition have relevance within the context of this study. The Make Vs Buy decision is part of the software acquisition process. In focusing on only this particular step in the process, it is hoped that some new information may be found on software acquisition.

2 RESEARCH TASK

2.1 Research Questions

1. What are the key motivational factors behind Make Vs Buy decisions?
2. What are the perceived positive and negative effects of the decision?
3. What is the overall perception of the success or failure of the decision?

2.2 Research Goals

The primary aim of this study is to determine the key motivational factors in Make Vs Buy decisions. Key motivational factors are factors which lead to the decision. These may include perceived cost or risk. Identifying these factors may lead to a better understanding of this step in the software acquisition process.

Another goal of this study is to find out what are the perceived positive and negative effects of the decision. This research question is designed to give an insight into the subjective behaviour and thoughts of those involved in the Make Vs Buy decision. Many different cognitive biases may be at play here, including choice-supportive bias, confirmation bias, the well-travelled road effect, the availability heuristic and post-purchase rationalization.

The final goal of this study is to find out the overall perception of the decision. That is, is the decision seen as a success or a failure? Since perceptions and biases play an important role in the decision process, the perceived success or failure may influence future Make Vs Buy decisions.

The expected results of this study is a simple list of identified factors and effects which answer the research questions. These identified factors and effects will be examined and compared in order to reveal possible theories and hypotheses.

3 RESEARCH FRAMEWORK

In the context of this study, Make and Buy have specific meanings which may be unique to this study. In order to clarify the situation, an explanation of each term follows.

A Make decision constitutes the creation of a new piece of software. This includes insourcing and outsourcing the development of said software.

A Buy decision constitutes the purchase or acquisition of a pre-made piece of software.

There is also a third, more ambiguous option available. This is Buying a piece of software which partially fits the needs of the company, and then Making it fit the needs more closely. As an example, a company could buy a piece of software and then significantly modify/have it modified. This option has facets of both the Make and Buy decision. For the purposes of this study, this situation will be avoided so as to provide a clearer focus for the study. This allows for future studies to comparatively analyse this third option within the context of this study.

The core problem that this study addresses is that the Make Vs Buy decision is difficult, and can be influenced by human subjectivity and bias. The Make Vs Buy decision, for the purposes of this study, is always a part of software acquisition process. Even if no consideration was given to the decision, the decision was in fact made. This case is completely valid and will not be ignored in this study, since the decision was made, there were motivational factors involved in the decision, and there is a perception as to the overall success or failure of the decision. This gives answers to all of the research questions, so the case cannot be ignored.

There are many potential motivational factors in a Make Vs Buy decision, as well as potential positive and negative effects of the decision. Some of these factors and effects, in no particular order, will now be briefly discussed.

Availability of solutions

One of the most immediate motivational factors may be the availability of pre-made solutions. What is meant by availability of solutions is the quantity of pre-made solutions that reasonably fit the requirements, which are currently available on the market. A saturated market may influence the decision makers by overwhelming them with choice. It might also influence the perceived consequences of the decision. Schwartz (Schwartz: TedTalk 2005) argues that in this situation, the buyer is more likely to be dissatisfied with the product simply because of the fact that there were other solutions which may have been better. Similarly, if there is a small market of solutions, the quality of the solutions may be judged, positively or negatively, by their quantity.

The availability of solutions also ties in with a number of other factors including the function of the software and the cost of solutions, which will later be discussed.

Functionality of the desired solution

The function of the desired solution refers to the requirements of the solution. If the desired solution performs a very specific function or is too unique, finding suitable pre-made solutions may be difficult or impossible, which will in turn influence the decision. The function of the software may also influence the perceived consequences of the decision. As was previously discussed, the function of the software is tied to its availability. For example, there are more pre-made email solutions available than nuclear reactor temperature controllers.

The function of the software also directly affects the cost of the available solutions, since market prices are directly related to quantity and variability of available solutions.

Cost of solutions

Another factor which may be relevant to this study is the cost of available solutions. As was previously discussed, the monetary cost of a solution is related to the functionality of the desired solution. The cost of the solution may be incorrectly judged based on personal bias, which is later discussed.

As well as the monetary cost, other costs must also be evaluated in a Make Vs Buy decision. The cost of integrating the solution with pre-existing software may be one. For example, a company may wish for a newly acquired email system to automatically use the same accounts as an existing corporate system account.

Employee training and the effort required to fully utilise a solution may also be a relevant factor. An example of this kind of cost would be the usability of the solution.

Suitability

Suitability refers to how well the proposed solutions fit the requirements of the desired solution. This is similar to, but distinct from, the functionality of the desired solution which was discussed earlier. However, the functionality of the desired solution does tie directly into the perceived suitability of a proposed solution.

Business processes and users

Another potential key factor in the decision-making process is the internal business processes or business methods used in the company, as well as the users of the system. Many different software solutions provide the same general functionality, but in different ways. The way in which a given solution works may fit the internal business process of a company better or worse depending on how it works. The intended users of the solution may also affect the decision making process. As an example, people working in the IT industry may desire high customisability and extensibility, whereas less IT-literate users may prefer a simple user interface.

Personal bias/Flawed reasoning

Motivational factors may be heavily influenced by the personal experiences of decision makers. A decision maker may be less likely to consider an option which was chosen previously that had an overall perceived negative affect.

There exist a myriad of different human biases which have been documented. Some biases which may apply to the Make Vs Buy decision process are as follows.

Choice supportive bias

Choice supportive bias is the tendency for people to see past choices as better than the alternative options at the time. As a relevant example, a person purchases a certain piece of software. The person is likely to believe and reinforce the belief that the choice was right because they made it.

Confirmation bias

Confirmation bias is the tendency for people to remember and look for information which confirms their own beliefs. In order to reinforce an opinion, a person may selectively choose information in order to confirm their own opinion.

Well-travelled road effect

The well-travelled road effect is the tendency for people to underestimate the negative effects of an often made decision and overestimate the negative effects of an unfamiliar or less often made decision.

Availability heuristic

The availability heuristic is the tendency for remembered information to be perceived as more important that forgotten information.

Post-purchase rationalization

Post-purchase rationalisation is the tendency of a customer to ignore the negative consequences of a decision.

Risk

The perceived risk involved in a Make Vs Buy decision is of importance to this study. The facets of risk assessment this study takes into consideration are the biased and subjective behaviours in risk assessment, not the efficacy of risk

assessment techniques. To clarify, this study is concerned with the subjective perception of decision makers.

There exist many factors which affect the perception of risk, including personal experiences and past behaviours. Risk perception may also be affected by general human traits, such as risk aversion. Risk aversion is the tendency for people to prefer sure outcomes over an outcome of chance with greater reward. In other words, risk aversion is "playing it safe".

Potential value

Something that must also be considered in the Make Vs Buy decision process is the potential value that the desired solution may bring. The obvious thought is that the desired solution has the same value regardless of the decision made, Make or Buy. This may in fact be true, but it is not the actual value which is the topic of this study, it is the perceived value. The value ascribed to bought or made solutions may be biased in some way.

4 RESEARCH METHODS

In this study, qualitative research methods are used. A qualitative approach is taken because the focus of this study is the perception of Make Vs Buy decisions. The data collected in this study is qualitative in nature. Though some quantitative data may be introduced, it will only be used in support of the qualitative data, but not in the formulation of any theories. For example, an interviewee's perception may be influenced by actual quantitative data. In such a case, the information that is important is the interviewee's perception, and the causes and reasoning behind that perception. This study is not concerned with the actual success or failure of the Make Vs Buy decision, but the perceived success or failure. This may seem like an oversight, but, as has been previously stated, it is the reasoning behind Make Vs Buy decisions that is the focus of this study.

This study does not presume any theories or suggest any hypotheses prior to the data analysis. It is the aim of this study to find the motivating factors behind Make Vs Buy decisions, and the perceptions of these decisions. This means that the study is interpretive. Due to the fact that this study is interpretive, it takes an inductive approach to answer the research questions.

The core phenomenon that this study addresses is the making of Make Vs Buy decisions in software acquisition. What is meant by Make Vs Buy decisions is the decision of a company or individual to purchase or use a piece of free or commercial off-the-shelf Software (COTS), or to have a custom system made. An example of this may be a blogger deciding to create his/her own website instead of using something like Wordpress. There are many reasons why a company or individual seeks to acquire software. The software can be used to improve existing business processes, create business processes, access new markets or to support the business in some other way.

For this study, a number of case studies are used. Each of these case studies are cases in which a company or individual made a Make Vs Buy decision. In each case study, a broad overview of the case is given. Following this broad overview is a detailed look at how it relates to the focus and concepts discussed in this study, and a justification as to why that particular study was chosen. The core data

of each case study is an interview or questionnaire, depending on the case. The interviewee or recipient of the questionnaire is ideally a person who was involved in the decision making process, though any person who has intimate knowledge of the process is acceptable. The purpose of this questionnaire or interview is to find out the overall consensus as to the positive and negative consequences of the decision, the key motivational factors behind the decision and whether or not the decision was successful. This constitutes the essential information for each case study, though additional information is also desired. Additional information includes things like surveys, multiple interviews or interviews from different perspectives of the decision making process.

The ideal sample would have the case studies ordered into pairs. Each pair would have 1 case where the Make decision was made, and 1 case where the Buy decision was made. The criteria for matching these pairs is how closely the environment of the studies, area of business for example, are related to each other. This allows for a more meaningful comparison between case studies. The ideal sample will give the optimal data, though less ideal samples are still valuable.

The data is analysed firstly by identifying the reasons behind the decision that was made, and how effective they think the newly acquired software is. Once this is done for each case study, a comparison between the studies is made. The comparison seeks to find similarities, differences and correlations between the different cases. The purpose of this comparison is to build theories based on common themes found in the cases.

5 DATA ANALYSIS

5.1 Research data

In an attempt to reach the ideal sample, a total of 2 case studies were chosen. In these cases, the company was undergoing some kind of software acquisition. In case A, the decision to Make was made and it was considered as a successful decision. In case B, the decision to Buy was made and was also considered as successful. Another pair of case studies would have been the ideal sample, but this sample is adequate nonetheless.

In both cases an interview with a key person (KP) was the primary source of data.

Each of these two cases will now be described in turn, with the following 3 points in mind:

- **Point 1:** the key motivational factors behind the decision
- **Point 2:** the positive and negative effects of the decision
- **Point 3:** whether or not the decision was perceived as successful

Case A

In this case, a 40 minute interview with the on-site IT manager was the main source of data. General information regarding the need for the software and the acquisition process was discussed broadly.

Case A is a large chemical manufacturing corporation, with many thousands of employees, which has manufacturing locations and offices located across the globe in 6 different continents.

This particular case concerns one manufacturing facility in Europe. The manufacturing facility required an upgrade to its automated packaging lines, since many of the components being used, including software, had reached their end-of-life. At the time, many of the machines in use were being upgraded to Windows 7 and the system used old database technologies and was no longer sustainable. The entire solution used several different software packages, some of which were pre-made, off the shelf products, and some of which were custom developed. Since

some of the components had reached their end of life, it was decided that a replacement of the system was required. As part of the packaging line overhaul, a new label generation system also needed to be implemented. As well as this label generation system, an interface needed to be acquired in order to allow users to control different parts of the packaging line. It was decided that the best course of action was to have a custom-made solution developed with the use of their own in-house team and external consultants and developers, so in this case, the Make decision was made.

The decision process involved 3 main groups. These groups were the IT department, the process area owners (engineers responsible for the equipment), and the corporation's procurement department. The procurement department was responsible for the appropriation of funds and interacting with potential vendors. Ultimately, the IT department and process area owners made the decision.

Point 1: Motivational factors

The key person identified that the unique requirements of the system was the most important motivational factor. This was due to the fact that off-the-shelf products that fulfilled these unique requirements could not be easily found. The key person noted that the most important of these unique requirements was that the system must have a low learning curve and be easy to use. This was because of the fact that instead of having workers dedicated to the packaging line, 40-50 people work in a rotation on the packaging line. Any effort that would need to be spent on training would be expensive. Another requirement was that the new system's user interface should be as similar to the old one as possible, in order to "reduce the learning curve". Trying to find a commercial product that met this requirement would be difficult. This meant that customisation was an important factor. The key person said, "We would get the level of customisation that we needed through development as opposed to buying".

The key person stated that there were "plenty" of off-the-shelf systems available for labelling systems. It was also stated that these solutions didn't fit the unique requirements of the project adequately, and that some level of integration with existing systems would have been required regardless of the decision made.

Cost was also a motivational factor, "Another factor in decision making would be cost". It was known that there would be a significant cost for the project, due to the packaging equipment as well as development costs.

Another factor which was considered during the decision making process was the level of support. The key person stated that with pre-made, off-the-shelf products, the level of support is less of a concern. That is, dedicated support for the system has been put in place by the vendor. This means that they are well equipped to deal with support issues.

The key person also identified risk as an important factor. The key person said that the automated packaging lines are "operationally critical areas... if our packaging lines are down, we're not making any product". The key person stated that, in order to reduce risk they would; "typically look to work with larger vendors". The key person sees larger vendors, large software development companies, as being more reliable than relatively small vendors.

Point 2: Positive and negative effects

When asked about the positive effects of the decision, the key person identified 3 important effects.

The first effect was a low learning curve for the new system. As was previously stated, a low learning curve was one of the requirements of the system. This was achieved because of the fact that they could customise the way the application looked and worked at their own discretion due to the Make decision.

The second effect was the adaptability to the changing requirements that the Make decision allowed for. During the testing phase of development, new requirements were identified by the process area owners. Because of the fact that the Make decision was made, it was possible to develop these new requirements more easily.

The third effect was the freedom the Make decision allowed for. This effect is somewhat related to the previous point. Making a custom solution allowed them to freely customise and design the system in the way they wanted.

All of the requirements of the desired solution were met, as well as a few "nice-to-have" features.

When asked about the negative effects, the key person could identify 2 “minor concerns”. Due to the scope change during the testing phase, the cost of the project rose. Also, due to the fact that the solution was partially developed in-house, knowledge loss is a concern. That is, if people who worked with and have intimate knowledge of the system leave the company, the knowledge they have may be lost.

Point 3: Success or failure

The key person said that, overall, the decision was a success, saying that "If we went back to do it again, we would make the same decision in terms of Make or Buy". The key person also stated that the solution "more than met the requirements". The solution gave them the customisation required, it was cost-effective and it was able to be integrated with some global enterprise systems, which was a first for the company. Integration with global enterprise systems would have been more difficult with an off-the-shelf product.

Case B

In this case, a 20 minute interview with the person in charge of software acquisition was the main source of data. The need for the software was generally discussed, as well as topics relevant to this study.

Case B is a small game development company based in Russia.

This particular case concerns a new community management office which was set up in Europe. This community management office was to serve as a customer support centre, serving 4 different languages, and a centre which collected feedback from the players of the games. As well as these tasks, another function of the office was "Communicating on different channels, including mainstream media such as Facebook". One of the facets of communicating on mainstream media was running and supporting Facebook competitions. In these competitions, players were asked to answer trivia questions and in return, would be given in-game rewards. Under Facebook's terms of use, a Facebook App must

be used to carry out competitions such as this. As a result, the office needed to acquire a Facebook App in order to carry out the competitions. It was decided that a pre-made, off-the-shelf Facebook App should be acquired, so in this case, the Buy decision was made.

The decision process was made in 3 stages. The first stage involved the community management team setting and prioritising the requirements. The second stage was the assignment of a person to be in charge of the acquisition process, this person was the key person of this case study. This person was in charge of searching for any available solutions based on criteria such as "price, how hard it is to learn [and] manage". This person then selected the best solutions and presented them to the community management team. It was ultimately this person's choice as to which solution to adopt. The final stage was deployment, whereby the solution would be taken into use and any necessary training would be given.

Point 1: Motivational factors

The key person identified a number of different factors which were involved in the decision making process, including time, availability, cost and risk.

The key person stated that the acquisition process was time-sensitive. The solution had to be implemented within 1 week of the process beginning. The key person said that they had "no time for creating a dedicated solution". Due to the time-sensitivity of the acquisition, the key person stated that the solution should be "dead simple to use" because "a few weeks of training... wouldn't be viable". The key person also said that they "didn't have time to create, we had to improvise".

The key person also stated that the decision could be revisited one year later, once the office was set up and fully operational.

On the availability of solutions, the key person stated that "surprisingly, not a lot of solutions that fit the description" could be found. Also, "mid-way, we had to strip down the requirements in order to broaden the search".

Cost was also identified as a factor. The key person said that many of the found solutions were "pricey" in regards to the features that they offered. Many of the

solutions found came as software bundles, which the key person said that they would only use "5% of ". This raised the concern that they would be paying for more features than they would actually use. A more modular solution was eventually found, in which unneeded functionality could be discarded in order to lower the price. Regarding cost, the key person also stated that "[the cost of making] would be far greater, and not worth investing in at this time".

The key person identified the biggest risk factor as being the payment model for the solutions found. All of the found solutions came with a subscription based payment model, so it was impossible to make a one-time payment for the solution. In order to acquire the software, they had to commit to a fixed-term contract with weekly or monthly payments.

Point 2: Positive and negative effects

When asked about the effects of the decision, the key person noted that the effects were "mostly positive".

The key person stated that the solution was "really easy to use", and that it displayed competition winners in a spreadsheet. This meant that distributing rewards to competition winners was a simple and quick process. The key person noted that it was also very simple to use from the competition participant's point of view.

The key person also stated that "we saved a lot of time by purchasing the software".

Support was also identified by the key person as having some positive effects. The response time from the support was typically on the same day, 1 or 2 hours from inquiries.

When asked about the negative effects, the key person identified 2 main effects, the price model and aggressive support.

The key person also found that "not even half" of the original requirements were satisfied by the solution. The key person noted that they were forced to adapt their requirements to the available solutions, and implied that it should be the other way

around. That is, the software would be "generally better" if it were capable of adapting to the requirements of its use. When asked if time had not been an issue, would they have made the Make decision, the key person responded "most likely, yes" because it would allow the solution to fit more requirements.

As was previously stated, the price model was something of an issue. The key person stated that "it was a bit hard to settle on the software... because we were required to purchase and pay for the software for a specific amount of time".

The key person stated that despite good response times, the product support was a little too aggressive. That is, they were being contacted "from time to time" by the support trying to sell additional products and features, and requesting feedback on the product. The key person said that "it was nice in the beginning, but it became annoying later"

Point 3: Success or failure

When asked whether or not the decision was a success, the key person said "I think it was both".

The key person stated that he was able to find a solution that was "really close" to what was needed, it was easy to use with a simplistic interface, and that even though the support was "aggressive", the response time was "really good".

About negative effects, the key person said that due to the fact that they were "in a rush", a better solution may have been found given more time. The key person said that "due to the time limit, we had to neglect a lot of opportunities".

When asked directly, the key person said that the solution was more of a success.

5.2 Data analysis/Cross-case analysis

The data from both studies will now be compared based on the three points:

- **Point 1:** the key motivational factors
- **Point 2:** the positive and negative effects
- **Point 3:** whether or not the decision was perceived as successful

Point 1: Motivational factors

Unique requirements

In case A, the desired solution had a requirement that was perceived to be not easily available in pre-made solutions. This requirement was that the desired solution should have a user interface which was similar to the system it was replacing. The key person in case B didn't identify any requirement as being particularly unique.

Customisation

In case A, the key person valued customisation, and saw Making as the means by which customisation could be achieved. The key person in case B didn't make any direct reference to customisation.

Support

In case A, the key person perceived solutions obtained through the Buy decision as having a greater level of support. In case B, support wasn't identified as an important factor.

Time

In case B, time was seen as an important factor. The acquisition process in case B was put on a time limit of just 1 week. Due to this, Making was not seen as a viable solution. Case A didn't seem to have this problem.

Revisit decision

In case B, the key person stated that the decision could be revisited 1 year in the future. This means that the solution was seen as replaceable. The key person in case A didn't mention the possibility of revisiting the decision. This difference may be due to the relative difference in size and cost of the desired solutions in case A and B.

Cost

In both cases A and B, cost was identified as a motivating factor. In case A, the key person was not able to identify which course of action, Make or Buy, would be more costly. In case B, the key person identified Buying as having a lower cost. The difference in the relative cost in each case may be a factor in comparing this point. Case A had a price tag of over $100,000, whereas case B had a price tag of around $500. In case A, the key person knew that the solution would have a high cost regardless of the decision made, since the project was such a large undertaking. Due to the fact that the company in case A was a lot larger than the company in case B, there may have been a difference in the way that cost was perceived. In case A, cost might have been perceived as necessary, whereas in case B cost might have been seen as something that, crucially, needed to be minimised.

Risk

In both cases A and B, risk was identified as a motivating factor. The key person in case A noted that the biggest risk factor in the acquisition process was the selection of a vendor, whereas in case B, the key person identified payment models as the biggest risk factor. This difference in perceived risks may again be due to the relative difference in size and cost of the desired solutions.

Availability

In both cases A and B, availability was also mentioned. The key person in case A stated that there were a lot of available solutions, whereas in case B the key person stated that there weren't a lot of available solutions. In both of the cases, however, the solutions available didn't fit all of the requirements of the desired solution. This indicates that the Buy decision consists of some compromise in terms of requirements.

Training

In both cases A and B, training was identified as an important factor in the decision process. Both cases required a low learning curve for the new systems, but for some different reasons. In case A, a low learning curve was required so

that the system could be used by a large number of people. In case B, a low learning curve was required due to the time-sensitivity of the acquisition process.

Point 2: Positive effects

Requirements

In case A, the key person stated that all of the requirements were met, including some nice-to-have features.

Adaptability

In case A, the key person stated that they were able to adapt when the requirements of the desired solution changed.

Freedom

In case A, the key person identified that, due to the Make decision, they were given freedom to customise and design the system as desired.

Time

In case B, the key person noted that time was saved by taking the Buy decision.

Support

In case B, the key person stated that the response time of the support for the system was good.

Low learning curve

In both cases A and B the key persons identified that a low learning curve was a positive effect. This is the only positive effect which was shared by both cases.

Point 2: Negative effects

Rising costs

In case A, the key person identified rising costs as a negative effect. The scope of the project increased which lead to an increase in cost. It may be that the Make

decision indirectly caused the cost to increase. That is, the ease at which the scope could be changed due to the Make decision, encouraged the increase in scope which in turn increased the cost.

Knowledge loss

In case A, the key person identified knowledge loss as a concern. This concern was perceived by the key person as being only associated with the Make decision. This may be because the key person saw Bought solutions as having better support.

Requirements

In case B, the key person stated that not all of the requirements of the desired solution were met by the chosen system, noting that over 50% of the requirements were not met. The key person also mentioned that the available solutions were not capable of adapting to the requirements. When asked if time had not been an issue, would they have made the Make decision, the key person responded "most likely, yes" because it would allow the solution to fit more requirements.

Price model

In case B, the key person identified the price model as a negative effect. Due to the subscription based price model of the chosen solution, they were tied into paying for the solution for a fixed period of time.

Support

In case B, the key person also identified the support as a negative effect. The key person stated that the support would aggressively sell new products and acquire feedback.

Point 3: Success or failure

In both cases A and B, the key persons perceived the decision as a success.

In case A, the key person stated that all of the requirements were met by the system, as well as some nice-to-have features. The key person also stated that the

system was cost-effective. There were only 2 negative effects of the system. The increase in cost, which was caused by the inclusion of nice-to-have features, and knowledge loss, which was perceived by the key person as being "a minor concern".

In case B, even though the key person perceived the acquisition as a success, some doubt was expressed. The key person said that the support response times were good, and that the system met some of the requirements, but showed some regret as to missed opportunities. The key person felt that opportunities were missed due to time constraints.

6 CONCLUSIONS

Research questions

Though there were a limited number of case studies, some answers have been found for the research questions. Some common motivational factors behind Make vs Buy decisions were found across the cases, the positive and negative effects of the decision were identified in both cases, and the perceived success or failure of the decision were ascertained. Some of the answers to the research questions were found to be common to both cases, but there were also some answers found in one case but not the other.

What are the key motivational factors behind Make Vs Buy decisions?

Motivational factors	*A*	*B*	*A and B*
Unique requirements	X		
Customisation	X		
Support	X		
Time		X	
Revisit decision		X	
Cost			X
Risk			X
Availability			X
Training			X

There were three motivational factors found in case A which were not found in case B. These were unique requirements, customisation and support. Two of these

factors, unique requirements and customisation, may have only been found in case A due to the context in which the decision was made. In case A, the unique requirements and customisation were highly valued, whereas in case B there were no unique requirements and customisation was not required of the new system. Support was not considered as a motivational factor in case B. This may be due to time-sensitivity of the acquisition process in case B. Since so little time was allowed, it may be that much effort was spent in evaluating all the pros and cons of each decision.

There were two motivational factors found in case B which were not found in case A. These were time and the ability to revisit the decision in the future. These were not identified as issues by the key person in case A, possibly due to the fact that there was comparatively more time allowed for the acquisition, and that the new system was intended to be a long-term solution.

There were four motivational factors found common to cases A and B. These were availability, risk, training and cost. Though the perceived availability of pre-made solutions was different in each case, case A a lot of solutions were perceived to be available whereas in case B not a lot of solutions were perceived, a common theme was found between the cases. This common theme is that pre-made solutions were perceived as not being able to adequately fulfil the requirements of the system. Risk and training were factors found in both cases, but for different reasons. This may be explained by the differences in the cases. Cost was perceived differently between the cases. In case A, it was known that the acquisition would have a large monetary cost, whereas in case B the cost weighed heavily into the selection process. Again, this difference is likely due to differences between the two cases.

What are the perceived positive and negative effects of the decision?

Positive effects	*A*	*B*	*A and B*
Adaptability	X		
Freedom	X		
Requirements met	X		
Saved time		X	
Support		X	
Low learning curve			X

There were three positive effects identified in case A which were not identified in case B. These were adaptability, freedom and fulfilled requirements.

There were two positive effects identified in case B, which were not identified in case A. These were saved time and support.

This single effect identified in both cases was a low learning curve.

Negative effects	*A*	*B*	*A and B*
Rising cost	X		
Knowledge loss	X		
Requirements not met		X	
Price model		X	
Support		X	

There were two negative effects identified in case A which were not identified in case B. These were rising costs and knowledge loss.

There were three negative effects identified in case B which were not identified in case A. These were price model, support and unfulfilled requirements.

There was one positive effect and no negative effects identified in both case A and B. This may be due to the fact that the effects identified are largely related to the decision made and the context in which the decision was made. For example, adaptability and freedom were not desired in case B and time was not an issue in case A. This is the result of a discrepancy between the requirements of the desired solutions. Since each desired solution had such vastly varying purposes, meaningful analysis of the common effects of the decision is difficult. Though analysis of common effects is difficult, analysis of uncommon effects still provides valuable information.

What is the overall perception of the success or failure of the decision?

In both cases, the decision made was considered a success. In case A, the only negative effects of the decision that were identified were perceived as being a "minor concern". Though case B had some negative effects, and the key person was somewhat hesitant to regard the decision as an outright success, the decision was seen overall as a success.

Limitations, reliability, validity and generalizability

A very small sample size was used in this study, only one pair of case studies. As well as the small sample size, the companies which are the subject of these two case studies are very different. One being a billion dollar chemicals manufacturing company, the other being a small game development company. As a result, generalising the results of this study is not advised. A better sample would have been comprised of multiple pairs of case studies, and pairing by field of work and geographical location.

The findings of this study may not be entirely reliable, since a single interview was used as the basis of each study. The biases of the interview may have affected the outcome of the study. Additional interviews from different people involved in

the decision process, and possibly surveys, would have provided more reliable data.

7 DISCUSSIONS

Earlier findings

Some of the findings of this study are shared with findings of earlier literature.

In regards to time, the key person in case B was in agreement with the findings of (Daneshgar, Worasinchai and Low 2011, 5), in that the Make decision requires more time. Support was also a factor in that study but for different reasons. In this study, support was identified only in case A, where the key person stated that in the Buy decision, vendors are generally better prepared to support their products. Contrary to this (Hung and Low 2008, 128), found that some organisations considered support in the Buy decision to have *"faster turnaround and flexibility*". (Daneshgar, Worasinchai and Low 2011, 5) simply identified that if vendor support is inadequate, the Buy decision is more likely among SMEs.

(Nelson, Richmond, and Seidmann 1996, 35) found that "*companies have idiosyncratic tendencies concerning their software acquisition decisions*". This may be relevant in both cases, in that the key persons may have had "*a strong predisposition toward [custom]".*

Several studies identified cost as an important factor in the decision making process, including (McManus 2003) (Daneshgar, Worasinchai and Low 2011) (Hung and Low 2008).This implies that cost has special relevance in the Make Vs Buy decision. With this in mind, further study on cost as a motivational factor is necessary.

In case A, the key person was not able to identify which is generally cheaper, Make or Buy. In case B however, the key person identified the Buy decision was cheaper in that particular case. (McManus 2003, 36) touches on that topic, stating that "*The cost risk is about the same when deciding to buy or build a system*".

Time was identified as a motivational factor in case B. The Buy decision was seen as being faster than the Make decision. This is identified in (McManus 2003, 36), whereby the author identifies that, in terms of risk, the Make decision has a higher time-loss risk associated with it. However, (Hung and Low 2008, 126) holds some conflicting information regarding this topic. It is indicated that some organisations

perceive the Make decision to be faster due to highly developed skill sets and that a protracted package/evaluation process can inflate implementation time.

Requirements fit (Hung and Low 2008, 125) was a factor in both cases. In case A, the system had some unique requirements that would not be met by a purchased solution and in case B, many requirements were sacrificed in the acquisition process.

Vendor selection was identified by the key person in case A as being an important risk factor. Vendor risk is also identified in (Hung and Low 2008, 126).

The potential for knowledge loss was identified as a negative effect in case A, whereby knowledge attained during the development of the system was perceived to be at risk of being lost. (Hung and Low 2008, 129) found that some organisations take the opposite point of view. That is, that the knowledge attained during the development of the system was seen as an asset, and sometimes even a competitive advantage.

Further implications

This study reveals some interesting implications. There were four motivational factors which were found in both studies. There were, however, six motivational factors which were not common. The same is true to the positive and negative effects. Only 1 common positive effect was found between the cases and no negative effects were found to be common. As previously stated, this may be caused by various factors specific to each case, including size, intended use, cost and requirements. This implies that motivational factors, and their perceived positive and negative effects, are, at least in some part, dependant on the context in which the decision is made. Further study may be helpful in identifying these context specific factors and effects. It is important to identify these in order to clearly structure and focus meaningful data comparison.

Future study

For further research on this topic, a number of factors must be taken into account. The most important factor is using a more appropriate sample. In order to make a more meaningful comparison of data, the data must be organized by area of

business to at least some degree. At the very least, data should be categorized based on the sources familiarity with technology and ICT in general. This is because of the fact that past experiences do have an effect on perceptions. This also means that past experiences must be looked at more closely in the data gathering phase, so that a more meaningful data comparison can be made.

There is also another facet of the Make Vs Buy decision which may warrant future study. That is the third option which was previously discussed in this study. This third option involves some measure of both the Make and Buy decisions. It is when a solution is Bought which partially fits the requirements, and then Made to fit those requirements more closely.

The sample for this study was limited. Though it gave some meaningful data, it did not represent the full spectrum of business environments that exist. With this in mind, it is suggested that more research be done on a number of other fields of business.

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