How risk assessment can be done in a quantitative way in a Chinese SME?

A case study in China

Bachelor Thesis within Business and IT management

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Jönköping June, 2010
Abstract:
Outsourcing as a business strategy has been around for a very long time. Despite of that fact the main focus still falls on the customer’s perspective. In this thesis we researched a risk assessment framework that is suitable for the vendor’s perspective of the project. The advantages that the quantitative risk assessment framework will bring are saving time and money, and make it much easier to record risk levels and compare them to old projects.

Our case is a small Chinese company (Da Gen located in Shenzhen) that is facing a new stage in their business – going international. They want to be more prepared (concerning risks expectations) for that step. Currently they are using a qualitative risk assessment framework, which does not provide them with any particular or comparable data. They want to be able to keep track of how risky each project is and the success level in order to be able to compare projects and make better decisions.

In the theoretical framework we presented to Da Gen a list of possible risks that they can encounter. After the risks are being recognized, we proposed to the company a way to assess those risks in a quantitative way. In addition we presented the P-I Table framework and based on that table, developed a new quantitative framework that Da Gen can use.

The data gathering was done in both quantitative and qualitative ways. Interviews and questionnaires were conducted in order to find information about the company and previous projects. After all of the data was gathered, the data was entered into newly built quantitative framework. The results are a clear representation of the risk levels of previous projects.

In the analysis section we showed how the new framework works and how the results can be displayed and analyzed. We also compared the old qualitative framework to the new one in order to prove that our method of the quantitative framework assessment is much faster and more accurate.
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1. Introduction

Nowadays, outsourcing is not a new phenomenon. However, some of the risks are still to be identified for many Chinese small companies involved in outsourcing projects. This chapter is going to introduce the risk outsourcing background, choice of topic, and briefly mention the company’s background. In addition, the problem discussion, the research question, and the purpose will also be presented in this chapter.

Figure 1.1 Disposition of the Introduction Chapter

1.1 Outsourcing Risks Management Background

Outsourcing is not a new topic in the business world. It has been around since the 1960s, but only since 1989 has it been identified as a business strategy (Williams, 1998). In the beginning of the 1990s, organizations began to outsource those functions that were needed to successfully run a company, but still not closely related to the core business. This was done in order to enhance the cost saving (Williams, 1998). As in every new strategy, it hides many risks. Many researches and models are done in the field to find the risks prior to outsourcing. But even though outsourcing hides many risks it is still a preferred strategy for many businesses (Handfield, 2007).

Since the beginning of outsourcing, different countries have been in focusing on outsourcing centers but that has been changing over the years. In the beginning of the outsourcing ‘boom’, India was in the ‘lights’. "In 2003, Ireland and India were the main beneficiaries of offshoring and the largest exporters of IT services, reaching 14.4 billion dollars and 11.3 billion dollars respectively..." (International Monetary Fund July 2005, RTTS, 2009). These days the picture has slightly changed: "An annual survey by accounting and consulting firm BDO Seidman LLP showed that 22 percent say the United States is the outsourcing destination they are most likely to consider in 2009, compared to 16 percent for China and 13 percent for India." (RTTS, 2009, Silicon Valley Business Journal March). The main risks indicated in outsourcing to other countries are the language and cultural barriers, not to mention the time difference. Even with the far location and different culture, most of the outsourcing clients are looking at contracting with China (Blokdijk, 2008).
China is the most populated country in the world with more than 1.3 billion people (Central Intelligence Agency, 2010). That is one-fifth of the population of the world. Meanwhile, China has the third largest economy. Being a member of WTO, APEC, East Asia Summit, G-20 or Shanghai Cooperation Organization is getting more important in the business world today.

The government of China plans to develop 10 outsourcing base cities by 2010 in an effort to build up outsourcing services. These cities include Shanghai, Dalian, Xi’an, Shenzhen and Chengdu (Thaindian News, 2008).

Shenzhen is a sub-provincial city in Guangdong province in the southern China. Shenzhen is in a first Special Economic Zone and also is a major manufacturing centre in a local level. It is also a head quarters to some of China’s mainland and Taiwan’s most successful high-tech organizations and companies, such as Hua Wei, Tencent, Hon Hai and ZTE. Most iPods, iPhones and notebooks of Apple and ThinkPad notebooks are manufactured in Shenzhen. Also, it is the centre of technical outsourcing for China. Nowadays, it is reputedly one of the fastest growing cities in world (Shenzhen Government Online, 2008).

1.2 Topic choice

In the beginning of writing the thesis it is very important to choose the “right” topic. By right we mean that it should be interesting for us as well for our readers.

We have focused on the topic of risks in outsourcing. We would like to explore the fast growing market of outsourcing and what risks that brings to a company. We did a lot of detailed research and data collection. We found that China is a fast growing market in the outsourcing field; meanwhile, China has also attracted a lot of outsourcing companies in the recent years. Another advantage of choosing China is the understanding of the Chinese language that one of the team members has. This will help us gather primary data during our research. Therefore, we decided that we will put our focuses on Chinese outsourcing. Another topic that came up, while researching, was risks in outsourcing, which actually caught our attention. Combining that with the interest in China, we decided to narrow down our topic to the question of how to assess risks in Chinese companies.

1.3 Company’s Background

Da Gen tech CO. LIT is a Chinese company in Shenzhen. It has 60 employees and total assets lower than 400,000,000 CNY, therefore it falls in the small Chinese company category. Da Gen is a system design house in Consumer Digital industry. It mainly focuses on producing system chips for its customers. The system chips can mainly be used for Digital Photo Frames (DPF), DPF Wireless Baby Monitors, Mini Projectors, Digital Whiteboards etc. Da Gen offers total solution and full design services to its customers. Its customers are mainly Chinese companies and some companies located in southern Asia (Da Gen official web page, 2008).

As the global business is growing each day, Da Gen is not satisfied being limited only in Asia, they want to expand their business abroad. Da Gen’s next plan is to cooperate
with occidental companies. On the other hand, Da Gen has no experience doing business with companies from outside of China. The first step for Da Gen going abroad is to discover and assess what risks it can encounter when going abroad (Appendix 1, Interview with York Dai).

Da Gen uses a model, which will be explained later in this section, to assess the risks in outsourcing. It has had many successful projects in their past, but the company wants to keep track of the ones that have not been successful as well as to see how they could have prevented them prior to signing the contract. In other words Da Gen wants to add functionalities to the current framework, that they are using, or to change it in order to have more quantitative results that can be compared to other project’s results.

In Figure 1.2 Da Gen Tech CO.LIT presented to be a vendor and a client in the same time. At present, the next plan for Da Gen is to expand its business abroad.

In Figure 1.2 Da Gen is presented both like a vendor and like a client. Most companies these days are in the same situation. They cannot produce all that they need for business that is why they need to buy it from other, third party companies. Da Gen sells programming chips with in-house developed software for different devices like photo frames and electronic boards. This is the vendor side of the company, but in the same time it needs to get the raw chips from somewhere else. Da Gen buys its chips from companies that produce raw chips like: ITE Tech. Inc., Epson, Magic pixel, and GMT, those will also be referred to as the third parties later on in this thesis. This is the client’s side of Da Gen.

In Figure 1.2 the arrow that points to the right represents the next step for Da Gen. Since the company is located in China, which has been the outsourcing center for the past
couple of years; it wants to go abroad as a vendor. As mentioned earlier, Da Gen has the business possibilities to be both vendor and client, which means that it will not be any problem for the company to become a vendor to receive outsourcing offers from outside of China. Also, for the purpose of this study, Da Gen will be viewed as a vendor.

One of the problems that Da Gen faces before going international is that the company is not aware of what risks to expect. It has great experience working with companies on a local level and it has built up a good risk assessment framework (explained further in this section), but the company wants to make some changes for the new step. Da Gen wants to be able to see the level of risk each project has and to compare it to other projects, since the company will be facing completely new environments for them.

1.3.1 Da Gen’s Risk Assessment Framework

Da Gen is using a framework that has no particular name, for more convenience we will just call it DG Risk Assessment Framework (Figure 1.3). It has three main points as shown below:

1. Clarify the scope of responsibilities of IT outsourcing

The first step of DG Risk Assessment Framework is to establish the requirements. That is done through a lot of negotiations between the clients and the project team. The requirements from the client are presented in the first meeting with the company. That is followed by deciding if the requirements are feasible. This is usually done by the IT department. If they conclude that some of the requirements are not feasible, they prepare a new solution that will still achieve the main goal. Then the solution is presented to the client. The client can accept or reject the solution. If the solution is accepted the assessment moves to the second step. If the solution is not accepted another solution is prepared until the client decides it is acceptable.

2. Conduct a comprehensive assessment of customers

The customer assessment is always conducted before signing a contract or undertaking a project. The assessment is done by a discussion between the managers of the IT and Marketing department and the project team members. In the end the founder of the company, called “the boss” further on, always has the final decision. The company evaluates the customer depending on its capital, popularity, or by any previous experience with the same customer. Risks are established on the spot by the managers, IT department, and marketing department. They decide if the project is risky and worthy of undertaking. For each project new risks and new guidelines are discussed. This can be very time consuming. In the end of those discussions, the result is whether the company will undertake the project or not.

3. Pay attention to the details of change management and outsourcing contracts

In the third step, the project team reviews the contract and sends it to the boss to hear the last decision. He has the power to say “yes” even to a very risky project. However, the boss only views the results of the evaluation which are produced by the IT and Marketing departments. Also, in the end of the discussion, the team mentioned earlier tries to forecast further implications of the project that will also be included in the risk levels.
1.4 Research Problem

In this thesis, the focus will fall on the vendor’s side of company. Normally, when companies plan to outsource, there are many factors that have to be considered in order to gain maximum benefits. Similarly, when a vendor receives an order, it has to consider how to satisfy its clients while earning maximum profit. There have been many discussions and a lot of books have been published on that topic but most of them focus on the client’s side (Schniederjans, 2007). That led us to make a research and see what a vendor can do before signing a contract.

Very few publications focus on the vendor companies. Most of the papers give guidelines that will aid the customer to choose the appropriate outsourcing company. Others do not recommend outsourcing at all. A strategy is not about predicting the future of the firm, it is a tool when analyzing and understanding it. This is important concerning the competitive advantage or competitive value in the long term for the firm (Dobson, Starkey & Richards, 2004).

The same goes for the risk assessment. There have been hundreds and thousands of articles about outsourcing risks but the emphasis is on the client’s side (Schniederjans, 2007). We have brought this problem in front of Da Gen. The company is currently using a simple qualitative framework in order to assess its customers. As we took up that case study we would try to provide a better solution for evaluating risks and present it to Da Gen, as well as test it on them, since Da Gen can be both viewed as a customer.
or a vendor. Later on we will inquire results if they have used the given solution and how they liked it.

Da Gen has the idea to expand abroad as a vendor but they want to see what kind of risks they can encounter and how it will be easier to assess them. The old framework that they are using is not very clear and lacks consistency. We would like to research for Da Gen the risk they could encounter when trying to go international and introduce a quantitative framework that will help them to be more consistent with their results. The new framework needs to have a numerical input that is easy to rate and understand. Then the calculation should not take much time and should be easy to record. In the end, the output will be the percentage of risk that a client or a project has.

We do not have the time and resources to conduct a research to find the risks, which is why we will research risks that already have been found from all over the world, in a previous study. The list of risks will be reviewed and the ones that best suit Da Gen will be chosen.

1.5 Research Questions
- What risks can be discovered by a Chinese SME vendor prior to entering an outsourcing contract with an international client?
- How to make better and easier assessment in a quantitative way?
- How to gain better risk perception by calculating in a quantitative framework?

1.6 Purpose
The purpose of this thesis is to find a list of possible risks for Da Gen, a small company in China that wants to become a vendor in an outsourcing contract in an international environment. In the same time, give a solution of how to evaluate risk in a quantitative way and find risk levels for a project, which will create consistency.

1.7 Delimitations
This thesis will be delimited to the vendor’s side of the outsourcing project. To narrow it down even more we will observe only small and medium size companies in China that want to contract with other countries. Because of the time limit and the difficulty to find companies to collaborate with we will use Da Gen as a starting point of our study.

1.8 Interested parties
The interested parties that may have a use of this thesis are small and medium size companies in China that would like to enter into an outsourcing contract in the role of a vendor. Most of the risk that will be found will be transferable from China to other companies, with similar characteristics to Da Gen, in other countries. All companies that are in the same area of business as Da Gen and have similar size will be able to use the solution provided.
1.9 Dictionary

SME - According to “Provisional Regulations on Standards for SMEs” which is published by the Economic and Trade Commission, State Development Planning Commission, Ministry of Finance, and National Bureau of Statistics at 2003, it claims in manufacture industry, small and medium enterprise must accords with: the number of employees lower 2000, or sale lower than 300,000,000 CNY, or total asset lower than 400,000,000 CNY. In this category, the number of employees of medium size companies must more than 300, and sale more than 30,000,000 CNY, and total asset more than 40,000,000 CNY; others are small size companies. (Chinese SME information website, 2010)

IT outsourcing - Outsourcing can be defined as “the strategic use of outside resources to perform activities traditionally handled by internal staff and resources”. Sometimes known also as “facilities management”, outsourcing is a strategy by which an organization contracts out major functions to specialized and efficient service providers, who become valued business partners (Handfield, 2007).

Risk - In his book of Risk Analysis Vose (2008) defines risk as follows: risk is a random event that may possibly occur, if it did occur, would have a negative impact on the goals of the organization. Thus, a risk is composed of three elements: the scenario; its probability of occurrence; and the size of its impact if it did occur (either a fixed value or distribution). (Vose, 2008)

Vendor - a vendor is a company that provides goods or services to another company. A vendor usually manufactures items and sells to its clients companies (Skjott-Larsen, 2007).

Impact - the damage the risk can inflict, can be measured in cost, quality, delay etc (Vose, 2008).

Probability - is a numerical measurement used to measure the likelihood of a result of random process (Vose 2008, p118).

WTO - The World Trade Organization, an organization that deals with the rules of international trading between nations (WTO official web page, 2010).

APEC - Asia-Pacific Economic Cooperation, the premier forum regarding trade, cooperation, and investment in the Asia-Pacific region (APEC official web page, 2010).

G-20 - The Group of Twenty (G-20) Finance Ministers and Central Bank Governors; the premier forum is promotes open and constructive discussions in order to increase international economic development, such as emerging-markets and industrialization. Countries discuss key issues which regards to global economical stability (G-20 official web page, 2010).

Hua Wei - Huawei Technologies Co. Ltd., a telecom solutions provider in China, that provides Telecom Network Infrastructure, professional services, devices, application and software (Hua Wei official web page, 2009, Foxconn, 2007).
**Hon Hai** - Hon Hai Precision Industry Company Ltd, it is also the anchor company of Foxconn Technology Group, is one of the manufacturing leaders in TFT & DVD fields (Hon Hai official web page, 2009).

**ZTE** - is an integrated communications manufacturing company, it is also a global communications solutions provider (ZTE official web page, 2010).
2 Methodology

According to the purpose, in this chapter, we will discuss our research method. Meanwhile, we are also going to introduce how we went about data gathering. Present how we reached reliability, validity, and generalisability in our research.

Figure 2.1 Disposition of the Methodology Chapter

2.1 Research design

Before we started to think of our research questions, we have begun to think about research’s purpose.

There are three different research designs that can be undertaken: explanatory, exploratory, and descriptive. We have decided to carry out an exploratory study at first. According to Saunders (2007), an exploratory study is used to clarify the understanding of a problem, to find out ‘what is happening; find a new insight; ask questions and evaluate phenomena in a new way’. There are three principal ways to do exploratory research:

- Conduct a literature research;
- Conduct interview with experts in the subject;
- Conduct interviews to focus group.

As mentioned before, we have focused on the topic of risks assessment. We are going to conduct exploratory research in order to investigate our research questions. We will conduct a research that is concentrated on both literature review and interviews, and combine them with the theory in order to provide an in depth understanding of our research questions. In the same time we will use an explanatory study in order to answer our research questions more clearly.

Saunders (2007) clarifies that explanatory study is when the researcher studies a problem in order to establish relationships between variables. This type of research mainly needs qualitative data as an input. We will use the explanatory study to explain in a qualitative way the advantages of the quantitative framework.
2.2 **Choice of Method**

The choice of method has to be closely related with the research questions since it will represent how we are going to answer them. That is why it is important to choose the right method in order to receive the “right” answers. In the following sections of this chapter, we will introduce the methods used in this research for data gathering and analysis. Also, we will present the strategy of the whole research.

2.2.1 **Case Study**

According to Robson (2002) defined “Case study as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence”. And “case study strategy is most often used in explanatory and exploratory research…” (Saunders, 2007). Since we plan to conduct an exploratory research, we will conduct a case study in order to explore the phenomenon which we are interested in – risk assessment in outsourcing.

Yin (2009) identifies two discrete dimensions depends on four case study strategies: single case v. multiple cases, holistic case v. embedded case. There are five rationales to choose a single case study according to Yin 2009: representing a critical case, representing an extreme or unique case, representing a typical case, representing revelatory case, and representing longitudinal case. We have chosen the single case study because we have a typical case.

Da Gen is a technical company which is located in southern China. We have a good opportunity to contact Da Gen, and managed to interview one of the top staff members. Da Gen also is a typical company because it has a small size and it outsources with many big companies. Therefore, we conduct a single case study in order to have a deeper understanding of Da Gen’s problems.

As we mentioned above, Shenzhen is the centre of technical outsourcing of China. There are around 40 to 50 small companies similar to Da Gen in Shenzhen. The difference between big and medium size companies and the small ones is that these small companies are surviving in the gap among those big and medium size companies. The small companies keep their competitive advantages, as low price, fast production, special customization and small quantity of production. Since China has joined World Trade Organization (WTO) in 2001, more international companies in the business with technology began to pay more attention to China as an outsourcing market, meanwhile, the Chinese local outsourcing companies have the ambition to contract with international companies.

2.3 **Deduction vs. Induction**

There are two main approaches to build one’s research: inductive and deductive approach. They can be used separately, one by one as well as in combination of both by starting with one and finishing with the other. The right mix is determined by the authors and depends on the goals of the research.
Deductive approach goes from the more general to the more specific. It is often referred to as a ‘top-down’ approach. In this approach, we start by finding a theory that is relevant to the research we are interested in. After the theory has been chosen, it is being narrowed down to more specific hypothesis. That hypothesis will later be tested, but before that, we narrow it down even more with observation. In the end of this approach, the theory is narrowed down enough in order to be easy to test it and confirm or reject the initial theory (Saunders, 2007).

Induction, on the other hand, has the opposite way of researching, therefore referred as ‘bottom up’ approach. It starts from a particular observation, during which we try to register a pattern. When this is accomplished, a hypothesis is developed that can be explored afterwards. The whole process ends when the researcher comes up with general conclusions or theories (Saunders, 2007).

In this thesis, we are going to use both of the approaches in order to gain the best understanding of the researched topic. Since the purpose of this thesis is not to come up with a completely new theory, hence to the time limits and the academic level, we will rely mainly on the deductive approach. In the beginning, though, we did not have an idea of what to study. We used abductive reasoning as mentioned further on which lead us to the idea to create new framework, which meant to use the inductive approach. Our idea was to create a completely new framework for our host company, in order to do that we observed several phenomena in the IT management area. Using the inductive approach, we decided to try and come up with a hypothesis about outsourcing risk analysis, but when we continued our literature review and we read more into that topic,
we found several theories that drew our attention (P-I tables, Outsourcing risk lists, and Software risk assessment methods). Looking more into those options, we realized that it will be better and more “accurate” if we undertake deductive approach and change the aim of our research a little. The new goal was still to create a framework, but based on established theories (like the P-I table) and to test them in a real case environment with our host company.

Using both approaches and the abductive reasoning, as well, we managed to view the topic of our thesis from all different aspects and choose one aspect that best fit our interests, time, goals, and constraints.

2.4 Abductive reasoning

In the beginning of our research we used the abductive reasoning that helped us to get ideas for the topic. Abductive reasoning is used when you have limited data about a subject. This type of reasoning differs from inductive and deductive one in a way that it can be disputed if more information is found about the topic (Aliseda, 2006). Abductive reasoning can be referred to daily decision making, it is done on the spot with the best information at hand, which means that it is not always the best one as we learned by experience.

Abductive reasoning is not as accurate in comparison to deductive, since deductive reasoning can be interpreted as mathematical reasoning, thus making it more accurate. The first one resembles inductive reasoning in its none-logical nature (Aliseda, 2006).

We started our thesis with an incomplete set of observations about the risk assessment phenomenon. As we proceeded towards our research we managed to find some explanations about how risks can be assessed. In the beginning, when we chose our topic and decided that we will make a framework we did not know that the theory of the P-I Table existed. Therefore we had the idea that we could create a new framework and therefore we will use the inductive approach, but with continuing our literature review we discovered the P-I Table. Then, our research changed its course a little. This is how the abductive reasoning was used in our research; by discovering new information and therefore our first decision was at a halt.

2.5 Qualitative vs. Quantitative method

Many authors are trying to give defined distinction between quantitative and qualitative methods (Saunders, 2007). In order to gain better understanding we have viewed different definitions of qualitative and quantitative methods. Having different perspectives will also aid us in our choice of methods and will optimize the data gathering and data analysis. The following two definitions come from different authors:

“Qualitative research is multimethod in focus, involving an interpretive naturalistic approach to its subject matter. This means that the qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience,
introspective, life story, interview, observational…texts – that describe routine and problematic moments and meanings in people’s lives.” (Denzin and Lincoln, 2000).

“Qualitative researchers seek explanations and predictions that will generalize to other persons and places. Careful sampling strategies and experimental designs are aspects of quantitative methods aimed at produce generalizable results. In quantitative research, the researcher’s role is to observe and measure, and care is taken to keep the researchers from ‘contaminating’ the data through personal involvement…” (Glesne and Peshkin, 1991).

Thomas (2003) summarizes the previous definition in a simpler one. According to Thomas (2003) qualitative methods is when a researcher is describing events and people without comparing them to measurements or amounts. On the other hand quantitative methods focus on measurements and amounts of the characteristics displayed by the people or the events that are being researched (Patton, 2002).

After reviewing the different methods, we have to decide which one suit us best. Our research has the goal to acquire in depth and particular information about a specific problem in the area of outsourcing risk assessment, which leads us to choose qualitative method. In the same time, in order to make sure our research is as “objective” as possible, we will also conduct a questionnaire to collect quantitative data. In this way we will try to cover a more representative sample, rather than conducting only interviews. Therefore, we tend to use both qualitative and quantitative methods, in order to analyze the quantitative and qualitative data. This method is named “mixed method research”, which defined as “… uses quantitative and qualitative data collection techniques and analysis procedures either at the same time (parallel) or one after the other (sequential) but does not combine them.” (Saunders, 2007). This means that we will have both types of data gathered from the interviews, theories and questionnaires, and also we will analyze it with graphs and interpretations.

2.5.1 How we calculate our Quantitative Data

In this section, we will explain shortly how we will calculate our gathered data.

First, we need to calculate the value of each factor. As you can see in Table 4.1 in the Empirical Findings Chapter we have used Excel to input the data from all of the questionnaires. Once the data is in the Excel table it is very easy to complete the calculations. We used the Probability (P) multiplied by Impact (I) formula, and then we got the Value (V):

$$P * I = V$$

This is taken from the P-I Table theory explained later in this thesis.

Second, we calculated the sum value for each factor, as $$V_1 = V_{Q1} + V_{Q2} + \ldots + V_{Q41}$$. $$V_1$$ represents the value for risk No. 1 and $$V_{Q1}, V_{Q2}, \ldots, V_{Q41}$$ represent the values given by each respondent. This is needed in order to calculate the average of the particular risk factor.

Once we had the sum value ($$V_1, V_2, \ldots, V_{41}$$) of each factor, the third step is to calculate the mean value of each factor. The reason of this calculation is to gain a value for each risk that is more general and that represents the input from all the participants.
According to (Aczel, 2009) the mean value is the average of a set of observations. It could be equal to the sum of a set of observations, and the sum divided by the total number of observations. The formula is as below:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$\sum_{i=1}^{n} “\text{means the sum of all } x_i \text{ values where } i \text{ is between 1 and } n”$$ (Vose, 2008 p 113).

$$x “\text{is the label generally given the value of a variable}”$$ (Vose, 2008 p 113).

$$\bar{x} “\text{means the average of all } x \text{ values}”$$ (Vose, 2008 p 113).

In other words, $\bar{x}$ is the mean of a set of observations, and $n$ is the total number of observations, and $\sum_{i=1}^{n}$ is the sum of a set of observations. In our case, the formula will look like follows:

$$V = \frac{VQ1 + VQ2 + ... + VQ41}{n}$$

Here, $n$ also means the total number of respondents. It will vary since we have some data missing, which will be explained more in the Dealing with missing data section of this chapter.

After these calculations were completed we received averaged values for each risk.

### 2.5.2 Dealing with missing data

According to Saunders (2007), the missing data also needs to be analyzed. The reasons of why the data is missing have to be established. Saunders (2007) mentions the following 5 reasons for missing data:

- The respondent was not required to answer the question
- The respondent refused to answer the question
- The respondent did not know the answer
- The respondent may have missed to answer
- Missing data implies an answer

We have established only two main reasons for our missing data: the respondent was not required to answer the question or the respondent forgot to give an answer. We came to these conclusions, because, first, we asked that risk No. 36 should not be given values for this study. We did this because, as York, the head of IT department explained in the interview they do not have any international clients, but they (the company) wish to expand. In other words the staff cannot answer risk No. 36 because it is connected with the international environment. Taking out risk No. 36 will reduce our risk Factors from 42 to 41, which means that in the calculations that are going to be carried out, we would count 41 as the total number of risk factors.
Second, is the missing data that was acquired from forgetting to answer a question. During recording the collected data, we found some respondents who have missed to put a value for some of the evaluated factors. For example, a respondent missed to evaluate risk factor No. 8, thus, we only counted the values of factor No. 8 as 47 out of 48.

2.6 Data collection

Saunders (2007) categorizes three types of data: primary, secondary, and tertiary literature. In this paper the focus will fall on primary and secondary.

2.6.1 Primary Data

According to Saunders (2007) primary data is the type of data that we are able to get directly from company without it being analyzed or evaluated. Primary data collection is to provide us with a realistic view on our research and also more suitable for our research purposes. Primary data can be collected through questioning or observation. For the purpose of our research we have chosen to use questioning technique. It is cheaper and less time consuming compared to observation, but it has a couple of drawbacks that we need to acknowledge. Getting people to answer questions is sometimes hard. We have to consider that we need to find the right people in order to get the most relevant information. In the same time the validity of the answers needs to be put to a test. The people may not be objective with their answers, or might not have the correct information which can mislead us in our research.

The questioning can be conducted in several ways: surveys, interviews, and questionnaires. Depending on the time and cost constraints we have to choose the best technique for us, in the same time we do not want to have bad or unusable data. Our choice fell on conducting a personal, one to one, phone interview and questionnaires. More about that technique will be explained later on.

2.6.1.1 Interview

In order to gain the most useful information which is relevant to our research questions, we decided to adopt the interview technique for gathering data. Our interviews are focused on key staff members who are working in Da Gen and also have relevant knowledge to our research.

According to Saunders (2007) there are two types of interviews we have to consider: Standardized interview and Non-standardized interview. A standardized interview is applied to obtain data, which normally is used for quantitative analysis. Non-standardized is applied to obtain data, which is normally used for qualitative analysis. Since we plan to conduct an explorative study and get a depth research, the non-standardized is much more useful for our research. Meanwhile, the non-standardized offers us two more approaches to conduct an interview: one-to-one and one-to-many. Our research questions mainly refer to risk analysis according to marketing and technology, therefore, we have to make contact with the key person who is in charge of those areas. That is why our choice falls on a one-to-one interview with the key person
of marketing department and IT department through telephone, internet and intranet-mediated media. Because of the location of our host company we need to conduct a phone interview. With this type of interview we are losing the opportunity to meet in person with the interviewee. When conducting a phone interview there are couple of issues that need to be considered: in our case the time difference, also the technical issues like connection or possible line drop.

Before we conducted the interview we needed to prepare some basic questions that will guide us through the interview itself. Since this is the main source of primary data the interview questions have to be selected carefully and they need to be relevant to the research questions. In the Introduction Chapter we have stated 3 research questions that we want to answer, in order to reach our purpose. The first question is connected with what risks can be identified in advance when a Chinese company wants to outsource. In our case study, we had the idea to provide the risks for the company, not the other way around. Therefore, we try to change the view of the question. We asked the company if they had an assessment team that will discover any risks in advance prior to signing a contract. With this question, we tried to find out if the company has already established a set of risks that they use or not.

Another question that we thought was of big help for our research was when we asked them what do they consider when they assess clients. The data gathered from that question will aid us in answering the second research question (How to make a better and easier assessment in a quantitative way?) The findings we expected to get were some guidelines on how to evaluate the customers. We also inquired information as to who makes the assessment in the company. We expected the company to have an assessment team, but the findings were very surprising (Appendix 1), we will talk more about the findings from the interview in the Empirical Findings chapter.

In order to answer the last research question we needed to get more information about the company’s current framework. We have asked them to explain it more to us in order for us to compare it with ours.

All the interview questions were well thought out in advance and we tried to gather very relevant information. We realize that the company staff is very busy and they do not have time to participate in very long interviews, that is why we stayed on the main point and in the same time get as much information as we could.

**Interviewees’ information**

York Dai, is the head of the technology department of Da Gen. He has been working in Da Gen since the company’s build up.

We have conducted couple interviews with Da Gen’s representatives. The first interview we had just decided that we wanted to make a research about outsourcing and China. The interview was more general. We were trying to find out what problems Da Gen might have that will be of interest to us. After talking with them about their company and how it works, we reached the decision that we will explore the possibilities of Da Gen becoming a vendor in an international environment. From further inquiries during the interview we reached a result that Da Gen does not really have a well formed framework to assess risks when contracting with clients. They showed interest in that area, which leads us to the decision to find risks that may occur when contracting customers abroad.
2.6.1.2 Questionnaires

Questionnaire is a technique which people have to respond to a set of questions (Saunders, 2007). Questionnaire will be conducted by postal questionnaire which will be delivered by e-mail. In order to reach our research objectivity, we are going to conduct a rate questionnaire with the staff of the IT and marketing department of Da Gen.

2.6.1.2.1 The Choice of Population and Sample

Our population is all Chinese companies, with similar size - SME, same business area - IT, and similar business direction - going international. Companies should be planning to explore new business opportunities, but do not have a clear vision how to identify outsourcing risks.

From that population we have chosen one company that will have all our focus during this research. Due to the fact that we use Da Gen’s problem as our case study, the non-probability sampling techniques have been selected. Based on the research question which is related to the risks in outsourcing, we need to consider that our sample needs to be familiar with the researched areas. As mentioned before, Da Gen is small company, and for each trade or project both the IT and Marketing departments must be involved in the discussions and assessments of the clients. Therefore, the staff of IT and marketing departments will be involved and will conclude our sample.

2.6.1.2.2 The Design of Rate Questionnaire

The questionnaire was selected as a data collection technique in this research. It is very important towards our final analysis. The questionnaire has to be readable and understandable by everyone in order to gain the most reliable, valid, and valuable data. It also needs to be easy to fill out in order to avoid missing information or errors.

In order to support the research questions, the design of questionnaire will consider three points. First, the questionnaire has to find out what the key risks are, and the weight of each risk. This will be done by asking the managers and staff to fill in two values for each risk (Impact and Probability). Since we are using quantitative analysis, we have to give a possible range of values for each risk, which is another reason that we choose the questionnaire technique to gather data.

Second, the options of the rate questionnaire must consider all possible ranges in case the respondents provide unexpected answers and also for the respondents to have all possible answers that they will need.

Third, in order to ensure answers that are assessable by different elements, we provided a table with two elements of measurement to require respondents to fill in (Appendix 2). The table will work like a chess board that all risk will have two coordinates that will classify them in a position on the table. Those coordinates will be the two values that were asked for the impact and probability.
2.6.1.2.3 The performance of Rate Questionnaires

Prior to sending the rate questionnaire we needed to formulate it in the most easy to understand and easy to complete way.

We have already identified 42 risk factors of outsourcing in the Theoretical Framework chapter. These 42 risk factors were numbered accordingly from 1 to 42. Next, a fillable form was designed in a shape of a table with two elements on its axes: impact and probability. We provided five different degrees for each element: very low, low, medium, high, and very high, which correspond to the values from 1 to 5 (Appendix 2). We have also provided the staff with the explanation for each of the axes value. After the questionnaire was completed it was send to the IT and marketing department staff in Da Gen. The questionnaire required respondents to evaluate each risk factor by five different grades or levels of the impact and probability. Completing the questionnaire required that each respondent would only fill in the corresponding numerical representation of the risk factor in the matrix table provided by us (Appendix 2), this is done by crossing the two axes values of P and I.

The questionnaires were sent to the IT and marketing departments. Both departments consist of 49 employees. We sent the questionnaires to all of them and received 48 replies, which made our response rate 98%.

2.6.2 Secondary data

Secondary data is easier and quicker to obtain, and also helped us to analyze and have a deeper understanding of primary data. It is a preexisting data, which has not been gathered for the purpose of our research. This type of data is already been synthesized and analyzed. Some disadvantages of secondary data are: it can be costly to obtain, most of the data is not recent, have to be careful of the source if it is trustworthy, information may be incomplete, and the confidentiality issue may be raised (Saunders, 2007). On the other hand there are the following advantages to support the choice of secondary data: it gives you the possibility to examine trends that have occurred over the past, it is already gathered and analyzed, sometimes it is easier to obtain than primary, and it can have more quality, depending on who gathered the data (e.g. government surveys) (Saunders, 2007). We have tried to gain access to only reliable secondary data. Taking into consideration the time and financial limits, we have managed to gain access to a lot of online publications of books and academic articles. We have used the university journal database in order to get the most reliable sources of knowledge.

It is very important to combine different data collection techniques because then the bias can be reduced. We are going to combine both primary data collection (interviews, questionnaire) and secondary data collection (books, articles, scientific publications).

2.6.2.1 Literature review

According to Easterby-Smit (2008) “Reviewing the literature is a research activity all in itself and a contribution can be made to knowledge on a particular subject through the literature review.”…”As indicated above, a literature demonstrates knowledge about the
extant literature of the field, but it is more than simply describing authors’ perspectives, it is expected to include a critical evaluation of those studies.”

In this thesis we will mainly exhibit relevant theories and methods. They will help us to gain better understanding of the risks of outsourcing to different countries. The sources of literature are mainly from:

- University Library
- DIVA Theses & Research Publications
- Google scholar

2.7 Reliability, Validity and Generalisability

2.7.1 Reliability

Reliability “refers to the extent which your data collection techniques or analysis procedures will yield consistent findings” Saunders (2007). There are four threats that disturb the reliability of a project.

The first threat to reliability is participant error. People may give different answers depending on the time you ask them the question (Saunders, 2007). In China, similarly with other countries, the workdays are from Monday to Friday and the weekend is on Saturday and Sunday. In the meantime, China has its own festivals. The time of conducting the interviews and questionnaires has to be considered very carefully. We sent our questionnaires in a time of the year when there were festivals. The questionnaires were sent on a Tuesday, since we wanted the company to have the rest of the week to answer and send us back the questionnaires. In this way, we avoided people being pressured by time with the upcoming weekend, or be tired from the past week.

The second threat is participant bias. The interviewee might be answering in a way that he thinks that the managers would want him to answer. We solved this by interviewing the head of the department.

The third threat is observer error. People may ask the questions in different ways, which may lead to different answers. We prepared a questionnaire that was standardized and the same for everyone.

The forth threat is observers bias. Since all people may have different opinions and points of view, the information may be interpreted in a different way. To avoid this after we conducted the interview we viewed our notes and prepared an interview summary. After which we sent it back to the Da Gen interviewees to make sure that is what they meant.

2.7.2 Validity

According to Easterby-Smit (2008) validity is “the extent to which measures and research findings provide accurate representation of the things they are supposed to be describing.” In other words “Validity is concerned with weather the findings are really about what they appear to be about” (Saunders, 2007).
There are two types of validity: internal and external, or also referred to as generalisability.

Internal validity is concerned with the people that are being observed or questioned. There are many threats to internal validity such as people may switch jobs, leave the company, or just lose interest. We will try to overcome those threats by conducting a very short and straight-to-the-point questionnaire. The time limitation that we are facing will ensure that most of the staff will stay in the same department or even company for the period of the study, in the same time we will try to contact well establish managers that have been in the company for a very long time and have a loyal relationship with Da Gen.

External validity or generalisability refers to whether the findings can be applied in other situations in the same way. Threats to external validity may be caused by national settings (research conducted in one country may not be applied for another). A research conducted in a big corporation may not reach the same outcomes if it was conducted in a small business. We will talk about this a bit more in the Generalisability section.

2.7.3 Generalisability

In this thesis we will try to reach high generalisability. The case study that we have chosen represents a very typical Chinese company. The list of risks is gathered from different companies around the world, which means that the risks can be applied to others than Da Gen. Most of the risks can also be applied to other types of businesses as well because of their general nature.

Our study is focused on a small company in southern China. As mentioned in the Case Study section, Da Gen is located in a Shenzhen which is one of the biggest cities in China. This gives a lot of opportunities for business. One small company like Da Gen cannot cover all of the city, or the area at all. That means that there are many more companies similar to Da Gen that in the same technical business as our host company. In other words, Da Gen is a typical company that works with chip software development. If the size of another company and the business area matches Da Gen then the results of our thesis will be able to be applied, therefore the other company will be able to use the framework to easily asses its risks when contracting.
3 Theoretical framework

In the following chapter we are going to present theories that are relevant to IT outsourcing and especially risk assessment from the vendor’s perspective. Those theories will be closely connected with the purpose of this paper. The theoretical framework will be based on literature review and scientific articles. The purpose of this chapter is to introduce to the reader additional knowledge in the research area.

In order to create an outsourcing risk framework for Da Gen we will base our search on two big previous studies of risk factors: Taylor (2007); Schmidt, Lyytinen, Keil, Cule (2001).

3.1 IT Outsourcing Risks

In the last 30 years there have been many reports appearing in the literature about problems with IT projects. During those years, some advices on how to deal with those problems has also started to appear in both academic and particular literature for IT project management (Taylor, 2007). Risks have been identified as one of the major factors in IT projects. Therefore significant research efforts have been put into identifying those risks (Taylor, 2007; Schmidt, Lyytinen, Keil, Cule 2001). In the recent years, more and more interest is being put towards the client’s perspective, taking away research from the vendor’s side of the project. In the years of study of risk factors most of them have already been identified, but it is not stated clearly which one of them relates closely to the vendor. The research by Taylor (2007): “explores the issues associated with vendor risk management of outsourced IT projects”, it “examines the key risks identified by experienced vendor managers of software package implementation projects on clients’ sites.”

Schmidt, Lyytinen, Keil, Cule (2001):’view risk management as a two-stage process: assessing the risk, and taking action to control it. The first stage, risk assessment, consists of three steps: (1) identification of risk factors, (2) estimation of the likelihood for each risk factor to occur, along with potential damage from the risk, and (3) an evaluation of total risk exposure.

As mentioned before the client’s side of the project is well studied, but the client does not always have full control over the vendor and how the work is done. These days the
vendor and the client are sharing the responsibilities and the risks. The vendor might have different objectives and profits that they want to gain from the project; this may lead to different perception of the risks accompanying the work. The challenge in this contract for the vendor is to meet the clients requirements and in the same time reach his/hers own goals, which may differ. In the outsourcing agreement both parties strive to prosper. In order to do so, the vendor must accept the transferred risks in the project and consent to the controls imposed by the client and in the same time try to gain from the relationship and meet his/hers interests (Schmidt, Lyytinen, Keil, Cule, 2001).

The risk factor’s list from Taylor (2007) is a result of a very in depth research. The research did a lot of detailed, semi-structured interviews. The respondents were asked to explain projects, which were recently undertaken, and included some challenging situations concerned with risks. The respondents were encouraged to elaborate on which issues were more important to them. Follow up questions were asked for details of the risks identified. The sample that was used in that research was selected in the following way:

When a company agrees to participate, the senior executive was asked to nominate projects managers that were considered ‘experts’ in their field. The chosen managers varied in nationality, age, and number of projects that they have completed.

The complete framework contains 42 risk factors, which are differentiated by source into vendor risk, client risk, and third party risks; the risks are also differentiated by type: project management, solution, technology, relationship, location, and commercial environment.

The framework is as follows:

Table 3.1 42 risk factors from the vendors’ perspective, Taylor (2007)

<table>
<thead>
<tr>
<th>No. of risk</th>
<th>No. of PM’s mentioning risk</th>
<th>Risk Factors</th>
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<td></td>
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<td><strong>Project Management risks</strong></td>
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<td>1</td>
<td>16</td>
<td><strong>Vendor staffing:</strong> Includes problems that are connected to vendor staffing like: not enough staff, wrong skills, staff turnover.</td>
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<td>2</td>
<td>5</td>
<td><strong>Client staffing:</strong> Includes problems that are connected to client staffing – not enough staff, wrong skills, staff turnover</td>
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<td>3</td>
<td>3</td>
<td><strong>Third party staffing:</strong> Includes problems that are connected to third party staffing – not enough staff, wrong skills, staff turnovers</td>
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<td>4</td>
<td>19</td>
<td><strong>Schedule and budget management:</strong> Risks related to keeping with the current schedule and budget, includes failure to develop work separation structure, failure to monitor progress on tasks, and crashes caused by unpredicted problems</td>
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<td>5</td>
<td>7</td>
<td><strong>Client project management:</strong> Risks related to client’s internal project management structure, including failure to assign appropriate client project manager, failure to appoint to the client project manager needed authority over the client staff, and incompetence of the client</td>
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<td>6</td>
<td>15</td>
<td><strong>Change management:</strong> Risks from the vendor’s side that are connected with managing clients requirements. There are two perspectives in managing: being too tight (hence alienating clients) or being too loose (hence losing control)</td>
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<td>7</td>
<td>12</td>
<td><strong>Documentation management:</strong> Risks arising from the vendor’s side and the failure to keep and adequate documentation of project meetings, changes in the requirements and contract clauses</td>
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<td>8</td>
<td>6</td>
<td><strong>Sign-off control:</strong> Risks arising from the unwillingness or failure of the client to sufficiently test and sign-off on deliverables. For example, client fails to meet its deadline for testing, and then signing off on satisfactory test completion. This can be done deliberately by the client to delay payment, or can result in fear of accepting in case something pops up later on</td>
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<td>9</td>
<td>5</td>
<td><strong>Third party deliverables control:</strong> Risks arising from third parties and failure to meet deliverables deadlines or to meet quality requirements. It can include risks such as ensuring that the third parties will develop an adequate work separation structure and failure to monitor third party progress</td>
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<td>10</td>
<td>5</td>
<td><strong>Client readiness:</strong> Risks related to the readiness of the client to implement. This includes place preparation, user training, data conversion, client’s ability to meet their deadlines etc.</td>
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<td>11</td>
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<td><strong>Development choice:</strong> Client agrees on wrong development strategy. For example package instead of custom, or fails to identify requirements that are needed, or fails to identify the degree of needed customization</td>
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<td>12</td>
<td>14</td>
<td><strong>Vendor understanding of requirements:</strong> Vendor fails to understand the requirements. For example, the requirements are too high, or unclear, or are based on unfounded assumptions</td>
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<td>13</td>
<td>14</td>
<td><strong>Client understanding of requirements:</strong> The clients have no clear view of what their requirements are or have internal differences what should their requirements be</td>
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<td>14</td>
<td>7</td>
<td><strong>Required functionality:</strong> Risks related to the match between the final product and the client’s requirements</td>
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<td>8</td>
<td><strong>Third party solution:</strong> Risks related to the third party’s deliver the required deliverables</td>
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<td>16</td>
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<td><strong>Customization of product:</strong> Risks related to the level of required customization. In addition covers issues related to on-doing support</td>
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<td><strong>Newness of product</strong>: Risks related to how new and innovative is the package and also the associated with it bugs</td>
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<th><strong>Complexity of product</strong>: Risks related to the amount of different functionalities that need to be implemented – the greater the complexity the bigger the risk is.</th>
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<th><strong>Third party integration and compatibility</strong>: Risks related to the compatibility of the third party products to the vendor’s products and the client’s technology, as well as other third party products.</th>
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<th><strong>Data conversion</strong>: Risk related to the data conversion from the client’s systems</th>
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<th><strong>Client technical environment</strong>: Risks related to client technical environment, such as combinations of hardware and software, and availability of testing environment, or technical requirements set by the client’s IT department</th>
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**Relationship Risks**

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<th><strong>Vendor internal negotiations</strong>: Risks related with vendor’s internal communication, competition for staff, also associated with the need to influence other teams or sections in the company.</th>
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<th><strong>Vendor team morale</strong>: Risks related with the decreasing team morale affecting the project completion.</th>
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<th><strong>Vendor top management support</strong>: Risks related to getting support from the vendor’s top managers for increasing the schedule or budget, for influencing the clients and third parties</th>
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<th><strong>Client top management support</strong>: Risks related to lack or unwillingness of the client’s top managers to support the change or the project, and to handle internal conflicts</th>
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<th><strong>Client expectations</strong>: Risks related to the client expectations and how to address them. This includes the expectations about the client’s contributions to the project, and also the expectation about the deliverables</th>
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<th><strong>Client trust</strong>: Risks related to the decreasing or missing trust between clients and vendors.</th>
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<th>‘Bad news’: Risks related to the refusal of the client users and IT department to pass bad news to the managers. This also includes keeping the client tom managers informed, particularly when problems are related to the client staff’s performance</th>
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<th><strong>Client it department</strong>: Risks related to client IT department skills and willingness to participate</th>
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<th><strong>Users</strong>: Risks related to user’s skills and willingness to participate</th>
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| 31 | 5 | **Third party cooperation:** Risks related to getting the third parties to cooperate in acceptable levels  
| 32 | 8 | **Client organization culture:** Risks related to difference in organizational culture and ‘the way we do things’. Includes issues associated to dealing with government and commercial projects, and with different country culture  
|   |   | **Location Risks**  
| 33 | 4 | **Vendor overseas head office:** Risks related with difference between non-local headquarters and the local brunch in terms of how the work should be done, or what should be done at all. Relates only to large multinational vendor companies  
| 34 | 8 | **Non-local third party:** Risks related with dealing with non-local third parties  
| 35 | 5 | **Multiple third parties:** Risk related to having multiple third parties that the vendor needs to coordinate and integrate  
| 36 | 13 | **Multiple client sites; sites in multiple countries:** Risks related to completing projects in different places. These risks can become more severe if the places are spread across different countries  
| 37 | 5 | **Multiple departments:** Risks related with completing projects within several departments in one place, includes interdepartmental conflicts and issues related to unwillingness of any department to accept responsibility  
|   |   | **Commercial Environment Risks**  
| 38 | 8 | **Vendor’s reputation:** Risks related to vendor reputation and possible damage that can be inflicted to it from the results of the project. For example bad client relationships, bad project performance, or rejecting difficult projects  
| 39 | 14 | **Vendor’s competition:** Risks related to external competition and its implications, especially the impacts on the contract, such as over-selling or under-selling to get the project  
| 40 | 12 | **Legal and credit risk:** Risks related to possible financial damage to the vendor as a consequence of rejecting a difficult project, client financial instability, or refusal to make payments  
| 41 | 10 | **Contract terms and conditions:** Risks associated with contract terms that can be harsh or favor the client, or not leaving enough room for negotiations.  
| 42 | 5 | **Client business changes:** Risks related with the financial stability of the client, as well as with possible changes in the client business such as takeover
The 20 vendor perspective factors that are listed above in Table 3.1 fall into four groups:

- Risks that arise from the client side of the project
- Risks that arise from the vendor side of the project
- Risks that relate to the location of the project and the parties involved
- Risks that relate to the vendor’s commercial environment

### 3.1.1 Risks that arise from the client side of the project

The following risks arise from the client side in an outsourcing project: client project management, client readiness, client IT department, data conversion, integration of third party products, client organizational culture, client trust, and ‘bad news.’ The fact that these risks are being recognized mean that the vendor project managers will understand less about the capabilities and readiness of the client organization.

The three first of the mentioned above factors: client project management, client readiness, and client IT department are concerned with the ability and willingness of the client to manage their side of the project. Also, those are a reflection of the vendor’s concerns that the project may fall outside the locus of control.

Next two factors, data conversion, and integration of third party products, show the vendor’s concern that they might not have enough knowledge of the design and the operations of the client’s system. This lack of understanding increases the risk in connection to fitting the new system to the client’s processes in terms of data conversation and integration, especially if there is a third party involved.

The final three factors, client organizational culture, client trust, and ‘bad news’ are closely related. It is very important that the vendors and the clients build trusted relationship. Building such a relationship will mitigate the ‘bad news’ factor. This factor is associated with the unwillingness of the client staff to inform their managers of possible occurrences of problems in the project (Taylor, 2007).

### 3.1.2 Risks that arise from the vendor side of the project

There are mainly five identified risks that can arise from the vendor’s organization: customization, complexity, vendor top management support, internal negotiations, and team morale. If the vendor is working with software package implementation two more additional factors need to be noted: customization and complexity. These days customization as a process is almost inevitable. An ideal situation is when the customer changes its processes to match the new system, but that does not happen so often. The need for customization arises two more risks: the extent of the change needed and the integrity of the new system. More risk can be identified from those: the risk of implementation if the client’s require too complex of a system.

There are three last factors remaining: vendor top management support, internal negotiations, and team morale. The top managers need to give approval in budget increase. They are also needed to be the connection with the client’s top managers.
Another aspect that the top managers need to cover is the *internal negotiations*. That is closely related to manager’s support factor. In order to lower the internal competition risks the top manager needs to have strong backing up from the executives of the organization. Team morale has been mentioned by many managers as an important risk factor. The key to success is to have well motivated team (Taylor, 2007).

### 3.1.3 Risks that relate to the location of the project and the parties involved

With the growing globalization and internationalization more and more companies have to deal with multiple countries. The risks that can arise from those relationships are: *multiple sites/countries, overseas head office and overseas third parties.*

The multiple sites/countries risk is related to working in different countries. That can include logical errors, language and cultural issues.

The problem with working with overseas head offices or overseas third parties is that they would not be able to fully understand how the home office works. This aspect adds additional communication risks, including time zones and cultural differences (Taylor, 2007).

### 3.1.4 Risks that relate to the vendor’s commercial environment

The last four risk factors are newly indicated risks and include: *risks from the vendor’s competitors, risks to the vendor firm’s reputation, legal and credit risk, and risks from contract terms and conditions.* Those four factors show that these days managers take in consideration every aspect of the business not only risks that are closely related to the success of the project. Managers realize the need to be aware of your environment and to be prepared to react to external factors (Taylor, 2007).

### 3.2 P-I Tables

P-I tables are part of Risk Management framework and are concerned with analyzing the risks in a qualitative way. To start this stage of Risk Management, the risks have to be identified in advance. After the risks have been identified, the assessor has to assign estimated values to the probability (P) of a risk event and the impacts (I) it can produce. The assessor describes the probability and the impacts of each risk according to predetermined scale, for example, of 1 to 5 (very low, low, medium, high, very high, and zero if the risk is irrelevant). In order to make it easier for the assessor to choose the right value they should have an additional explanation. For example view the table below (Vose, 2008).
<table>
<thead>
<tr>
<th>Category</th>
<th>Probability</th>
<th>Delay</th>
<th>Cost</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>10-50%</td>
<td>&gt;100 days</td>
<td>&gt;1000</td>
<td>Failure to meet acceptance criteria</td>
</tr>
<tr>
<td>High</td>
<td>5-10%</td>
<td>30-100 days</td>
<td>30-100</td>
<td>Failure to meet &gt; 1 important specification</td>
</tr>
<tr>
<td>Medium</td>
<td>2-5%</td>
<td>10-30 days</td>
<td>100-300</td>
<td>Failure to meet an important specification</td>
</tr>
<tr>
<td>Low</td>
<td>1-2%</td>
<td>2-10 days</td>
<td>20-100</td>
<td>Failure to meet &gt; 1 minor specification</td>
</tr>
<tr>
<td>Very low</td>
<td>&lt;1%</td>
<td>&lt; 2 days</td>
<td>&lt;20</td>
<td>Failure to meet a minor specification</td>
</tr>
</tbody>
</table>

Table 3.2 Description of the different risk levels, Vose 2008

The value ranges do not need to be spaced equally, and can be changed to match the scale of the project or the size of the company.

One advantage of using the P-I tables is that they give a very good way to visualize the risks. It is a quick tool to be able to lock in all the risk and see which ones are the most risky. Table 3.3 shows that risks 2, 12, 13, and 15 are the most threatening.

![Sample P-I Table](image)

<table>
<thead>
<tr>
<th>Impact</th>
<th>Profit impact for identified risks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Med</td>
</tr>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>V High</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>13,2</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Table 3.3 Sample P-I Table

Once every risk factor has been put into the table, the next step is to calculate the severity (S) of the risk. It is done with the simple formula:

\[ S = P \times I \]

When the severity scores are calculated they are used to determine the most important risks. This will help the management to focus on those risks and try to eliminate them first. There is a drawback to this process: the process is dependent on the scaling factors that are assigned to each phrase describing the risk factors. In order to get accurate results more accurate probability and impact values need to be assigned, which means that more time and studying of the risk needs to be done.

In order to evaluate the severity of the risk, the results can be entered in a table as shown below (Table 3.4). Ranges can be assigned, for example if a risk is having severity more than 10 or 12, it is a high scoring risk, it falls into the red zone, therefore it is an important one, and needs to be evaluated further. A drawback of this can be that a risk with severity 9 or 10 needs to be examined more in order to decide whether it needs to be scaled as high scoring or medium, since they lay on the border between the red and yellow zone. The different coloring resembles the traffic light and it is made to...
ease the user. The green color represents low risks, the yellow – medium ones, and the red is very high ranking risks.

![Probability Impact Table]

**Table 3.4 P-I Table**

One of the main advantages of this method is that it is easy and relatively accurate to use. It does not require any high technology software. It also gives the possibility for the company to take a closer look at the risk it may encounter and try to find possible solutions to avoid them. The P-I Tables gives a quick visual output in order for the company to see where it stands on possible risks and their impact.

### 3.3 Other frameworks that were considered

While deciding how to improve Da Gen current framework we did a broad research of quantitative analysis tools. Vose (2008) mentions the following: @ RISK, Crystal Ball, and Mode Risk. Another considered product was SBA.

We found out that those products are software based, online analysis, or paid services. All of them are already build and the logic behind them is hard to find or not easy to understand. In the same time, when we were selecting the analysis tool, we had to consider that Da Gen is a small company with limited resource. Therefore, the cost, fee of training, environment requirement, time, and effectiveness were with high importance.

After a broad research, we found the P-I Table is quite suitable with our requirements. The P-I Table is a simple frame analysis by P-I scale. It can assess the probability (P) of a risk factor and the impact (I) the factor would produce. The P-I Table has the ability to assess each single risk. It can be modified to match different kinds of projects. Selecting different range of values for the P and I is done to match the size of project.

The P-I Table has the following advantages as explained below, according to Vose (2008):

- Cost saving: The cost of risk analysis for most companies is very important factor to be considered. The P-I Table can be transformed to be a paper-based analysis
technique, the company do not need to buy any specific software to use it, therefore the company can save money.

- No environment limitation: P-I Table has no environment imitations. It can be done by a computer, board, or paper.
- Staffing training: P-I Table is easy to operate. The person can quickly learn after a short introduction how to perform the evaluations and the calculations.
- Flexible: P-I Table is more flexible, because the range of value can be set depending on different products and the size of project.
- Effectiveness: P-I Table provides the level of each single risk in the project. And the risk also can be presented by the degree of probability and impact.
- Creation: P-I Table can be self-created by a person on paper, computer or calculator.
- Visibility: P-I Table provides a quick way to visualize a signal risk within its relative importance to a project.
- Time consuming: Comparing with the products we mentioned above, P-I Table can be quickly applied on computer or calculator. The calculations are very simple and will not take much time.

P-I Table has also disadvantages. It cannot analyze simultaneously multiple projects. It is difficult to perform a result combination of analysis of risks from all projects (Vose, 2008).

### 3.4 Our Framework

We want to introduce the following framework for a company to use in order to evaluate its risks. We base parts of our framework on the P-I table framework. Our framework consists of four steps.

![Figure 3.2 Our proposed framework](Image)

Receive requirements from clients and identify risks

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive requirements from clients and identify risks</td>
<td>Give values for Probability</td>
<td>Multiply P*I for each risk</td>
<td>Find the Average for the whole project</td>
</tr>
<tr>
<td>Give values for Probability</td>
<td></td>
<td></td>
<td>Compare the project value with the established ranges</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sign a contract</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solve problems = Minimize the risk</td>
<td>Identify Problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not acceptable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

Figure 3.2 Our proposed framework
The first step is connected with getting the requirements from the clients. This is up to the company how it is going to be done. Also in this step the company should already have a predetermined list of risks, but if any new risks have come up the company should add them to the list.

After the requirements the company can move to Step 2. It includes the predetermined list of risks that the company can use. The list was presented earlier in this thesis in the Theoretical Framework Chapter. The risks list can suit any company because the risks are gathered by questioning different managers all over the world as it was mentioned in the study. Also the risks can be applied for domestic as well as international projects due to their general nature.

In this step each risk factor is given a number that will represent it. This is done to ease the assessor. Each risk is given two values that represent how important that risk is – impact (I) and how often that risk can occur – probability (P). Some risks might not be relevant for all projects. If the risk is not relevant it is not given a value and will not be considered later on. In order to make it easy and simple for the assessing company the risks may be assessed in a table such as Table 3.5 below, this table will be also used as a template for our questionnaire:

<table>
<thead>
<tr>
<th>Probability</th>
<th>Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.5

The values from very low to very high will represent numerical values from 1 to 5 (as 1 is very low and 5 is very high). The number that represents the risk can be placed in the corresponding cell. For example if risk 1 has a probability of 5 and impact 2 it will be placed in the corresponding cell: probability – very high, and impact – low). (see for example Table 3.6)

<table>
<thead>
<tr>
<th>Probability</th>
<th>Very High</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Table 3.6
Once all the risks are being placed in the right cells depending on their values (P, I), the whole value of the risk needs to be calculated. The value of the risk will be calculated by the following formula:

\[ V = I \times P \]

Once all risk factors have the value calculated, we are done with step 2.

In step 3 the value for the whole project needs to be calculated. The value for the whole project will be called \( V_p \) and will be equal to the average of all the risks’ values.

\[ V_p = V_1 + V_2 + \ldots + V_n \]

In the previous equations the \( n \) represents the number (quantity) of risks that are going to be evaluated. When the project value is calculated we move on to the fourth step of the framework.

Step 4: In step 4 we will compare the project risk value (\( V_p \)) to the predetermined table that have the borders of different risk levels.

<table>
<thead>
<tr>
<th>( V ) high</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>( V ) low</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3.7

There are three predetermined levels for the project risks: low, medium, high, represented by the green, yellow and red color. If the \( V_p = 12 \) after the calculation, the project has a high level of risk.

Once the comparison is done there are two ways that the company can continue, depending if the results are acceptable or not. If the results are acceptable and the project is approved by the boss then the company signs the contract. If the results of the risk levels are not acceptable the company needs to identify the problems and try to come up with solutions or compromises. In that way the company will reduce the risk levels. After solving the problems the company should go back to step 2 of the framework and assess the risks again according to the P-I Table. The process needs to be continued until they are satisfied with the levels of risk.

After reviewing many theories we have stopped our attention on the ones mentioned through this chapter. We will use them as a base to analyze the empirical findings as well as to build a better quantitative framework.
4 Empirical Findings

In this chapter we would like to present our empirical findings that we gathered with the help of questionnaires and interviews, as well from secondary data. Also we would like to present the data that we calculated that will aid as later on in the analysis.

4.1 Empirical Data Collection

4.1.1 Interview

In the beginning, when we started writing this thesis, we conducted one interview (Appendix 1) with Da Gen’s IT manager. He is one of the main figures that assess a new project. Since it was very early in our research we asked him very broad questions. We already had an idea that we want to do risk assessment so that is why some of the questions were closely related with that topic. The rest of the questions in the interview were aiming to find any problems or place for improvement in Da Gen, as well as gain a deeper and more complete understanding of the way they conduct business.

In Figure 4.2 we present how the interview was summarized. We conducted a 35 – 40 minutes phone interview. In appendix 1 we presented a summary of 15 minutes from the conducted interview and in the following section we will preset 5 minutes of the most important findings.

The first answer that drew our attention and helped us decide on our research question was:

5. What do you need to consider when you assess clients?
From this question we learned that the company uses a simple assessment framework that is based on qualitative input and output. We have explained and presented the framework in the Introduction Chapter.

This answer gave us the idea that we can prepare a better quantitative framework. Another idea that we gained was from the following question:

6. How do you know if a project is risky or not?

The answer that we received was that the managers that are involved in a project and also the staff have discussions and talk about possible risks and advantages of the project and in the end decide if they should undertake it or not.

This made it clear for us that Da Gen relied only on qualitative data and that they did not have any particular way of assessing the risks. They did have their framework but it was very general and not very consistent.

Another point that was mentioned by the IT manager was that for different projects and customers there are different people that assess them, this can definitely lead to inconsistency and not accurate results.

The last question in our interview inquires about any future plans. Da Gen’s IT manager shared with us that they plan to go international, but they need to do some more planning. The company wanted to make more research about the risks that can happen, even though they have good experience and for them is not a problem to establish the risks in advance, it is much more efficient and time saving if they had already a complete list. Those thoughts that the manager shared with us gave us the idea to prepare a list of risks and present a new framework to assess the customers and projects.

4.1.2 Data from the Rate Questionnaires

We are building up a quantitative framework, therefore we need to gather quantitative data. We have chosen to use a rate questionnaire in order to collect the grades (levels) of the risk factors that will be put in into our framework and will be assessed.

We have sent out 49 questionnaires and received 48 back. A template of the questionnaire can be found in Appendix 2.

In Table 4.1 we have presented the results from all 48 questionnaires. That is a screen shot of the Excel file that we also used to calculate the averages that we needed for our analysis. The orange column represents the risk number. The green row represents the number of the respondent, and the blue column represents the Average that we calculated. In the bottom, in the red cell is the whole project value. We have discovered that for previous projects, according to all the questionnaires, the overall risk is equal to level 9.
| Risk No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
As can be seen from Table 4.1 it can be very quick to calculate the average values. According to our previous explanations, we will calculate the values from all of the rate questionnaires in order to gain a general view of Da Gen risk levels.

In the following section using the P-I Table representation we have shown our average results.

### 4.2 Da Gen’s P-I Table

The following table represents the data gathered from all of the questionnaires. The risks are represented by their numerical values (1 to 41), in order for them to fit in the table. As mentioned before, the colors represent high (red), medium (yellow) and low (green) risks levels. This is how Da Gen’s Table looks like for previous projects. As mentioned before the values are given from previous experience. The data in the table is gathered by calculating the average value for each risk. The values are acquired from the sent questionnaires. The numbers on the white background are the grades (axes) from the P-I table. They are kept in order to show better how the borders between different risk levels (red, yellow and green) are formed.

We have found that the 16 risk falls into the red area, 14 to the yellow area, and 11 into the green area.

This representation of data is easy to read and to analyze. We will talk more about that in the Analysis chapter.

<table>
<thead>
<tr>
<th>Probability</th>
<th>Impact</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>3, 6, 11, 14, 18, 21, 23, 24, 25, 28, 31, 37, 39, 40, 41, 42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>1, 4, 8, 12, 13, 15, 17, 19, 22, 26, 27, 29, 32, 38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2, 5, 7, 9, 10, 16, 20, 30, 33, 34, 35,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.2 Da Gen’s P-I Table*
4.3 Findings from secondary data

From secondary data sources we found a list of risks that we have presented and explained in the Theoretical Framework Chapter. The list contains 42 risk factors that are gathered from different companies around the world.
5 Analysis

In this chapter we will analyze the empirical findings and explain them with the theories mentioned before. We will also show how our findings build up in order to reach the purpose of this thesis and answer our three research questions.

Figure 5.1 Disposition of the Analysis Chapter

5.1 What risks can be discovered by a Chinese SME vendor prior to entering an outsourcing contract with an international client?

There are two ways to look at the question: What risks can be discovered and categorized by a Chinese SME vendor prior to entering an outsourcing contract with an international client? The first way is to find particular risks that can be expected, the second way is to interpret the type of the risk as high, low or medium, in other words to observe the level of the risk. In the following section we will present, with the help of our empirical findings and the theories, the types of risks that we found.

We had already identified 42 risk factors in the Theoretical Framework Chapter. We chose that list of risks because it was focused on the vendor side, which fit our host company’s needs. The list of risks will also be a base for the evaluation framework that we will present later in this chapter.

The second view of the risks type is the risk levels. We have already received values and calculated the average value for each risk (Table 4.1, Empirical Findings Chapter). In the previous chapter the empirical findings were presented in a P-I table. Based on it there are three colors that limit the three ranges of possible values as follows: 1 to 4 is low value area represented by the green color, 5 to 9 is medium value area represented by the yellow color, and 10 to 25 is high value area represented by the red color. As explained earlier we had to skip one of the factors therefore leaving us with only 41 risk factors. From the Da Gen’s P-I table (Empirical findings, 4.2) we can see how the risks are separated into the different levels. In order to decide how risky the project is though we need a better representation. Such is suggested by using a percentage of the whole.
In other words, we built a table that has all of the 41 arranged from the highest ranking to the lowest. After that, the ranges are applied (1-4 green, 5-9 yellow, 10-25 red). The risks that fall in one of those categories are colored in the corresponding color (Figure 5.2).

Figure 5.2 presents a different representation that aids us to see clearly the amount of risks in each level and also the descending severity of each. From the Empirical Findings Chapter, we can conclude that 39% of the risks are in the red area, 34% are in the yellow, and 27% are in the green.

![Risk Distribution](image)

**Figure 5.2 Risk Distribution according to Da Gen**

From the results, we could imply that from the 41 factors 39% are high risk, 34% are medium risk, and 27% are low risk. As mentioned before, Da Gen wanted to have a framework, which will give comparable results before going abroad, in order to be prepared when facing risks on an international level. Therefore results such as figure 5.2 and tables such as in Appendix 3 will be prepared for each project in order to have on Archive the previous project values.

Since the red and yellow have very close values, 39% and 34%, it can be ambiguous to estimate if the project is medium or high risk. In addition the yellow sector has very close borders, which leaves it to be a bit unclear, in a way that the values that are close to the boarders can be arguable if they can be low, or if at the top border – high. This means that the handling of those risks needs to be very careful because they might have a tendency to move up to the high risk sector (Vose, 2008).

Those risk percentages are a result from Da Gen’s previous experience and can be used as a base for their future projects. The fact that 39% in the project are high ranking risks and still the results are successful previous projects means that that can be set as a boarder that Da Gen can compare to in the future. In addition, Da Gen using this framework and also based on the P-I Table they already has a maximum risk level established. From previous experience everything that is higher than 39% will be considered risky.

Using the same logic as explained above, if the percentage of the risk equals to or is less than 39%, it will be counted as a medium risks for the project. Therefore the percentage of medium leveled risks is between 34% and 39%. This means that if the project is between those two boarders it will be considered medium level of risks. On the other
hand, Da Gen should keep closer look on those “yellow” levels, since as mentioned before they can become more severe with time.

There is no doubt that all projects will have risk factors in all three levels, but with the presented framework, the company can discover in advance the risks and also the levels they fall in. Filling in a quick P-I Table can show the disposition of the risks in an obvious way.

5.2 How to make better and easier assessment in a quantitative way?

In the Theoretical Framework chapter we have shortly and in a very general matter presented the new quantitative framework. In this part of the thesis we will explain in detail how it works and also situate it in the Da Gen’s environment.

We have researched and presented to Da Gen 42 risk factors that they can encounter either in a local (Chinese) or international level. Those risks were gathered from another earlier research (Taylor, 2007) done in an international level, including several companies in China. These 42 risks are suited for the vendor’s side of the contract. The list with risk factors is presented to Da Gen in order to ease them and introduce consistency in their assessment framework. In the future, as the company starts to use the proposed framework, they can add more factors to the list. This will probably be mandatory for them in a few years because of the fast changing environment. Some of the current risks may be obsolete and new ones may come up. The 42 factors are essential to the new framework because they will save time for the company to come up with possible risks for each client.

Once the risk factors are established (written out) the next step for the company is to evaluate them according to probability (P) and impact (I). According to the P-I Table theory (Theoretical Framework 3.2, Vose, 2008) the best way is to have only 5 levels: very low, low, medium, high, and very high. Having such a number is a good solution because it makes it relatively accurate to choose and in the same time the levels are clearly defined, unlike if you use a 10 grade system. For probability, the levels will be separated as shown in Table 5.1. Probability can be measured in how many project a certain factor can occur. Since Da Gen is a small company it does not get as many projects as a corporation would. Therefore the numbers presented in the table below are relatively small. Given this table the assessor can almost accurately decide what value to give for the probability in a certain risk factor.
<table>
<thead>
<tr>
<th>Grade</th>
<th>Value</th>
<th>In comparison to other projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Often</td>
<td>5</td>
<td>8 out of 10 projects</td>
</tr>
<tr>
<td>Often</td>
<td>4</td>
<td>6 out of 10 projects</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
<td>4 out of 10 projects</td>
</tr>
<tr>
<td>Not so often</td>
<td>2</td>
<td>2 out of 10 projects</td>
</tr>
<tr>
<td>Almost never</td>
<td>1</td>
<td>1 out of 20 projects</td>
</tr>
</tbody>
</table>

Table 5.1 Probability levels

The impact can be measured in delay, cost, or quality. The boarder values are modified according to Da Gen’s size and capabilities. In the future, the company can decide what is acceptable for them and what not. For example, for Da Gen even a 10 days’ delay might not be so important in the future projects. In Table 5.2 is shown the ranges that the Impact can have for a risk in Da Gen.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Value</th>
<th>Delay</th>
<th>Quality</th>
<th>Cost in CNY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Important</td>
<td>5</td>
<td>&gt;100 days</td>
<td>Failure to meet acceptance level of requirements</td>
<td>&gt;150 000</td>
</tr>
<tr>
<td>Important</td>
<td>4</td>
<td>40-100 days</td>
<td>Failure to meet &gt; 1 important requirement</td>
<td>100 000-150 000</td>
</tr>
<tr>
<td>Some important</td>
<td>3</td>
<td>10-40 days</td>
<td>Failure to meet an important requirement</td>
<td>70 000-100 000</td>
</tr>
<tr>
<td>Not very important</td>
<td>2</td>
<td>5-10 days</td>
<td>Failure to meet &gt; 1 minor requirement</td>
<td>50 000-70 000</td>
</tr>
<tr>
<td>Not important at all</td>
<td>1</td>
<td>&lt; 5 days</td>
<td>Failure to meet a minor requirement</td>
<td>&lt;50 000</td>
</tr>
</tbody>
</table>

Table 5.2 Impact levels

In our case the values of P and I are both equal to five. Those values can be different according to the project. The fact that in our company the values are equal is because the values have the same weight in the risk evaluation for Da Gen.

After getting acquainted with the value tables and their representation the assessor can start evaluating the risks. The easier way for that is to use a P-I Table model. As mention before, that will give clear representation of the data. All the risk factors will have a numerical representation. As everything else in this new quantitative framework for Da Gen, this is done to ease the assessor. Each risk has to receive two values from 1 to 5 for P and I. The values will be written down in a P-I table. In the Rate Questionnaires part of the Methodology Chapter, we explained how to fill in the P-I table for each risk. Also, in the empirical data we have shown how a complete P-I table for the company will look like (Table 4.1). In that way, it is very easy to see which level (low, medium, high) of risk the project occupies. It is very easy to compare, even just
by looking, that in the presented table (Table 4.1), for example, the majority of the risks fall into the red and yellow area.

For further analysis and also for archive keeping it is necessary to calculate the percentage that each level occupies in the whole project. Since the main idea of Da Gen Company was to get a framework that will give them easily comparable data, we suggest that they continue to calculate the percentage as explained in the 2.5.1 How we calculate our quantitative data in the Methodology Chapter.

In the end of the quantitative framework, Da Gen should have very clear numerical representation, which is the main purpose of the IP table method.

As a whole the quantitative method is quite easy and not very time consuming. The calculations do not require any hard mathematical formulas and are very simple: P*I. Since the numbers that need to be multiplied will vary from 1 to 5 it will be very easy to calculate them, one will not even require a calculator.

As mentioned in the DG Assessment Framework, Da Gen is conducting discussion meetings for each project. With the new framework the company can still keep those meeting but make them much faster and successful. During those meetings the participants can quickly fill in a P-I Table with the 41 risk factors. There can be a person that will input the data and calculate it while the rest are discussing other issues that the project may have. By the end of the meeting the General P-I Table for the project can be prepared and presented to everyone. The results will show how risky the project is. This will save so much time and will not allow argument between the participants. It will shorten the prior to P-I Table risk discussion making it obsolete, in the same time the quantitative framework will present clear results in an easy to read and understandable way that the participants can take into consideration when deciding on the project. The last word will of course be left to the boss and he can decide if the project should be overtaken even if the risks are very high.

This method answers our second research question very well. The new quantitative framework is faster, easier, and consequently cheaper, because time is money.

### 5.3 How to gain better risk perception by calculating in a quantitative framework?

All of the calculations and theories mentioned until now can be summarized to have one main purpose, to introduce a cheaper, faster and better way to do risk assessment in outsourcing.

Our new assessment framework is based on the P-I Table and, therefore, caries all of the P-I Table advantages that we mentioned in the Theoretical Framework Chapter. In order to show that by using a quantitative framework will gain better assessment we will compare Da Gen’s old qualitative framework to the newly presented one in the previous section.

The first argument that the quantitative framework will provide better perception can be drawn from the name. Quantitative data is always more “accurate” than qualitative. Even though qualitative data can also bring very good and precise results, quantitative
has the purpose to measure a particular phenomenon (Glesne and Peshkin, 1991, Patton, 2002). This means quantitative framework will bring numerical results that has very clear representations and cannot be interpreted in another way. On the other hand, the qualitative framework that Da Gen uses can be very general or ambiguous. The assessment of the risks is done without any clear guidelines and the consensus is reached through a lot of discussions. In contrast the quantitative framework (as presented in the Theoretical Framework Chapter by the IP table and also explained in the previous section) has a very clear and none ambiguous guidelines of how to set a particular value and what that value means. Let us take an example from the framework: Impact with a value of 4 can mean that this risk is important and the expected delay will be between 40 and 100 days, or the risk will be connected with failure to meet more than one important requirement, or the cost will be between 100 000 and 150 000 CNY.

The rest of the advantages are similar to the P-I Table, because it is the base of the framework.

- **Cost saving:** The framework that we propose for Da Gen to use will be very low cost. It does not require to be bought, very expensive, or complicated software. It also does not require specialists to set it up or to operate it, which means cutting on wages. Similarly, it can be mentioned that the previous framework also did not require any specialized software or hardware, but if you look into the long term, the quantitative framework is more precise and will lead to better decision making in the outsourcing process, therefore, it will prevent the company from bad choices that can lead to money loss.

- **No environment limitation:** The proposed by us framework does not require any type of hardware or software to be carried out. It can be done anywhere and anytime, and it can be fitted to the resources that you have. The current qualitative framework of Da Gen can also be accredited that it does not need any particular environment. It can be concluded that to the environment limitation both frameworks are very independent.

- **Staffing training:** The quantitative framework does not require any staff training; it can be done by anyone after a short explanation, or just reading the guidelines for it. Once that all the team members have inputted their perception of the risk values, then only one person is needed to calculate them. On the other hand, in the previous framework more people have to be involved at all times. During the discussion and later on during the review of the contract everyone from the team must be present.

- **Flexible:** The new framework is very flexible in its assessment. The values can be changed to better fit the project or the company. The values are also based on studies and statistics, unlike the qualitative framework that is mainly based on the previous experience of the participants in the assessment. Even though it can be considered that the qualitative framework may be more flexible that the quantitative, we must keep in mind the objectivity and the weight of the results, which prevail in the quantitative framework.

- **Effectiveness:** The most important advantage that the quantitative framework has is its effectiveness. The values from the quantitative framework are precise, containing only one meaning that cannot be confused or misunderstood. It is easy to fill in and calculate the results for each risk and the whole project. There is no ambiguity to how to interpret and understand the results of the risk assessment. In contrast the
The qualitative framework’s results can be understood differently by different sides of the company, the different departments can interpret different risks differently. That can create low reliability of the end assessment, rather than having clear sectors that show that 39% of the expected risks are in the high risk levels.

- **Creation:** The creation of the proposed framework is very independent from any type of material, software, and hardware. It can be done on a paper, on MS Excel, or just with a calculator.

- **Visibility:** Another very important advantage of the quantitative framework is the result display. Since all the data gathered for the risk assessment is quantitative, as well as our purpose is to have a quantitative output, all the result data can be categorized into tables and charts. In the previous sections we have given examples how that can be accomplished. In that way there is clear representation of the results of the risk factor levels and values. It is obvious that the major number of risks fall into the red area. Also the visibility of the assessment is well developed. The assessment, as mentioned, is done with simple values that are not vague. Also our framework uses three distinguished colors that have already established with common meanings: red represents usually importance, attention, yellow is the more middle color, like in the traffic lights and implies to be ready, the green colour represents success, or free to proceed.

- **Time consuming:** In the end the last advantage of our framework is the time that it needs to be completed. The only time that the framework takes from all the people is for them to evaluate each risk in a P-I Table. After that only one person is needed in order to calculate the results, and that time can be used for the other team members to discuss other project related issues. The qualitative framework is based on constant discussions and arguments against and for a particular topic. This can be very time consuming if people have different views. Even though the boss has the last word, as mentioned in the interview, before presenting to him a contract needs to be put together. When presented to the boss more explanations and discussions can occur. Having the quantitative framework and the clear results will save all the explanation time. In that case, the boss can see the clear result of how risky is the project and make a decision.

Another advantage worth mentioning is that the quantitative framework that we present is based on proven theories and models. The qualitative framework that Da Gen is using now is based on previous experience and common sense; it is not backed up by any particular model or theory. Charmaz (2006) explains that the qualitative frameworks emerge from the analysis of the situation or projects and the quantitative frameworks invoke already established theory. In other words, the quantitative framework that we introduce is more standardized.
6 Conclusions

In this chapter we will present the conclusions that we have reached.

To conclude our findings from this thesis we can say that the quantitative framework makes the risk assessment better in the following way:

- Saves money
- Do not have environment constrains
- Do not require elaborate staff training
- It is very flexible
- It is very efficient
- It is easy to create
- Displays results in a visible way
- Saves time

In addition the proposed quantitative framework is suitable for most of type of projects.

We found also that there can be 42 main risks that can be identified before entering a contract. We needed a suitable tool to assess those risks. We discovered that the P-I Table gives very clear results and it is easy to use and calculate. We applied it in a case study in China and the results proved that it is much easier to work and use the P-I Table in comparison to a qualitative framework.

Our proposed framework is a combination of the P-I Table, the identified risks, and calculations. The framework (see Figure 3.2) is mainly a process of requirements identification, P-I Table filling, calculations, comparisons, and problem solving. The framework provides a step by step assessment process, which results in a quantitative representation of the risks that the company needs to avoid or must solve before signing a contract.

Finally, from the comparison between the proposed framework and DG Risk Assessment Framework, we can conclude that the proposed framework is much more suitable for companies like Da Gen, because it do not require an assessment team, it is very cheap to conduct and can save time.
7 Reflections

In overall we are satisfied with the research process and the results we received in this thesis. Looking back we would have done differently several things.

The first thing that we would have liked to improve was the amount of interviews. We could have spread the time line differently and made some time for couple of more interviews during the work process.

With the knowledge that we have now, we would have probably written the interview questions a bit differently. We would have tried to ask more risk assessment questions, but when we were conducting the interview we did not have enough knowledge in that area. Also the time line did not give us another opportunity to conduct a follow up interview.

Another point we could have done differently is the case study. We thought it would have been interesting if we managed to contact more companies from our population and test the proposed framework in their firms. That would have definitely given us more broad results and improved the framework considerably.

Finally, we believe that this thesis have provided us with a lot of new knowledge about the IT outsourcing risk assessment. We have also learned a lot about the risks a company can face in advance.

In overall, we can say that we reached the purpose of this thesis, as the results can show, and also we went a little bit beyond that. The knowledge that we gain in the research area is the unofficial purpose that we think we reached in more than one way. We managed to gain not only theoretical knowledge but also we learned how to manage our time and to continue our group work from distance.
8 Further studies

After finishing the thesis we went back and thought about the things we wanted to do but we couldn’t because of different reasons. We would like to present some of the ideas that we think would be interesting to undertake in the future and also write them out for other authors.

One point is that we think it will be very useful to research a new list of risks that is more up to date. We need to take in consideration the constantly changing environment of the business world. Even though most of the risks have their constant appearance many are results of newly developed technology. Those new risks are very hard to predict. That was also our suggestion to our host company when they are going to use the proposed framework: they need to continuously look for new risks and add them to the existing list in order to keep the risk assessment accurate.

Another interesting research that we would like to point out is to focus on more companies. In our research we did a single case study, but with more time and resources we would have liked to study bigger sample in order to record more “accurate” results.

Last we thought that it can be possible to incorporate our framework into simple software. The software can keep the low cost and low time consummation of the current framework, the only advantage that will be removed will be the environment freedom. As we are IT students we are constantly developing our programming skills. We thought that a simple program that keeps the logic of the proposed framework will not be so hard to build but it will definitely be very time consuming. The time constrain is the main purpose that we did not undertake that way of our research.
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Appendix 1
Interview with York Dai

1. How easy is to lose reliability in your company if you can not meet certain requirements?

We always try to satisfy our customers, any differences that occur we would communicate with them in order to fix them. We try to achieve win-to-win solutions. Until now, we have not had a project that we lost the trust of customers.

2. Do you have an assessment team? Who decides if the customer should be accepted?

No assessment team. They always rely on negotiations.

Marketing department is a bridge that connects the inner company and the outer world. Marketing department communicates with customers and receives orders, then sends the orders to the technical department. Technical department receives the order and analyze specific details. If there are differences, negotiations with a delegate of the customers are conducted. For the parts which delegate does not want to compromise, the technical department will hand out to the boss and analyze the requirements with him. However, the boss has the right to the final decision.

3. How often do you get new customers?

There is no rule how to get a new customer. Most of them are customers that have already worked with the company before. New potential customers would like to try and get acquaintance with Da Gen first. They perhaps take time to get to know or do own research of Da Gen before the new customers will outsource a task. The research can be done from cooperated companies, friends, company’s website, advertisement.

4. Is it the same person that decides if they (Da Gen) should sign a contract or not?

Yes, the boss has to make final decision. The boss is the founder of Da Gen.

5. What do you need to consider when you assess clients?

The company uses a simple qualitative framework to assess its clients.

6. How do you know if a project is risky or not?

The managers that are involved in a particular project discuss the risks that can occur and also the advantages of that project and they decide if the company should undertake the project.

7. When you have a new customer, will you have a board meeting or some other kind of meeting to discuss the new customer?

Yes, we do. Similar to question 2.

8. How Da Gen communicates with their clients the requirements? more specific with the notes you mentioned

All specific details are taken notes of and will be included in the final contract. This means that any differences must be discussed and solved before the contract is closed. On the other hand, when the company signs a contract with the customers, the boss has already agreed to accept the customers.
9. How does Da Gen negotiate if they want to change some of the requirements?
For any problems that the company cannot fulfill, they suggest other solutions to achieve the same goal. If the customer rejects, another solution may be prepared. That is the reason why some projects can be delayed and can bring impact on other projects.

10. Do you consider client's capital strength at the beginning?
Yes, we would analyze the customer.

11. How full requirement list does the company get? Is there some freedom left when agreeing on requirements? (e.g. customer: we want a digital boards, don’t care how or what colour)
Customer gives us all details of the product, but sometimes they said they want the product with attractive color, but they did not know which color is most suitable. Therefore, the company produces couple of prototypes of a product with different colors like black, gray, blue etc. Then the customer can select a suitable one.

12. Who makes the assessment of a customer, and how?
For different customers, we will have different assessment people, the assessments could be made by market department, technical department and the boss.

13. What are your future plans for expansion?
The company is currently working only on a local level. It has plans to expand abroad and attract more international customers.
Appendix 2

Your department:

Please assess each factor, and fill their representing numbers in the following table based on different degrees of elements. Only numbers are needed.

<table>
<thead>
<tr>
<th>Probability</th>
<th>Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thanks for your time and helping!

*(Risk factor No. 6 is evaluated and given a value by the crossing the medium of probability and high of impact.)*
## Appendix 3

<table>
<thead>
<tr>
<th>Value</th>
<th>Number</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>31</td>
<td>Third party cooperation</td>
</tr>
<tr>
<td>19</td>
<td>11</td>
<td>Development choice</td>
</tr>
<tr>
<td>19</td>
<td>21</td>
<td>Client technical environment</td>
</tr>
<tr>
<td>18</td>
<td>24</td>
<td>Vendor top management</td>
</tr>
<tr>
<td>18</td>
<td>23</td>
<td>Vendor team morale</td>
</tr>
<tr>
<td>16</td>
<td>39</td>
<td>Vendor’s competition</td>
</tr>
<tr>
<td>14</td>
<td>25</td>
<td>Client top management support</td>
</tr>
<tr>
<td>14</td>
<td>42</td>
<td>Client business changes</td>
</tr>
<tr>
<td>14</td>
<td>41</td>
<td>Contract terms and conditions</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>Change management</td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>Third party staffing</td>
</tr>
<tr>
<td>12</td>
<td>37</td>
<td>Multiple departments</td>
</tr>
<tr>
<td>11</td>
<td>28</td>
<td>Bad news’</td>
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<tr>
<td>11</td>
<td>14</td>
<td>Required functionality</td>
</tr>
<tr>
<td>11</td>
<td>18</td>
<td>Complexity of product</td>
</tr>
<tr>
<td>11</td>
<td>40</td>
<td>Legal and credit risk</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Vendor staffing</td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td>Client organization culture</td>
</tr>
<tr>
<td>9</td>
<td>27</td>
<td>Client trust</td>
</tr>
<tr>
<td>9</td>
<td>38</td>
<td>Vendor’s reputation</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>Client understanding of requirements</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>Schedule and budget management</td>
</tr>
<tr>
<td>8</td>
<td>29</td>
<td>Client IT department</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Sign-off control</td>
</tr>
<tr>
<td>7</td>
<td>26</td>
<td>Client expectations</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>Newness of product</td>
</tr>
<tr>
<td>7</td>
<td>22</td>
<td>Vendor internal negotiations</td>
</tr>
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<td>6</td>
<td>12</td>
<td>Vendor understanding of requirements</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>Third party solution</td>
</tr>
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<td>5</td>
<td>19</td>
<td>Third party integration and compatibility</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>Users</td>
</tr>
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<td></td>
<td></td>
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<td>---</td>
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<td>20</td>
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</tr>
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<td>3</td>
<td>9</td>
<td>Third party deliverables control</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Client project management</td>
</tr>
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<td>3</td>
<td>2</td>
<td>Client staffing</td>
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<tr>
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