A Study on SME Software Development Background and Risk Assessment Implementation in Malaysia

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Abstract: In Malaysia, majority of the Small and Medium Enterprises are from services sector including Information and Communication Technology and more than two-third of the companies are microenterprises. Nearly one-third of these companies are located in Klang Valley, Johor and Perak. Our research focus is to study the implementation of risk assessment and usage of tools to identify and analyze risks in projects for those companies in the services sector who does software development projects. Also, in terms of enterprise and their staff, to examine their experience of risk and knowledge of working with project management related software development projects. Moreover, the research examines the usability of risk assessment tools in these companies and the reasons that may cause of not taking any advantage of the existing tools. Finally, the researchers enlighten some gaps in the field that needs more focus with further directions.

Key words: Risk Identification • Risk Assessment • Risk Management • Software Development • Malaysia • Small and Medium Enterprise

INTRODUCTION

Small and Medium Enterprises (SME) are the backbone for the economic growth of each country. There is no international convention for defining SME but generally each country base their SME definition in terms of two criteria: the total sales turnover/revenue by an enterprise has in a year or the number of full-time employees that registered in the company. In this study, we are focusing SME companies located in Malaysia by examining different aspects of their staff background and risk assessment procedures.

For the coming sections, a brief background of SME companies in Malaysia is presented in section II, while the study methodology applied in this research is discussed in section III and then a detailed elaboration of Malaysian SME companies’ background and risk assessment implementation are discussed in section IV with a conclusion and future recommendations.

Malaysian SME Background: The National SME Development Council, has published recently SME Annual Report for 2011-2012. SME, in Malaysia, combines Micro, Small and Medium enterprises [1]. Furthermore, SME companies are divided into three sectors: manufacturing including agro-based and manufacturing related services sector; primary agriculture sector; and services sector. The services sector includes Information and Communication Technology (ICT) related enterprises like software development companies which are our focus in this research. Moreover, National SME Development Council, defines these sectors based on the two criteria mentioned above as shown in bellow table 1 and 2.

The above two tables summarizes the definition of SME in Malaysia by considering an SME to any each company whose sales turnover/revenue in a year is equal or less than 5 Million Malaysian Ringgit (around 1.6 million USD dollar) OR have less than or equal to 150 full-time employees. As mentioned in [1], the total number of
Table 1: Malaysian SME Definition Based on Annual Sales Turnover Criteria [1]

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Micro</th>
<th>Small</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Sector</td>
<td>&lt; RM250,000</td>
<td>RM250,000 - RM10 million</td>
<td>RM10 - RM25 million</td>
</tr>
<tr>
<td>Primary Agriculture Sector</td>
<td>&lt; RM200,000</td>
<td>RM200,000 - RM1 million</td>
<td>RM1 - RM5 million</td>
</tr>
<tr>
<td>Service (including ICT) Sector</td>
<td>&lt; RM200,000</td>
<td>RM200,000 - RM1 million</td>
<td>RM1 - RM5 million</td>
</tr>
</tbody>
</table>

Table 2: Malaysian SME Definition Based on Number of Full-time Employees Criteria [1]

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Micro</th>
<th>Small</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>&lt;5 employees</td>
<td>5 - 50 employees</td>
<td>50 - 150 employees</td>
</tr>
<tr>
<td>Primary Agriculture</td>
<td>&lt;5 employees</td>
<td>5 - 20 employees</td>
<td>20 - 150 employees</td>
</tr>
<tr>
<td>Service Sector (including ICT)</td>
<td>&lt;5 employees</td>
<td>5 - 20 employees</td>
<td>20 - 150 employees</td>
</tr>
</tbody>
</table>

SME companies in Malaysia as per 2012 are 645,136 enterprises in which 90% of them are in the services sector which includes ICT. On the other hand, in terms of size, microenterprises are forming 77% of total SME in Malaysia in 2011 and 79.6% of services sector companies are microenterprises [1], [2], [3] as shown in figure 1. This means more than two-third of SME enterprises in Malaysia are micro and specifically more than two-third of services sector companies—our focus companies includes—are micro enterprises. Furthermore, based on geographical locations, nearly one-third (32.6%) of total SME companies are located in Klang Valley (Selangor and Kuala Lumpur) followed by Johor (10.7%) then Perak (9.3%) [1].

Therefore, as majority of these companies are located in Klang Valley, Johor and Perak, we focused to those companies located in these three areas. Before gathering any information about these companies, we need to firstly identify those companies who develop software products as there are different ICT related companies registered in this sector. A detailed study procedures followed to identify our focus group companies and then gather and analyze the data is discussed deeply in the following sections.

**Study Methodology:** Our research focus is to examine the use of technology by companies in identifying and analyzing risks in software development projects. Besides that, also to know more about the background of these majorly micro companies which do software development. The researchers used structured questionnaire to examine risk identification implementation existence and assessed usage of tools for the process of specifying risks in software projects before starting their development. Therefore, in order to examine and assess SME companies based on their knowledge and background of risk assessment, the researchers carried out various steps starting from identifying the focus group till the analyzing phases.
First of all, SME companies which develop software’s or products are part of the ICT umbrella which occurs in the services sector. To specify software development enterprises in the SME field, the authors carried out a research by all means of getting information about existing companies. With the help of SME Corporation Malaysia (SME Corp) and Malaysian Technology Development Corporation (MTDC), we figured out around 108 SME companies that develop software’s and located in Klang Valley, Johor and Perak. Only 25 of them accepted to participate in our survey. The majority of the rest of companies were either not existed anymore or are not willing to participate in the study.

Before starting the data collection, a pilot study was conducted to evaluate the understandability of the instrument and the reliability of the question items. 63 respondents from 7 SME companies were surveyed to test the instrument yielded an Alpha value of 0.954 which is above the acceptable Alpha value (0.7) of reliable data [4], [5], [6], [7]. That proofs the validity of our instrument and to continue further with the real data collection.

The primary data collection took around 3 months and the total distributed survey forms was 450 forms. 211 of the forms were returned. After checking the data received, 9 incomplete forms were discarded. As a result, only 202 forms became valid survey forms yielding a response rate of 44.88%. Finally, the respondents, in general, was surveyed about different aspects related to their background of project management, risk assessment process and usage of tools for identifying risks in which comprehensively discussed in below sections.

IV. Staff Profile

In this section, a detailed background of the company’s staff profile is discussed. This information includes the staff’s experience in risk management and in general project management related software development, different positions that stuff holds in his/her current work, their knowledge of working with project management related software development projects and finally their level of education.

First of all, in terms of gender, nearly two-third (69.3%) of the stuff were male while the female yielding 30.7% of total staff in these surveyed companies. On the other hand, the respondent’s age was divided into three sub-groups which are: less than 25 years, between 25 and 45 and those above 45 years old. The respondent’s age between 25 up to 45 was the highest number of the respondents yielding two-third (70.5%) of the respondents. This provides that Malaysian SME staffs are majorly from age 25 up to 45. For those respondents who are less than 25 years old were 27% out of the total respondents where those above 45 years old were the lowest number of respondents as they produce 2.5% of the total respondents.

On the other hand, there were three levels of positions which the researchers questioned about the respondents. The three levels we focused were SME owner(s), Project/Team Manager(s) and Project Team. In this study, project team for software developments includes for those who develop, analyze and test the projects. The project team were took the highest number of respondents as they were more than two-third (69.9%) of the total respondent. The other two levels, the Project/Team Manager(s) were 24.7% and SME owner(s) were 5.4% of total respondents.

Furthermore, 74.3% of the staff has less than 5 years of experience and 19.8% has 5-10 years of experience while 5.4% of the total respondents have more than 10 years of experience. For those staffs which have difference years of experience have worked with different projects in their experience. 93.9% of the total respondents worked with less than 50 projects during their experience while 6.1% of the respondents worked with between 50 up to 100 projects in their experience. For all respondents, there is no one selected the option of worked with more than 100 projects. Additionally, when we connect the experience of the staff and total projects they worked during their experience, as shown in figure 2, we can see that 98.6% of staff who has less than 5 years of experience worked with less than 50 projects during their experience. And in general, 93.9% of all staff worked less than 50 projects during their experience.

In terms of level of education, the majority of the staff we surveyed has Bachelor degree as they are taking 63.8% of the total respondents. The second highest respondents were those who hold Diploma as there were 19.4% of the total respondents. Then Postgraduate holders are next in number to the Diploma holders as there were producing 12.2% of the total respondents. The least number of respondents were those who holding High School or below and they were only 4.6% respondents.

In summary of the staff background, we can conclude that majority of the staff in the SME software development companies in Malaysia are male. The majorly staff are aged between 25 years and 45 years old. Also majorly majority of them have less than 5 years of experience and worked with less than 50 projects during their experience. They are also majorly having minimum Bachelor degree and they majorly are project teams which are the backbone of each software development company.
Company Demography Profile: In this section, the researchers will briefly discuss the types of software development projects, that the surveyed companies, develop and what knowledge their staffs have regarding working with different project management related software development projects.

Generally, software development projects are divided into three types: small, medium and large projects. Therefore, we asked all respondents to select which type of project they worked with during their previous and current works as they can select more than one type. 36.9% of total respondents were worked with small projects while 43.8% worked with medium projects. For large projects, there were 19.3% of total respondents worked in this type of software project.

Furthermore, in order to know the background knowledge of the respondent before they join working with project management related projects, the researchers asked the respondents to choose one out of 5 categories regarding their status before joining their project management related works. The categories were:

- Having degree on project management (under/postgraduate) before starting working with project management related software development project
- The degree taken was not related to any project management before starting working in project management related software development projects
- Having degree in project management but not taken any training/courses before starting working in project management
- Having both degree on project management and training before working with project management related software development projects
- Not having both degree and training before joining working in project management

Those categories with their percentage of respondents are mentioned below:

- There were 20.7% of the total respondents who are having degree on project management (under/postgraduate) before they started working in project management.
- Under the category of those their degree was not related to the project management when they were starting working with project management were 35.9% of the total respondents.
- The third group was those who have taken degree related to project management but didn’t took any training or courses before they started in working with project management related software’s. In this category, the respondents selected were 8.7% of the total respondents.
- There were 9.8% of total respondents who had degree related to project management with training or courses before starting working in project management related software’s.
- There were also 24.5% of total respondents-the second largest number of respondents-who do not have any related project management degree or training before they started working with project management related software’s.
Finally, as these categories shows, more than half of the respondents either don’t have degree or didn’t take any training/course related to project management before starting working in a project management related software development projects. However, with that less knowledge on project management, we need to figure out how these companies assess the risks in their project as risk management is one of the fundamental pillars of any project management. A detailed of these findings is explained in the next section.

**Risk Assessment Procedures:** In this section, we are assessing two aspects in order to know what kind of risk assessment that these surveyed companies use for their projects. In order to justify if there is any risk assessment procedures taken by SME companies, the researchers asked the respondents regarding taking assessments of their projects and if they use tools to identify risks.

In general, risk assessment is part of risk management. According to [8], risk assessment are divided into three levels which are risk identification, risk analysis and risk prioritization. Therefore, software risk assessment is the process of identifying, analyzing and prioritizing project risks [9], [10], [11], [12]. Before analyzing or prioritizing any risk it has to be firstly identified by using any of the identification methods like checklist, brainstorming, questionnaire and so on [13], or with the help of a tool to identify and analyze risks [14].

As shown in figure 2, 58% of the total respondents agreed that they do risk assessment for their projects but not for all projects. This means risk assessment is being implemented in these companies but they don’t assess risks for every project. On the other hand, 28.5% of the respondents totally agreed that they do risk assessment for their projects before they start their development. While only 13.5% of the total respondents disagreed on doing risk assessment for their projects. The good indicator here is that majority of the respondents agreed on doing risk assessment for their project. Doing so requires using techniques of identifying risks, analyzing and prioritizing them in order to be taken the right decisions about them.

Therefore, to identify risks, there are a lot of ways to do so including usage of tools to help identify and analyze risks. Hence, the researchers asked the respondents if they use any tool for identifying risks in their projects and as shown in figure 3, majority of the respondents (62.9%) disagreed of using any tool for their risk identification while 37.1% of the total respondents agreed on using tools to identify risks in their projects.

As we mentioned earlier that majority of the respondents agree of identifying risks in their project but again these majority agreed on not using any tool for their risk identification. Then how do they identify risk and why they don’t use any tool for their risk identification? According to [10], mostly risk identification for small and medium software development companies handle them manually and they don’t have risk registry to keep in truck with risks. Finally, this indicates that there is lack of knowledge of taking advantage of tools to identify risks.

Therefore, researchers carried out to investigate the reasons of not using any tool in the risk assessment process in the second stage of data collection and we figured out that 24% of the respondents agreed that the cost of buying or outsourcing the tool is the reason of not using any tool for the risk assessment process. Also the 19.4% of the respondents agreed that the second reasons of not using any tool for the risk assessment is tools require experienced people in order to apply it in real projects. Other reasons like “Tools require staff to be trained”, “Tools require a lot of templates which can only be found in big companies”, “Staff are few and staff turnover is high which can causes that trained staff may leave the company in which causes to train another staff every time and hence a lot of money will be spent” and
“Time is very tight and doesn’t have time to use the tool” took they part of the reasons affecting the use of any tool in the risk assessment process as they yield 17.2%, 13.1%, 13.1% and 12.7% respectively.

Conclusion and Further Directions: In this paper, the researchers carried out a study of the Malaysian software development SME’s on their risk assessment implementations and usage of tools. Also researchers, examine the background of the enterprise and its staff regarding their experience and knowledge on working with project management related software development projects.

On the other hand, we have studied how these companies identify risks and whether they use tools for their risk identification. We figured out that majority of them do not use any tool for their risk identification and the reasons the cause of these companies not to use any tool for their risk assessment process. In the literature, most of the researchers focus, in general, all project types and specifically large companies while these companies which mostly are micros and develop small and medium projects does not get enough consideration from the researchers.

Finally, researchers are currently focused on the existing risk assessment tools in order to examine their strength and weakness and to study the assessing issues that risk assessment models or methods of these tools have. Finally, also researchers are studying to determine the major risk factors that these microenterprises have in their daily projects.

REFERENCES