

# The Extent of Risk Management Practices in E-Government Projects

NOOR HABIBAH ARSHAD, AZLINAH MOHAMED, ZAIHA MAT NOR  
Faculty of Information Technology & Quantitative Sciences  
Universiti Teknologi MARA  
40450 Shah Alam, Selangor  
MALAYSIA

*Abstract:* - The ever-increasing rate of project failures coupled with increased in expense and complexity of IS development projects are spurring greater interest in formal risk management. Malaysia's government conscious move towards a knowledge-based economy through e-government and leveraging on ICT to propel growth has demanded that serious attention be focussed on regards to how IS projects are to be managed. This paper presents empirical findings on the extent of risk management practices in e-government projects. The findings demonstrates that risk management is still not widely practice in many IS development projects where only 8% of the software developers practice IS risk management. Meanwhile, 89.3% of the reasons cited for not practicing risk management were due to the lack of formal training in project risk management. Thus the findings and the discussion in the research would improve the IS projects development and increase the project success rate in e-government projects. Appreciate it

*Keywords:* - e-government, IS projects, risk management, risk management practices, software risk management, risk checklist

## 1 Introduction

The Government of Malaysia has launched the Multimedia Super Corridor (MSC) to provide a comprehensive world-class Information and Communication Technology (ICT) in its drive to move the country towards higher productivity through information technology and high value-added economic activities. This National IT Agenda was formulated in 1996, provided the framework for the orderly development of the country into an information and knowledge-based society by year 2020. Seven flagship applications were introduced where the flagship applications were categorised into two groups, namely multimedia development flagship applications and multimedia environment flagship applications. Electronic Government (EG) is one of the MSC flagship applications, launched with the objective of improving government operations in terms of its internal processes and delivery services to the public and to business. EG require a comprehensive

development and implementation programme, which covers all aspects of the government.

Information system (IS) projects involved in the EG applications are large-scale projects, diverse in nature and highly complex where it involved 24 ministries, 640 agencies and over 890,000 government employees. Typically, if the project is large, the associated risk is deemed to be proportionately large. The projects are high in decision stakes and high levels of systems uncertainty. The complexities are even more prominent because of the organizational and technological complexities and also the involvement of multiple parties. In terms of organizational complexity, it would mean the number of hierarchical levels, number of formal organizational units, division of tasks, number of specializations and also the degree of operational interdependencies and interactions between the project organizational elements. For technological complexities, it includes the number of diversity of inputs, outputs, tasks or specialities, integration and also the

technology itself. Complex relationships can occur when there are involvements of multiple parties.

The critical characteristics in the EG projects have given risk management a higher profile. In the Government blueprint for Electronic Government, risk management has been introduced as part of its governance structure. The awarded organization has to provide a risk management strategy describing the approach for risk identification, analysis, management and mitigation [7]. Risk management is crucial especially with the complex arrangements of multi-vendor alliances, co-sourcing, and complex multi-vendor, multi-client relationships.

The objective of this paper is to present empirical findings on the extent of IS risk management practices in public sector particularly that involved EG projects. In particular the study will also provides empirical findings on the factors that influenced the organisations to practice risk management or otherwise. The findings from this exploratory research would provide important inputs for those researchers on IS risk management as well as practitioners of IS project management. Acceptance and broader understanding of risk management by public sector organizations are critical for the risk management to be adopted when developing the IS projects.

## 2 IS Risk Management

From the past Literature, it was found that IS project still suffered from high failure rate even though there were widespread used of advanced tools and concepts such as prototyping, data modelling, structured design, and Computer Assisted Software Engineering (CASE). UK Government IT survey revealed that more than a third of government IT projects were at serious risk of failure, either from budget overruns or late delivery. Two thirds of the IT Director said that missing deadline was a major problem with two fifths worried about going over budget [11].

IS development project have been plagued by budget overruns and unmet user

requirements [1,10]. Billions of dollars are lost due to cancelled projects, late delivery, over-budget delivery, and limited functionality. Standish Group's survey showed that 52.7% of IS project miss their budgeted time and financial targets, 31.1% of all project cancelled, and only 16.2% of the project are completed on time and within the budget [6]. Statistical analysis of the survey data, discovered that overall only 9.2% engaged in IS development projects in Malaysia are successful [10]. The effective management of IS development projects remains as central issues for both practitioners and researchers. A review of the past studies shows that the management of risk in projects is one of the main topics of interest for researchers and practitioners working in the area of project management. The literature on IS risk management has increased over the past years. The main interest in IS risk management is the result of repeated and well-publicized failures associated with the IS development and its implementation. However, according to Ropponen and Lyytinen [12], despite the increase in the academic and professional attention paid to IS risk management, the knowledge of IS risk management had been sparse and anecdotal.

Successful project risk management will greatly add to the probability of project success [2, 4, 13, 9, 12]. According to Boehm, most post-mortems of IS project disasters had indicated that problems would have been avoided or strongly reduced if there has been an explicit concern with identifying and resolving the high-risk elements [3]. Hence, it is necessary for IS risk management to be an integral part of the corporate culture. The need for IS risk management to be part of the corporate culture has significantly increased since at present it does not always get enough management attention. To facilitate the risk awareness and risk management practices across organization, a coordinated and integrated framework is needed to identify, assess, monitor and control the diverse and multiple risks in the IS development. With the coordinated and integrated framework, organizations can rapidly and effectively respond to changing circumstances.

### 3 Research methodology

An empirical study using a combination of questionnaire survey and interview was applied in this research. The interview sessions were conducted only when requested by respondents who require guidance in answering the questionnaires. During the interview session, some observations were done on risk management implementation. Five (5) factors regarding respondents' and projects' profile was used that are deemed significant in influencing the extent of IS risk management practices. These factors are the project manager's years of experience, the development type, project duration, project personnel and the project cost.

Based on these factors, the research has formed the following hypotheses:

- H1: Developers' years of experience is significantly associated with the risk management practices.
- H2: Project development type is significantly associated with the risk management practices.
- H3: Project Duration is significantly associated with the risk management practices.
- H4: Project Personnel is significantly associated with the risk management practices.
- H5: Project Cost is significantly associated with the risk management practices.

### 4 Findings and Results

The survey questionnaire and interview captured background data of respondents profile as well as their project profile. This section discusses the risk management practices in Malaysia Public Sector.

#### 4.1 Respondents' profile

Respondents' profile characteristics examined are organization name, current position, working experience, age and gender. The demographic profile of the respondents are categorized into designation, year of working experience, age and gender. The survey was distributed by hand or by email to thirty government agencies located in Klang Valley

with an average of three survey forms per agency. Only 25 agencies with a total of 50 respondents returned the survey forms. When analysing the respondents' responses, it was noted that 42.0 percent and 40.0 percent of the respondents were Chief Assistant Director and Assistant Director respectively. The next highest respondents were Project Manager with 8.0 percent, followed by Deputy Director with 6.0 percent and 4.0 percent of the respondents were Directors and IT Manager respectively. Majority of the respondents (58.0 percent) have more than ten years of working experience. The female respondents representing 70.0 percent of the total number of respondents for this study clearly dominate their male counterpart, who stood at 30.0 percent. The highest response was received from project managers in the age group between 40-49 years old (60.0 percent of the total respondents).

#### 4.2 Projects' profile

Projects' demographic is used to identify the number of project team, project duration, project cost, project nature of development and the personnel involvement in the project. The results show that the majority of the projects consisted of 1-5 team members (44.0 percent). There were only nine (18.0 percent) projects that had more than 20 personnel. Meanwhile, only eleven (22.0 percent) projects had 6-10 personnel and 4 (8.0 percent) projects had 6-10 or 11-15 personnel. In addition, most of the project duration was less than a year (1- 12 months); out of 50 projects, 27 projects (54.0 percent) fell in this category. Furthermore, only 10 projects (20.0 percent) are beyond 24 months and 13 projects (26.0 percent) are between 13-24 months. Project cost involved in this study was varied; 8 projects were developed without any cost by using open source software, 8 projects between 10 to 50K, 8 projects between 1.1 to 50M and 23 other projects fell in other categories. Through this finding, it shows that 70.0 percent of the project were new projects and mostly were developed in house (38.0 percent).

### 4.3 Results On The Risk Management Practice

The information gathered in the survey based on 50 respondents was to measure how intensive risk management being practice in the public sector. The result shows that only 8.0 percent of the respondents practice risk management, while 36.0 percent claimed they sometimes did performed risk management. However from observation, it was noticed that most of the activities were done only when a critical risk was involved and the management of risk was done without proper documentation. The complete cycle of risk management as suggested by literature such as risk identification, analyse, plan, track and resolve was never completely carried out [5]. Beside that, the results indicated that 48.0 percent of the respondents did not perform risk management practice and 8.0 percent of them did not even know whether there were any risk management activities in their project. This result verifies earlier finding, which indicated that 50.0 percent out of 46 projects in the public sector in Malaysia did not practice risk management [10]. In general, the survey shows that risk management was not the main agenda of the public sector project management. The study confirmed that one of the main reason why IS projects in the public sector failed was because they did not performed risk management practice in the project.

The results show that 50.0 percent of the respondents quoted that their reason for not performing risk management practice was because it was not a practice in their organization. Meanwhile 60.7 percent indicated that they did not have experience doing it. These two reasons most probably were due to the lack of formal training in project risk management. The high percentage showed that the public sector's project managers lacked the risk management training (89.3 percent) even though they had long service in the public sector. The continuity of formal training would definitely increase the willingness of project managers to do risk management in the project and indirectly would minimize project failure in the public sector. The training would also allow them to

do formal risk management practice as suggested in the past literature.

About 25.0 percent of the respondents mentioned that risk management will incurred time and cost; 28.6 percent agreed that the project was not mission critical; 10.7 percent agreed that project was not budget critical and 17.9 percent identified that risk management will cause project delay. Moreover, they also agreed that not having enough personnel was another reason why they did not perform risk management (53.6 percent). A few respondents indicated their ignorance on risk management (35.7 percent). However, only 14.3 percent of them identified risk management as not important. This small percentage indicates that most of the project managers were aware of the importance of risk management practice in minimizing IS project failure. Interestingly, 21.4 percent of them say that top management cannot see the importance of project risk management.

From the finding, it can be summarized that organization environment and having formal training play an important role in implementing risk management practice in the public sector and the support from top management.

### 4.4 Risk Management Practices and Association Test

Despite the importance of software risk management, public sectors differ widely in the extent to which they are practiced. In ability to see the factors that relate to the practice of IS risk management, cross tabulation and chi-square test of independence were used. Table 1 presents the results of this test based on the hypotheses discussed in Section 3.

Results in Table 1 shows that all the hypotheses (H1 to H5) were rejected. The results indicated that there was no relationship between year of experience and risk management practice ( $p$ -value  $> 0.05$ ). The table shows seventeen out of twenty-four respondents working more than ten years did not perform risk management. Surprisingly, less experience project managers (with less

than ten years working experience) sometimes conduct risk management practices.

Table 1 Results on risk management practices and association test

Year of Exp. (H1)	Risk Management Practice				P-Val
	Yes	Some time	No	Don't Know	
1-5	1	6	5	1	0.257
6-10	0	5	2	1	
11-15	0	2	10	1	
> 15	3	5	7	1	
<b>Dev. type (H2)</b>					
New	3	12	16	4	0.805
Enhance	1	4	4	0	
Replace	0	2	4	0	
<b>Project Duration (H3)</b>					
1-6	1	5	8	1	0.955
7-12	0	4	7	1	
13-18	0	0	1	0	
19-24	2	4	5	1	
>24	1	5	3	1	
<b>Personnel Involve (H4)</b>					
In House	1	11	7	0	0.163
Out Source	1	4	7	1	
Contract	0	1	6	2	
Joint Venture	2	2	4	1	
<b>Project Cost (H5)</b>					
Open Source	1	4	3	0	0.236
10K – 100K	0	5	5	2	
101K-500K	0	1	3	1	
501K – 1M	0	1	3	0	
1.1M- 10M	0	1	6	0	
10.1M- 50M	1	3	3	0	
>50.1M	2	2	1	1	

*Significant at 0.05 levels*

This analysis was also to see the pattern of project development type against project risk management practiced in the public sector. Since most of the projects were new projects, Table 1 shows that most of the risk

management practices were performed in new projects (68.1 percent). Even though there is no relationship between project development type with project risk management practice, an assumption that can be drawn from this analysis was that project managers are aware of the importance of risk management in IS project development. Results for project duration against risk management practice shows that the pattern of risk management practices is more or less evenly done regardless of the project duration. The results depicted that project duration has no influence to the risk management practice (P value = 0.955). Table 1 also shows the cross tabulation analysis between project cost and risk management practice. The study showed that out of the four projects performing risk management, three were projects that cost more than RM10 million.

The study also revealed that risk management was not performed based on the budget allocated for the project but very much dependent on the project manager's initiative. It means that project cost has no influence on risk management practice (p-value > 0.05). During the data collection a few other aspects were also considered since findings in section 4.3 demonstrates that only 8.0 percent of the respondents perform risk management practices while 36.0 percent answered that they sometimes perform risk management. Therefore, the next section would demonstrate the descriptive statistical analysis using frequency test to determine the used or utilization of risk management tools and techniques in the public sector risk management activities.

#### 4.5 Results On The Techniques And Tools Used In Risk Management

From the finding, tools and techniques such as Risk Checklist (54.4 percent), Decision Analysis (72.7 percent), Interviewing (72.7 percent) and Lesson Learned (77.3 percent) revealed that project managers only used certain tools and techniques that they were familiar with and were considered suitable for doing risk management. The survey results shows that a powerful tools and techniques [8]

such as Delphi Analysis (0.0 percent), Sensitivity Analysis (40.9 percent), SWOT Analysis (27.3 percent) and Monte Carlo Simulation (4.5 percent) were not utilized by project managers for the effectiveness of risk management practiced. In order to get maximum impact on the success of managing risks, project managers should not take lightly while selecting risk management tools and techniques. Lack of formal training might be the reason for this situation. Therefore, organization should be encouraged to provide formal training through the introduction of educational courses or attending seminars and conferences specifically on how to manage IS project risks.

## 5 Conclusion

The most important insight derived from this research is that risk management is still not highly practised in EG projects where only 44% of the IS developers practice or sometimes practice risk management. The study found that out of this 44%, only four of them firmly claimed that they were really practicing risk management. The study revealed that the most obvious reason given for not practicing risk management in the public sector was that many project managers did not have formal training and experiences in managing risk. Formal training and learning seemed to contribute significantly to the increase in awareness on managing risk. Therefore, training in risk management is a must for project managers to encourage project managers to perform risk management formally. It is also important to note that learning from experience is highly valuable, and that the experience should be shared in a supportive work environment. Besides, experience and best practices should be shared at internal and inter-agency levels.

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