Evaluating the Success Factors of Information System (IS)

Case Study of Malaysian Public Sector

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Abstract—**Managing and implementing project well is important issues for IS projects in the public sector as well as other sectors. The government tasks the public sector to use public resources to deliver large and complex projects for the benefit of its citizens. Information and communications technologies (ICTs) are playing an increasingly vital role in the daily lives of people, revolutionizing work and leisure and changing the rules of doing business. However, still there is a gap between reality and achievement the success. This paper aims to evaluating the success factors of information system (IS) projects implementation in Malaysian government sector focusing on the correlated of project success criteria including Processes, People, Project Tools (Hardware and Software) and Project environment. The proposed model of project success criteria will be introduced and discussed.**

Keywords- pubic sector; success factors; information system; evaluating

I. INTRODUCTION

The Internet-driven a global digital revolution a explosive growth of computer networks and systems have resulted in the extensive use of information and communications technology (ICT) for gathering, maintaining and transmitting information and data. ICT is an enabler of efficient and effective functioning of government. In turn, a more efficient functioning of government allows for improved and better governance. Governments around the world are working continuously in order to improve services for their citizens.

However, most governments face problems with their current systems such as bureaucratic tendencies in governance system, centralized decision-making patterns, complexity of redundancies in the public sector, lack of coordination and information sharing between the public sectors, and the lack of effective Information and Communication Technologies (ICTs) infrastructure[1].

In recent years, Electronic Government has become a subject of considerable importance as a new form of government administration promising improved efficiency, and better provision of services to citizens and businesses [3].

According to Heeks, in developing countries, 35% of e-government projects are total failures, 50% are partial failures, and only 15% are successes [2]. Therefore, scholars have recommended further studies in this area [4, 5] in order to avoid e-government failure. In addition, Wood-Harper et al. declare that studying the factors involved in e-government delivery is an important issue. Countries around the world are implementing e-government using different approaches [6]. However, as mentioned above, some of them have faced total or partial failures. These different initiatives have pointed to different critical factors for e-government implementation. These factors are categorized into four groups (people factors, process factors, tool factors and environment factors).

Research into factors which lead to successful Electronic Government implementation should not be limited. Aldrich, et al, [7] suggest that a better understanding of the factors that

contribute to e-Government success and failures could inform others as they deploy such programs. Therefore, a study of success factors in IS project of Malaysian public sector is important in order to improved the project development and ensure that the money spent could bring value to the country, organization and citizens.

This study aims to evaluating the success factors of information system (IS) projects implemented in Malaysian government sector by focusing on project success criteria including Processes, People, Project Tools (Hardware and Software) and Project Environment. The proposed model of project success criteria will be introduced and discussed and compared with other models in the following section.

II. LITERATURE REVIEW

Many previous studied have done in the same field in order to examine the success factors and failure in IT projects. Factors for success are those occurrences whose presence or absence determines the success of an ICT project [8]. They can be drivers or enablers. Their absence can cause failure and their presence can cause success. Drivers are the factors that encourage or reinforce the successful implementation of ICT projects. Some of these are listed below:

- Vision and strategy

- Government support

- External pressure and donor support

- Rising consumer expectations

- Technological change, modernization, and globalization

Enablers are the active elements present in society, which help overcome the potential barriers. Some of these are listed below:

- Effective project, coordination and change management

- Good practice

On the other hand, the factors for failure are those occurrences that constraint proper/smooth implementation of ICT projects in government [8]. These can either be barriers or inhibitors. Barriers can be considered as those occurrences that hinder ICT implementation. Some of these factors for failure are listed below.

- Infrastructure

- Finance

- Poor data systems and lack of compatibility

- Skilled personnel

- Leadership styles, culture, and bureaucracy

- Attitudes

An Interconnected Success Factor Approach for Service Functional in Malaysian Electronic Government have introduced three main factors which can contribute to the success or failure of the Malaysian Electronic Government

service: people, processes, and systems[1]. The below diagram illustrates the interconnectivity of these success factors.
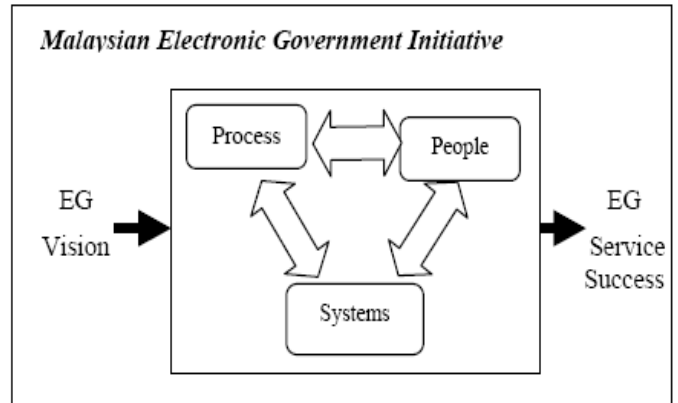

Figure 1: conceptual model

In figure1, these three success factors can be used to analyze the elements contributing to the success of the Malaysian Electronic Government services, by considering the impact of these factors on three Malaysian Electronic Government applications, namely, E-Services, E-Procurement and HRMIS. The selection of these three applications corresponds to the focus areas of Malaysian Electronic Government, which delivers different types of services to citizens, businesses and inter government agencies. However, our proposed project success criteria included Process, People, Tool and Environment. Comparing with the above model, we can say that Process and People are the common factors that influence the success and failure of IT projects.

III. METHODOLOGY

Before we further explain on the process of collection data, we will be discussed on the model of project success criteria which we have come out as a guideline of our study in the success factors of information system (IS) projects implemented in Malaysian government sector. Our proposed model contained the project characteristic which will lead to project success as below.

- Process: we examine the area of SDLC, PMMI, and Project Management

- People: we look at all people who get involved in the project such as project sponsor and top management, users and subject method expert(SME)

- Tool: we look at the hardware, software and test tooling used

- Environment: including cooperation, communication and culture.

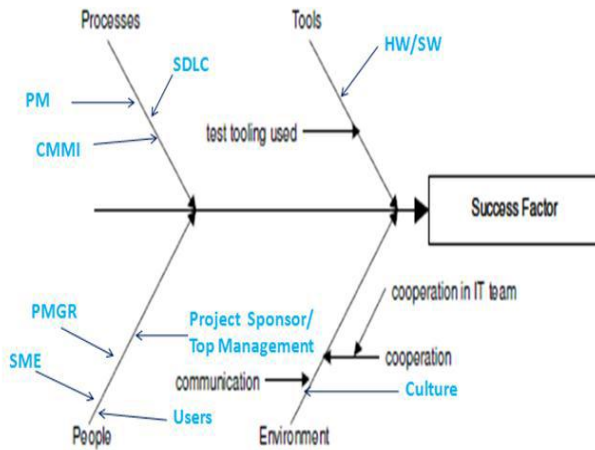## Fishbone diagram containing project characteristics

Figure 2 : project success factors damnations

The study was conducted using survey method. A questionnaire was used as the instrument of study and it was developed based on the above model. The questionnaires consist of 2 sections; the variables studied were demographic characteristic and project success criteria which included process, people, tool and environment. The questionnaires were test with 30 respondents from government sectors. The random sampling was used based on the government agency sectors. Data collected through survey was coded and analyze using SPSS. Interpretation of SPSS results were carried out by the researchers.

IV. FINDING

Based on the data collection the respondent details the result shows that the majority of respondents has been employed in the industry less than 10 years, most of experienced IT professionals are less than 3 years involved in IS project , majority are attended Project Management training and the number of project success handle are less than 5 projects .

TABLE1: RESPONDENT DETAILS FROM GOVERNMENT SECTOR

Demographic	Frequency	Percentage
Length of service in ICT industry		
<10 years	16	53.3
10-20 years	7	23.3
>20 years	7	23.3
Experience		
< 3 years	15	50.0
3-5 years	3	10.0
5-10 years	5	16.7
>10 years	7	23.3
Project Management training		
Yes	18	60.0
No	12	40.0
Number of project success		
< 5	22	73.3
5-10	6	20.0
>10	2	6.7

Based on the data analyzed for the project success criteria the majority are not CMMI certified company, only two out of 30 respondents have CMMI level 5 certified in the organization.

In table 2, most of government sectors use the combination of different methodologies which is 60%, followed by Prince 1/ Prince 2 which is 16.7%, Inhouse/Custom Methodology 13.3 % , 10.0 of respondent apply PMBOK and others 3.3%.

TABLE 2   PROJECT METHODOLOGIES

Project methodology	
PMBOK	10.0
Prince 1/ Prince 2	16.7
Inhouse/ Custom Methodology	13.3
Combination of different methodologies	60
Others	3.3

The result of the area of PMBOK used by government agency shows that 56.7% used Project scope management, 46.7% used Project quality management, 43.3% used Project time management, 33.3 % used Project cost management, and 26.7% used Project procurement management, 23.8 used Project risk management, 23.3% used Project integration management, 20.0% Project HR management and 13.3% used Project communication management as shown in the following table .

TABLE 3   AREA OF PMBOK

Area of PMBOK used	
Project integration management	23.3
Project scope management	56.7
Project time management	43.3
Project cost management	33.3
Project quality management	46.7
Project HR management	20.0
Project communication management	13.3
Project risk management	23.8
Project procurement management	26.7

According to table 4 , the studies found that the Prototyping methodology has the highest percents of usage (73.7%) as compared with other system development methodologies. There are 66.7% of respondents have applied RAD in there is project, follow by 60% used of Waterfall, 16.7% of Agile and, 10% of Incremental method have been used. However, we found that all of the respondents have never applied eXtreme, Cleanroom, and Spiral method in their organization. Also, there is no other methods have been introduced from the respondents.

TABLE 4   SYSTEM DEVELOPMENT METHODOLOGIES

System Development Methodology	
Water fall	60.0
Agile	16.7
eXtream	0
Incremental	10.0
Prototyping	73.7
Cleanroom	0

Spiral	0
RAD	66.7
Others	0

TABLE 5   DESCRIPTIVE STATISTIC AND INTER-CONSTRUCT CORRELATION

Variable	Mean	SD	Process	People	Tool	Environment
Process	1.2524	0.37597	1			
People	1.2067	0.39821	0.752**	1		
Tool	1.1333	0.29814	0.246	0.108	1	
Environment	1.2444	0.43710	0.471**	0.446**	0.373*	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis shown in table 5 was conducted by calculating the Person correlation coefficients among variables engaged in the study. The table above provides the summary of Person correlation between variables of constructs. The Person " r " value show the strength in the relationship accompanied by information about the significance of the relationship at 0.01 or 0.05 significance level (2-tailed).

The result indicates that several factors are positively correlated. These can be observed between People and Process (r = 0.752, p < 0.01) and, Environment and Process (r = 0.471, p < 0.01). This correlation is significant at the 0.01 alpha levels (2-tailed). In the same result, the environment and People are correlated (r = 0.44, p < 0.05) as same as the correlation of Environment and Tool (r = 0.373, p < 0.05) which correlated with the significant at the 0.05 level (2-tailed).

However, the Person product-moment correlation test did not reveal a significant correlation between tools and process (r = 0.246, p > 0.05) and, tools and people (r = 0.108, p > 0.05). Thus, the result does not support that the success of the project as it does not depend on an effective tools used in the organization.

The findings of study support that environment is important factor and correlated with all other parties including people, processes, and tools. Marchewka J. T. mentioned that "Projects operate in an environment larger than the project itself" [9].

The organizations choose projects for a number of reasons, and the projects chosen can impact the organization as stated by Laudon and Lauton 1996. It is important that the project manager and team understand the company's culture, environment, politics, and the like. These organizational variables will influence the selection of projects, the IT infrastructure, and the role of IT within the organization.

V.   DISCUSSION AND CONCLUSION

This study to evaluating the success factors of IS projects within Malaysian government sector and the success model has been proposed. In short, the finding shows that most of the project successes are depending on the environment of the organization and project team. Additionally, based on the study of the number of success project handle, the result shows that of project success handle are less than 5 projects, the researcher

assume that it because of the length of service in ICT industry of majority of respondents which involved in IS project less than 3 year. As they only serve for a short period of time, further assumption might be they still do not have experiences in IS project development that makes some of the project fail although they have applied methodology and they have trained but still some of the project failed. In addition , the study has been highlighted the methodologies used which depending on the scope of PMBOK such as (scope , quality , time , cost, risk , HR, communication , and procurement) as a part of project management which for sure help them to get a percentage of the success. However, further finding found out that by applying the propose project success criteria (Process, People, Tool, Environment) factors are positively correlated and the study supported that environment is important factor and correlated with all other parties including people, processes, and tools.

There are some limitations in this study as the respondents were only 30 participants, in order to get more sufficient result the questionnaires should be distributed to more respondents and to IT professional who have long experiences in involving with IS projects.

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