Early Warning Signs of Project Failure

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Abstract. Despite the improvement in utilization of project management tools and techniques over the years, there are still many projects failed to meet their objectives. Early warning signs becomes one of the concepts used to detect the potential cause of failure in a project. Early warning is defined by signals, which can be seen variously as an expression, indication, a proof, or a sign of existence of some future negative issues. In recent years, several researches regarding early warning signs have been proposed by many authors, varying from project assessment stage in detecting the signs, methodology in conduction early warning sign research and the type of the projects tested. This article presents a review of related work on early warning signs of project failure to give conceptual insights on what early warning is.

1 Introduction

Despite the improvement in project management tools and techniques utilization in industry, there are still a lot of projects fail to meet their requirements. Too frequently it was due to various factors; either failure in detecting the early warning signals which lead to project failure, not well-defined stage of where the signals to be detected or key development practices are ignored. Identifying project vulnerabilities and feasibilities as early as possible can provide valuable clues to help project in a long run.

Early warning signs have been discussed in various type of projects in different field of studies over the years such as Information Technology, Software Development, Education, Business, Medical and Nursing since the original concept was introduced by Ansoff [2] Nikander [1] and Klakegg et al., 2010 [3]. However, we found that very limited studies have been done on property construction project specifically. This will be discussed further in literature chapter.

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The aim of this paper is to provide insights of the existing work related to the early warning signs of project failure. This will be done through critical review on available literature in the field regarding early warning signs. The main research questions to be answered in this paper are (1) In which stage does early warning ideal to be detected? (2) What are the methodologies conducted on the existing work related to early warning sign? (3) What case studies were previously conducted and where? This approach to the research stems from previous exploratory investigations into the area, strongly indicating that there are obvious gaps in the literature regarding the field of early warning signs. At the end of this review, we will propose a new research which we consider could fill some of the gap.

2 Early Warning Sign

This section will give background info of early warning sign existed in literature, historically. Early warning is a broad idea. It can be applied to any situation where it is crucial to obtain certain indication at early stage to prevent undesirable possible outcomes of project in future. Early warning concept was first introduced by Ansoff [2] in a management context as “weak signals”. It functions as to give indication of future development. According to him, strategic event does not appear out of the blue, it must show their manifestation beforehand through signals. A weak signal defined by him as “.... Early imprecise indications about forthcoming impacting event.... all that is know is that some opportunities or threats will arise undoubtedly, but the source, shape and nature are not yet know. [4]

This idea was supported and further developed by Nikander [1] in a project context. According to him early warning sign can be defined as observation, message, omen or other communication form that could be seen as a proof or an expression of coming positive or negative issues. Ashley [5] has countered Webb [6] critique on Ansoff definition when he claimed that messages or information about the future could not be obtained and Ansoff’s work [2] has no pre-foundation to confirm the weak signals theory since he believed that final threat cannot be obtained from the signals. However, Ashley [5] countered by claiming that discontinuities are only seen after they have occurred, and only with the benefit of hindsight the possible pre-indicators of their arrival are identified. The phenomena of early warnings begin with a general observation of the project holistically. During the observation, signals and message may occur together with triggering events informing future problems. Action and decisions can be a success or failure of the project flow depending on the responses as shown in Figure 1.

Fig. 1. Phenomena of early warning signals. [7]

Makridakis and Heau [8] stated that the concept of weak signals had remained a purely academic idea, and Aberg [9] mentioned that the concept of weak signals is vague that they are easily missed. Despite all the arguments between previous researchers on the early warning signals; over the years we can see that early warning becomes more profound. There are various web pages, articles and reports dedicated to either identifying or dealing with early warning signs.

3 Ideal Stage in Detecting Early Warning

This section presents the ideal stage of project lifecycle in detecting early warning signs. Project Management Institute (PMI) has developed five phases of project management. They are Initiation, Planning, Execution, Control and Closure [10]. According to Kenny & Company [11], project failure could occur at any stage during the project life cycle, resulting the warning signs could be identified at any stages as well. However, we believe that the ideal stage to detect early warning sign is during Initiation & Planning or Front-End Stage of the project.

This stand is supported by a few other literatures. Haji-Kazemi, Andersen & Petter Krane [12] claimed that identifying early warning signals in planning stage can give more insights for project managers to take the right corrective measure. They also mentioned that planning stage is where the most critical decisions are made. This is due to the high level of uncertainty, but high potential of corrective actions to be made too which resulting in reduction of possible negative impacts. Their hypothesis of the earlier the warning signals identified, the more time available for taking corrective supporting Hanna and Gunduz [13] statement of the importance of detecting and rectifying project stress as early as possible for project team members. Haji-Kazemi, Ekambaram, Andersen, Zidane [14] further

supporting the early warning signals should be detected at planning stage when they describe that uncertainty events usually cause a surprise on the project. Project team need to explore the area of vulnerabilities early to avoid surprise.

It is important to identify the ideal stage in detecting early warning because it could help to keep the project moving in the right direction with less conflict and concerns, ultimately reducing the risk of project failure. [15] Identifying failing projects at early stage of project lifecycle too is critical in helping the sponsors or project organizers from cost overruns and potential misallocation of corporate resources. [11] Therefore, the management team must keep an eye for early signs of challenges or symptoms that lead to disastrous outcome in planning stage of the project.

4 Methodology

This section presents the research design, data collection methods and analysis approaches to address the research questions stated in section 1.

To identify earlier researches, we performed several ad-hoc queries using databases and search engines provided by well-known publishers. These searches made it clear that relevant articles in early warning signs area have been published in variety of journals.

We found that the Project Management Journal, Information System Journal, Canadian Journal of Civil Engineering, Journal of Management and Research, Applied Mechanics and Materials, Procedia – Social and Behavioural Sciences for example have published articles bearing upon the research question. Some results point us to books and websites article as well.

We further search the following databases available to us, which were:

- Microsoft Academic (<https://academic.microsoft.com/>)
- Directory of Open Access Journal (<https://doaj.org/>)
- Elsevier Science Direct (<https://www.sciencedirect.com/>)
- Academia (<https://www.academia.edu/>)
- PQDT Open (<https://pqdtopen.proquest.com/search.html>)
- JSTOR (<http://www.jstor.org/>)
- JURN (<http://jurn.org/#gsc.tab=0>)
- OATD (<https://oatd.org/>)

We used the following terms and synonyms in our queries:

- “early warning signals project failure”
- “early warning signals”
- “early warning”
- “causes of project failure”

All the literature found were kept in Mendeley Software for easy management. The literature search usually yields extensive amount of results. It is required to establish the criteria in selecting the literature relevant to this area of research and discarding the irrelevant literature. Therefore, in the first inclusion criterion, the articles were selected for further analysis mainly based on the title and the abstract. The title must be early warning sign related to construction or building industry, construction or building project or project in general, not other than those categories.

All titles and abstracts were read to remove the articles not related to scope of research, which resulted in 35 selected articles. However, the abstract did not always provide enough

information to decide whether the article included relevant information or not. Often the only way to decide whether an article was useful was to read full article. Related to the books selection, we first read the table of contents to decide if it was useful to explore full content.

The second inclusion criterion was applied during the full reading of the articles, resulting in 5 articles. The chronological, thematic and methodological analysis method was used to synthesize the data extracted from the primary studies. This method is used in qualitative research generally.

5 Case Studies of Previous Research

Based on the inclusion and exclusion criteria of the literature selection, five literatures were found to be relevant to the research area. Similarities and differences were analysed on the literatures based on issues discussed, objective or aim or hypothesis, methodology and finding. Then the way forward or research gaps were identified for further work.

The obvious similarities identified were in term of methodology. All five of the literature use literature review and case study to investigate further on their research area. However, the number of case studies are varying. Haji-Kazemi, Andersen, Petter Krane [12], Haji-Kazemi et al. [3] and Maity [16] utilized one project as case study, Hanna & Gunduz [13] used 116 project samples while Williams [17] studied on 8 case studies. Differences too are easily identified through methodology, especially in data collection method of the study. Most of them used surveys or questionnaires, interview and focus group expert to help them getting and analyse the data but only Hanna & Gunduz [13] used a model of Logistic Regression and Maity [16] used SPSS software to analyse their respective.

Two researches mentioned about similar issues in their study, which are on the project uncertainties in early stage of project will cause unexpected negative events. They suggested that, by identifying early warning signals early in the project stage, will reduce the consequence of negative impacts. They are Haji-Kazemi, Andersen, Petter Krane [12] and Hanna & Gunduz [13]. In the other hand, their aim of studies is different. Haji-Kazemi, Andersen, Petter Krane [12] aim is to help to introduce new insights in adding early warning system identification as a part of management process in planning, while Hanna & Gunduz [13] aim was to present factors which can help project team to predict outcome of the project.

In term of findings and recommendations, Maity [16] and Williams [17] both recommend testing their results on different nation or case study. According to Maity [16], "...researches can also be performed to compare the result of this study in Kolkata, Arabia with that of other nations in the section as a way of strengthening the outcome's validity." While Williams [17] said, "These results are for three countries, one Scandinavian and two Anglo- Saxon; more research is needed in other cultures.". Therefore, the suggestion to conduct the research taking case study in Malaysia is valid.

The field of case studies, even though have been narrowed down to construction or building industry, construction or building project or project in general; there are still significant difference of project type between one research to another. From railway project, electrical and mechanical project, NASA project, infrastructure project, oil and gas project and more. This proved Williams [17] findings on "each project is unique and has to be analysed within its own context to detect early warning signs." This encourage us to select one branch of construction industry for us to study further; property development.

After compare across studies were done, we finally managed to identify the gaps in the literature regarding the field of early warning signs. Therefore, a new research title was

proposed and formulated based on the gaps and will be discussed further in conclusion. Comparisons of related works are shown in Table 1.

Table 1. Table of Comparison.

Work	Field of Case Study	Location of Case Study	Data Collection & Analysis Method	Recommendation	Way Forward
Haji-Kazemi, Andersen, Petter Krane [12]	High Speed Railway Project	Norway	Literature Review Interview 1 Project	Testing on real case project; how identification in early stage of project can influence project performance	<ul style="list-style-type: none"> Propose Property Construction Project as specific case study to identify its early warning signs. Test the theory found on previous studies onto the proposed project. To select Malaysian Construction Industry as case study
Hanna & Gunduz [13]	Electrical & Mechanical Sector	Canada	Literature Review Logistic Regression Model 116 Project sample	Results might be useful to owners, electrical and mechanical engineers.	
Haji-Kazemi et al. [3]	NASA Challenger Project	United States of America	Literature Review Interview 1 Project	Detailed investigation of characteristics of uncertainties using cause effect analysis	
Maity [16]	Construction Project - Infrastructure	India	Literature Review Interview SPSS 67 respondents	More studies should be performed to examine the relationship found. Compare result of	

				Kolkata with other nation
Williams [17]	Oil & Gas, Civil Development, Building, ICT, Process Plant	Norway, UK, Australia	Literature Review 8 Case Studies	Specific study need to be conducted to identify the early warning signs Conduct the study on different country as case study

6 Conclusion

In this paper, we have provided the insights of the existing work related to the early warning signs of project failure. Critical review on available literature in the field regarding early warning signs was done. The three main research questions were answered in this paper are (1) Planning stage is the ideal stage to detect early warning. (2) The methodologies commonly used in conduction research related to early warning signs and (3) Comparison across study in existing literature. Based on the table comparison above, we are proposing a new project area of research on early warning sign which is in Property Development Project, A Case Study of Malaysia.

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