

# SELECTION FACTORS TO BID OR NOT TO BID FOR EXTRA LOW VOLTAGE SYSTEMS (ELV) PROJECT

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A project report submitted in fulfilment of the  
requirements for the award of the degree of  
Master of Project Management

School of Civil Engineering  
Faculty of Engineering  
Universiti Teknologi Malaysia

JANUARY 2019

## DEDICATION

Especially for

My loving parents

**Prof Dr. Khairul Anuar Kassim and Nor Azrina Deris,**

“Thanks for always been there for me”.

My lovely fiance

**Farah Farhanah Binti Mohd Rozadi**

“For all the motivation and support”.

My beloved sibling

“Thank you for everything”.

Friends, supervisor,

“I am nobody without your support and encouragement”.

May Allah repay all of your kindness greater than what had you given to me

## **ACKNOWLEDGEMENT**

Alhamdulillah, praised be to Allah S.W.T the Lord of this universe including what ever seen and unseen created by Him. Without Allah permission I would not be able to finish this master project by my own. May Allah bless this dissertation and could benefited others in the future.

First of all, I would like to acknowledge my supervisor, Mr Abdul Rahim Abdul Hamid for his support during the process of completing this dissertation. Thank you for always been available and provide related articles for my references. The cooperation given along the way had release a huge burden on my shoulder as a new learner.

Secondly, my gratitude goes to the respondents who participated in the survey conducted since without their time and willingness to answer the questionnaire survey, the result for this thesis unable to be generated.

Lastly, I am so grateful to had wonderful and supportive friends and family who gave support physically and spiritually. Even though I am the one who needs to move on by myself, but without the support given, I would not have the courage to finish this dissertation on time and properly.

## **ABSTRACT**

Improper selection of Extra Low Voltage (ELV) projects by contractors might lead to many problems including underestimating cost of the project, lack of experience and bad quality of work. ELV system requires in-depth knowledge of technologies and a strong team of domain experts, who design, integrate and deliver Integrated ELV Systems that meet diverse needs. Therefore, the objectives of this study are to determine the factors of selecting an ELV Project by contractors, determine problems associated with current practice of project selection and to establish solutions that could improve future ELV projects selection. The methodology of this study will be divided into two stages which is primary data and secondary data. Secondary data will be collected by literature review by focusing on writing related materials and primary data will be collected by distributing a number of questionnaires that will determine later to selected respondents within company undertaking ELV projects. The collected data will then be analyzed using frequency distribution and average index method. The results of the study show resource pricing continuity of work/possible future project and return of investment is the most critical factors; meanwhile cost overrun, losing tender and defective works are among common problems that occurs with the current selection process; and submit the bid early, understand the client well and to sell on value are among the solutions with regard to ELV project selection criteria. The improvement will enhance business strategy for ELV contractors in project selection and future planning.

## ABSTRAK

Pemilihan projek “Extra Low Voltage” (ELV) yang tidak tepat oleh kontraktor akan membawa kepada pelbagai masalah termasuklah anggaran kos projek yang rendah, kekurangan pengalaman dan kualiti kerja yang tidak bagus. ELV sistem memerlukan pengetahuan teknologi yang mendalam dan ahli pasukan yang mahir yang merekabentuk, mengintegrasikan dan menyampaikan Sistem ELV Bersepadu dengan memenuhi keperluan yang berbeza. Oleh itu, objektif kajian ini adalah untuk menentukan faktor pemilihan projek ELV oleh kontraktor, mengkaji atau menentukan masalah yang berkaitan semasa pemilihan projek dan mencari penyelesaian yang dapat memperbaiki pemilihan projek pada masa hadapan. Metodologi kajian ini terbahagi kepada dua peringkat iaitu data primer dan data sekunder. Data sekunder diperolehi melalui kajian literasi dengan memberikan tumpuan kepada bahan yang berkaitan penulisan manakala data primer akan dikumpulkan dengan mengagihkan sejumlah soal selidik yang akan ditentukan kemudian kepada responden terpilih dalam syarikat yang menjalankan projek ELV. Data yang dikumpulkan kemudiannya akan dianalisis dengan menggunakan pengagihan kekerapan dan kaedah indeks purata. Hasil kajian menunjukkan faktor yang paling kritikal adalah kesinambungan penetapan harga sumber kerja atau kebarangkalian projek masa hadapan dan pulangan pelaburan. Sementara itu, kos yang dibebani, kehilangan tender dan kerosakan adalah antara masalah biasa yang berlaku semasa proses pemilihan; dan mengemukakan tawaran awal, memahami pelanggan dengan baik dan menjual berdasarkan nilai adalah antara penyelesaian yang berkaitan dengan kriteria pemilihan projek ELV. Peningkatan ini akan meningkatkan strategi perniagaan dalam pemilihan projek dan perancangan masa hadapan bagi kontraktor ELV.

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## LIST OF ABBREVIATIONS

ELV	-	Extra Low Voltage
BAS	-	Building Automation System
CCTV	-	Closed-Circuit Television
HVAC	-	Heating, Ventilation and Air Conditioning
IP	-	Internet Protocol
A.C	-	Alternating Current
D.C	-	Direct Current
L.V	-	Low Voltage
CATV	-	Cable Television
SMATV	-	Satellite Master Antenna Television
LAN	-	Local Area Network
WLAN	-	Wireless Local Area Network

## LIST OF SYMBOLS

P	-	Percentage (%)
F	-	Frequency
$\sum N$	-	Total Number of Respondent
MS	-	Average Index
$W_i$	-	Weight assigned to the $i$ th response = 1, 2, 3, 4, 5;
$X_i$	-	Frequency of the $i$ th response given as a percentage of the total responses for each factor

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

In the modern era, the construction industry has been rapidly subject to technological advancement. Innovations based on technology offerings are constantly being implemented in the construction sector, time by time. Extra Low Voltage or ELV is the terminology used in the construction industry to electrically define all the systems in a building which actually is not part of the building's main electrical system but requires small amount of electricity to function. Extra Low Voltage are inclusive all the new modern technologies that are increasingly recognition and becoming a must-have system in every building such as Close Circuit Television (CCTV), data network, public address and announcement systems, audio video system and parking control. A fully integrated ELV system operates on a common platform where every connected system communicates and shares all of its data via standard open protocol which improves the operation of the facility. It also ensures that the data collected from every system is made available for use by other client applications.

To tender is to invite bids for a project or accept a formal offer such as a takeover bid. Tender usually refers to the procedure whereby governments or financial institutions invite organizations to bid for large projects. The project documentation must be submitted within a given deadline. The term also refers to the procedure where tenderers submit their pricing or job scope in response to a takeover offer. In construction business, the key of tendering process is usually for the selection of the contractor that will construct the works. However, as procurement routes have evolved to a more complicated process, so tenders may be required for a wider sort of goods and services. For example, in a construction management

contract the works are sub and contracted to a number of different trade of contractors whereby each of them signed and contracted to the main contractor, and these contractors may earn on extra functions such as design and trading. There is also an increasing tendency for suppliers to be grouped into single contract, for example an integrated supply team shaped on public projects may include, the main contractor, suppliers, sub-contractors, designers and facilities managers. Regardless the nature of the goods or services that are being required, the process for acquiring tenders may take a number of different basic procedures.

Tender evaluation and contractor selection continue to be an area of significant study by many parties on the importance and interest to organizations responsible for delivering project outcomes. But as for contractors' point of view, it is also a must to identify the project before taking consideration on submitting the tender and making decisions either to bid or not to bid. New business and new projects are the lifeblood of an organization especially contractors to sustain in the business. Without new business, it is difficult for an organization to grow and achieve their goals. Hence, it is very important for organizations to develop a winning proposal to sustain in the industry. That is why a project-oriented business should also threat the development of an extensive proposal for a large project as their own project itself to identify a universal set of criteria that can be made to suite criteria to support a tender selection (Xu & Tiong, 2001). Tendering is a complicated process, which is mostly based on current situation and expert knowledge and intuition. There are no same processes or method to get the best bid. These processes included technical personnel and knowledge, managerial capability, financial strength and status, past performance, experience, project management organization, and capacity to undertake or support the intended scope of work. Tendering is one of the commonly methods of selecting contractors to carry out construction works. A tender invitation is theoretically a business opportunity for contractors. A fast decision and judgment is required to either accept or decline the invitation to pursue for better opportunities or another project. This shows that a variability of judgments is required at different projects requirement levels in reducing their cost and

increasing their revenue. Hence this study will determine the criteria an ELV contractor focus on before decided to tender a project.

## **1.2 Problem Statement**

A primary interview was conducted with several sales personal and Project manager to gather more information on the problem faced of selecting an ELV Project and also the problems associated with the current practice. Currently, there are a lot of problems arising as results of poor selection factors for ELV project face by the contractors. According to the author's review, this study about the critical factors of ELV project selection to enable better tender decision making by contractor was not discussed by the researchers before. Therefore, it is timely for this kind of topic to be explored by the author.

A previous study stated that the industry's major problems in developing financial prudence can be classified into three categories. The categories are problems of shortages or inadequacies in the industry infrastructure, problems caused by clients or consultants request, and problems caused by the organization's incompetence or lacks of experience (Ogunlana *et al.* 1996). Poor evaluation by the contractors on the project before accepting it would result in many major problems such as quality issues, increase is total project cost and system failure. Extra Low Voltage system uses a modern design and high technology integration of all building systems over a fibre optic IP-based network which usually require good combination of high level of understanding in the system and networking knowledge besides technical expertise and experience. For example, a Smart Building HVAC system can automatically precool a building or regulate temperature based on number of occupants inside the building or outside temperature. Based on operational conditions, the system will take corrective actions which lead to reduced energy demand / consumption. Poor knowledge and workmanship could cause schedule mishaps or equipment malfunctions that can have cost major impacts on tenant comfort as well. For example, if an exhaust fan system control malfunction, the lack



of ventilation can cause more problems during fire emergency or even unwanted smells and other indoor air quality issues during operation. ELV systems are commonly used for different purposes. They are used within hotels, airports, offices and industrial areas commonly for entrance control and surveillance reasons. Business would be interrupted and can't start making money until the building is completely functional.

A contractor's understanding and business awareness of are usually inadequate to make sure that tender processes will deliver a great return between the cost of bidding groundwork and the profit of winning a contract that has great chances of getting the job. Often, inexperienced contractors are not the best at creating accurate bids. Their bid may seem low because they aren't accurately judging the amount of time the project will take them. If they are inefficient and unable to stay on schedule, this may be because the contractors need to be paying project delay penalty. The most common causes of an organization's failure is financial factors (Arditi *et al.* 2000). Excessive financing cost will reduce the contractor's profitability. The major issue is whether to bid or not to bid and it is made on the basis of the assessment of the contractor's capabilities against in hand project portfolio, analysis of the client's tender documents and requirements and anticipated economic growth effects of the project on the organization. A fast decision is needed to either to accept to bid or not to bid it in pursuit for better options. This concludes that before tendering, multiplicities of decisions are taken to reduce cost and upturn revenue besides expanding potential new business.

Amongst other things, the main reasons for a major problem in a project are the breakdown of trust between clients and main contractors. On a daily basis in construction many issues occur such as the issues unexpected variations orders from clients, uncertified payments, their refutation from decision making processes and also the decision of harsh contract terms in contract agreements between clients and contractors. In design and build contracts, the highest deficiency is the client's requirements in the contract document. This unavoidable requirement may bring to

additional costs claims by the contractor, which, if could not be resolved may lead in turn to costly disagreements to the contractors is self. Trust is much crucial to achieve maximum benefits from collaboration between client and contractors in the construction sector. Making relationships between clients and subcontractors continue to be affected by issues that bring in distrust among them. Project representative are also most likely not to withhold information deliberately and act against the interest of the overall project when the relationships among them are trust driven, hence resulting in open and reliable flow of communication and information (McDermott *et al.* 2004).

### **1.3 Aim and Objectives of Study**

The aim of this study is to determine the critical factors of ELV project selection to enable better tender decision making by ELV contractors and to achieve the aim of the study, the objectives are set as:

- I. To determine the factors to bid or not to bid for an ELV project.
- II. To determine the problems associated with the current practice of decision making for ELV project selection.
- III. To establish solutions that could improve future ELV projects selection

### **1.4 Scope of Study**

The scope of this study is to anticipate the participation of the all key players which include project sales personal, project managers and cost and design Engineers within a selected organization. This will also encompass of only staff of Acoustic & Lighting System Sdn Bhd including its branches that is located in Johor, Pahang, Sabah, Penang and Singapore that provide ELV system services in construction industries.

## **1.5 Methodology of the Study**

To achieve this study objective, three methods were used. The first method used was through literature review to gather more information and knowledge of the study topic where a better framework of the study was established. This process consists of reading, analyzing, evaluating, and summarizing scholarly materials regarding the particular topic. This methodology suitable for first and second objective which is determining the factors to bid or not to bid for an ELV project and to determine the problems associated with the current practice of decision making for ELV project selection. The bases of the literature were obtained from journals, academic thesis, books, articles, websites and previous researches.

The second method is by using Qualitative technique. This technique is applied to fulfil the second objective that is to determine the problems associated with the current practice of decision making for ELV project selection. It is used to gain an understanding of underlying reasons, opinions, and motivations from primary interviews with ELV experts. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research.

The third method was using quantitative techniques. This was achieved through distribution of questionnaire survey and expert interview from the author's organization. The questions will be divided into a several parts, to make sure that objectives set are clear, better analysis process and respondents understands well the question. The researcher is able to find the common answer which then utilized in generating the solutions for this matter. The questionnaire will be in Likert scale and the result will be presented in the form of a charts and tables. The researcher is able to analyze and discover the general problems or barriers inherent in the issues so that solutions could be suggested.

## **1.6 Arrangement of Report**

Chapter 1 related to the background of this study where the topics discussed generally with the real conditions of the main issues raised by the author. This chapter discuss the definition of Extra Low Voltage projects in construction and the problem raises for ELV contractors to make decision either to bid for tender or not. This chapter includes introduction, problem statement of this study, aim & objectives of the study, scope of the study and brief explanation on research methodology.

Chapter 2 is the literature review. The literature review is based on previous study conducted by other researches interrelated with this study. This chapter discussed on the critical factors of making decision to bid or not to bid in general projects. This chapter also discusses on the current practice of contractors and the problems associated faced by contractors.

Chapter 3 is the methodology selected to collect the data of this research. This chapter explains how the data will be collected and how to analyze all the data. The data will be collected through interviews and questionnaires distributed to related people in the ELV projects sector.

Chapter 4 is the data analysis that further analyzes the data collected in order to achieve the aim and objectives of this study. Data analysis will be presented in the form of bar chart retrieved from questionnaires distributed.

Lastly, chapter 5 is the conclusions and recommendations of this study. The conclusions and recommendations made after data analysis and result gain from the research. This chapter will include the recommendation suggested for future research.

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