THE IMPACT OF INDUSTRIALISED BUILDING SYSTEM (IBS) ON LOCAL LABOUR

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BY

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DECLARATION BY THE CANDIDATE

I, Lui Jing Wen, I16010885, confirm that the work in this report is my own work and the appropriate credit has been given where references have been made to the work of other researchers.

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ABSTRACT

As the emerging of technology, the construction industry of Malaysia undergoes a transformation from the conventional construction into advanced and mechanised approach, namely Industrialised Building System (IBS). IBS is an innovative construction technique that emphasizes on prefabrication of building components with the application of automation and robotics to tackle the issues of high dependency on foreign labours. The main setbacks of implementing the automation and robotics in IBS is that local labours will be impacted. In this research, the barriers and impacts of IBS on the local labours were investigated. In-depth interview sessions had been conducted on the contractors who experienced in conventional and IBS project. The result showed that the implementation of IBS has reduced the number of labours required on-site but local labours are maintained. Local labours are maintained in working with the technical team in IBS projects. Alternative initiatives are currently implementing by the government and authorities to retrain and reskill the local labours in order to stabilise their employment in construction project.

Keywords: Industrialised Building System (IBS), Automation and Robotics, Local Labour, Impact, Construction Industry

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LIST OF ABBREVIATION

CAD	Computer Aided Design
CIDB	Construction Industry Development Board
CMU	Concrete Masonry Units
GDP	Gross Domestic Product
IBS	Industrialised Building System
IRDA	Iskandar Regional Development Authority
KLCC	Kuala Lumpur Convention Centre
LRT	Lightweight Railway Train
MBAM	Master Builders Association Malaysia
MEP	Mechanical, Electrical and Plumbing
MMC	Modern Method of Construction
OSM	Off-site Manufacturing
OSP	Off-site Production
11MP	11th Malaysia Plan

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In a country, the development of the country lean on the sectors that contributing to Gross Domestic Product (GDP) of the country. According to Danny Myers (2017), GDP is a formal measure used by all the governments in worldwide countries to measure annual economic growth of the country in figures for the country's progress towards prosperity (Myers, 2017). In the economy of Malaysia, there are a few major sectors which include agriculture sector, industry sector and services sector, where construction industry is one of the dominant productive sectors in industry sector.

The construction sector in Malaysia is playing a significant role as it strongly contributes to the socioeconomic development of the country, meanwhile, indirectly stimulates and provides support to other sectors in the economy of Malaysia. The rapid growth of construction industry in Malaysia turns the construction sector to become the leading and dynamic sector to the country (Raza Ali Khan, Mohd. Shahir Liew and Noor Amila Wan Abdullah Zawawi, 2015). The construction industry provides dynamic working environment as it stimulates all the sectors including construction sector in the economy.

According to Dr. Khaled Hyari, construction can be defined as a process that involves plant and machinery, bringing in materials to the construction site and completion of works carried out either by labour or machinery together with moves away of plant (Khaled Hesham Hyari, 2016). In another words, in the construction industry, there are three main components are required in order to execute every single tasks of a construction project, and these components are the manpower such construction labour, professionals such as design team and consultants, the equipment, plant or machinery which dedicates to ease the construction tasks and the materials which are the components that can be made up and built into a functional building (Ahmad Mustanir Hadadak, 2013).

In addition, in the 21st era of globalization with emerging of new technology in the construction industry, Modern Method of Construction (MMC) which also known as Industrialised Building System (IBS) has been initiated and adopted by Malaysian government. In fact, IBS is a modern method of construction which emphasizes on the off-site manufacturing of components of building. The implementation of IBS integrates with the concept of construction industrialization where building components in controlled environment and automation and mechanisation where there are automated IBS plant will be utilised to produce the precast component for examples, fabricated steel structures, precast concrete beams, columns, slabs and wall and prefabricated timber structures (Kamaruddin *et al.*, 2013; Din *et al.*, 2012). Basically, IBS comes along with automated IBS plant attains to reduce the construction time of a project where the designed components are manufactured in the factory and all the building components that are required will be brought to the construction site for installation (Mohd Nasrun Mohd Nawi *et al.*, 2015).

In Malaysian construction industry, most of the nature of construction projects are labour intensive where every construction project depends to the physical construction works carried out by the labours manually. The norm in construction especially the physical construction tasks are usually executed and performed by the on-site labours. The examples of physical construction tasks include laying of timber formworks, manual concreting works, mixing of concrete, plastering works and painting works. All the trades which are very often to be carried out on-site by the construction labours on-site. Therefore, the encouragement of government in the implementation of Industrialised Building System (IBS) probably can tackle the issues of shortage of labour, lessening the dependency of foreign labour as IBS applies mechanised system, automation and robotics. However, for long term in future, the local labour may be replaced by automation and robotics applied in IBS and the problems may be encounter are the unemployed and jobless issues.

In a nutshell, this research study is proposed to discuss the drawback of Industrialised Building System (IBS) in limiting the physical construction tasks of local labour. This research also aims to propose alternative solutions in maintaining the employment rate of local labours while the government encourages the implementation of Industrialised Building System (IBS).

1.2 Problem Statement

In the construction industry, labour resources are one of the most significant keys to indicate the successful completion of a project (Abdul Rahim Abdul Hamid *et al.*, 2011). In Malaysia, most of the construction projects are labour intensive as most of the physical construction works require physical construction workers. Therefore, the problem of the influx of foreign labour has arisen in the situation of shortage of local construction labours. Based on the statistics on the estimating demand of foreign labour by Master Builders Association Malaysia (MBAM), it shows that the number of foreign workers required in the construction industry of Malaysia will be increased where about 2 million of on-site foreign workers are required (*MEF | Knowledge Centre*, 2019).

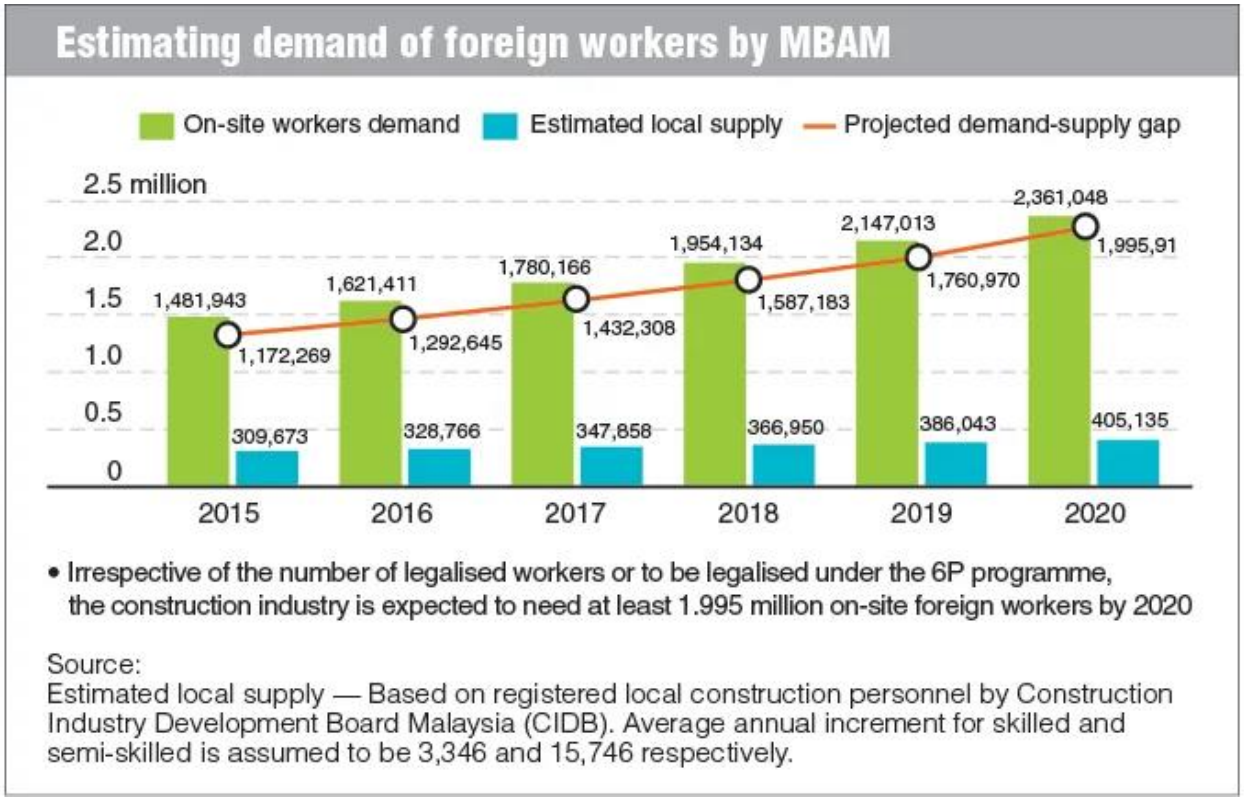

Figure 1.1: Estimating demand of foreign workers by MBAM (The Edge, 2016)

In this new era with the industrial revolution, automation and mechanisation such as robotics and automated plant have emerged in order to resolve the labour shortage issues as well as minimize the dependency on foreign labour in the construction industry. As according to Wong Sing Sing and Lau Ling Kung, Industrialised Building System (IBS) has been introduced with the purpose to solve the problem of shortage of labour in the construction industry (Wong and Lau,

2015). In fact, IBS is a construction technique that involves the prefabrication of components in the controlled environment such as in the factory where it implies the adoption of automation and mechanisation in producing construction components. For instance, IBS fabricates precast components such as steel structures, timber structures, precast concrete wall and innovative mould system (Din *et al.*, 2012). In addition, IBS is not only implemented to tackle the labour shortage issues, it also attempts for better construction work quality and working environment where construction works are being carried out in controlled and clean environment as well as enhance the construction works productivity.

Table 1.1: Labour Force Participation Rate in Malaysia

Period (Jan)	**Labour Force ('000)**	**Employed ('000)**	**Unemployed ('000)**	**Labour Force Participation Rate (%)**	**Unemployment Rate (%)**
2016	14,652.0	14,150.5	501.5	67.7	3.4
2017	14,880.9	14,366.8	514.1	67.7	3.5
2018	15,187.0	14,670.5	516.5	68.2	3.4
2019	15,508.5	14,992.8	515.6	68.6	3.3

(Source: Department Of Statistics Malaysia, 2020; Mohd Najib *et al.*, 2019)

However, with the encouragement of the government in promoting the implementation of IBS, it will cause an adverse impact on the construction labours especially on the local labours (Esther and Ahmad Naqib Idris, 2018). According to the data from the Department of Statistics Malaysia in 2019, the unemployment rate in Malaysia is stagnant between 3.4% to 3.5% (Department Of Statistics Malaysia, 2020). This figure denotes that there is presence of unemployed scenario occurs among the residents in Malaysia.

Dealing with the implementation of IBS where the utilisation of automation and mechanisation are endorsed in this modern method of construction, the unemployment rate in Malaysia may rise. The residents in Malaysia may encounter the problem of jobless or unemployed as the implementation of IBS involving automated plant which are capable to manufacture the construction components which were previously done by the construction labours manually by