1

INTRODUCTION

The construction industry across the globe is acting remarkably in development. This chapter covers an overview of the global and Malaysian construction industry, where stakeholder's role, the productivity of the construction industry with construction codes and ethics have also been discussed.

1.1 OVERVIEW OF THE CONSTRUCTION INDUSTRY

The construction industry includes the processes involved in producing buildings, infrastructure, industrial plants and related activities across the end of their lifecycle. It normally begins with initiation, feasibility, planning and designing until the facility is constructed and handed over to the end-user. The construction industry activities are extended from the execution of new or existing projects to maintaining, repairing or any works to expand, extend and improve the asset, and its eventual demolition, dismantling or decommissioning. The construction industry is an important sector that is imparting substantially all over the globe. It is one of the oldest yet one of the biggest influencing industries. The role of the construction industry cannot be deemed as the journey towards development cannot be completed without its input. Starting the work from masonry structures to reinforced concrete structures, towards steel structures, shifting to composite structures and building skyscrapers, highways and massive dams, the construction industry journey continues even with more advancements in technology day by day. Once a construction project starts, it not only fulfils the end-users needs but involves other industries as every individual material or service is linked with other industries. Besides building and infrastructure development, the construction industry creates job opportunities for numerous people and brings more investments into the economy. Thus, it can be said that the construction industry is contributing massively to Gross Domestic Product (GDP) growth and stabilising the economic [1]. Figure 1.1 shows the overall capital spending on construction projects worldwide.

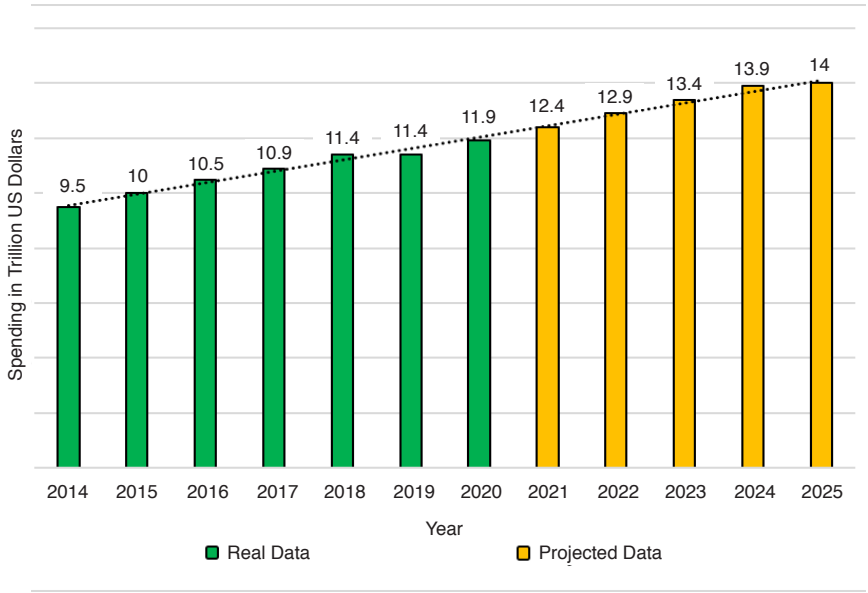

Figure 1.1 Construction Industry Spending Worldwide [2]

A clear understanding can be drawn that over time people are investing in the construction industry hence showing the importance of this industry. As one of the largest industries in the world, the construction industry provides services to many other industries. The growth in this industry directly impacts the economic sector because it employs many workers. With such an important position, the construction industry is also facing several challenges due to the uniqueness and complexness of construction projects. The construction project aims to develop a unique facility within a limited time and budget. The distinctiveness of the construction industry from other industries is because of the project size, unique features and built on-site with the involvement of various resources such as materials, labour, money, equipment, and time.

1.2 VARIOUS SECTORS OF THE CONSTRUCTION INDUSTRY

There are different schools of thought in various construction industry sectors, and the experts set the divisions according to their perceptions. In a nutshell, residential and non-residential are two main sectors in the construction industry. The residential sector includes all the houses and apartments where people live. The non-residential sector is further classified as industrial, institutional, commercial, infrastructure and heavy construction, as shown in Figure 1.2.

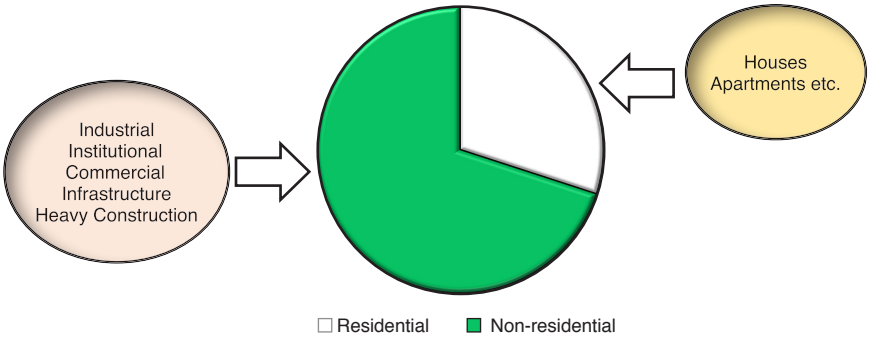

Figure 1.2 Construction Sector Division

Around 30% to 35% contribution is from the residential sector in the construction industry. The remaining 65% to 70% lies within the non-residential. The processes of awarding contracts, procuring services and financing vary in the construction sector. The construction facilities can be graded into four categories [1].

1.2.1 Residential Construction

This category includes high-rise apartments and houses. During the project's execution in residential assets, the developers work on behalf of the owners and make all the necessary arrangements, from preparing contract agreements for construction designing and implementation to financing and sales arrangement. The design of the residential places is prepared by architects and engineers; the execution is by the builders (general contractor) with the involvement of subcontractors who are assigned specific tasks. General economic conditions impact significantly residential construction, where an increase in residential demand causes significant investment due to ease of work as various developers can construct it in different locations simultaneously. With a high potential for risk and rewards, residential construction is highly competitive, as it is easy to enter and easy to leave without involving heavy equipment such as the infrastructure sector. Residential construction is a necessity and with time, its demand in Malaysia has increased. Figure 1.3 shows that the value of residential construction has been boosted in Malaysia and is expected to increase further in the future.

1.2.2 Industrial Construction

In industrial construction, large-scale projects have the utmost intensity of technological complexity. The construction of steel mills, oil refineries, palm oil refineries and chemical processing plants, as showns in Figure 1.4, comes under this category. The owners get fully involved with designers and builders to meet the project's timeframe. Usually,

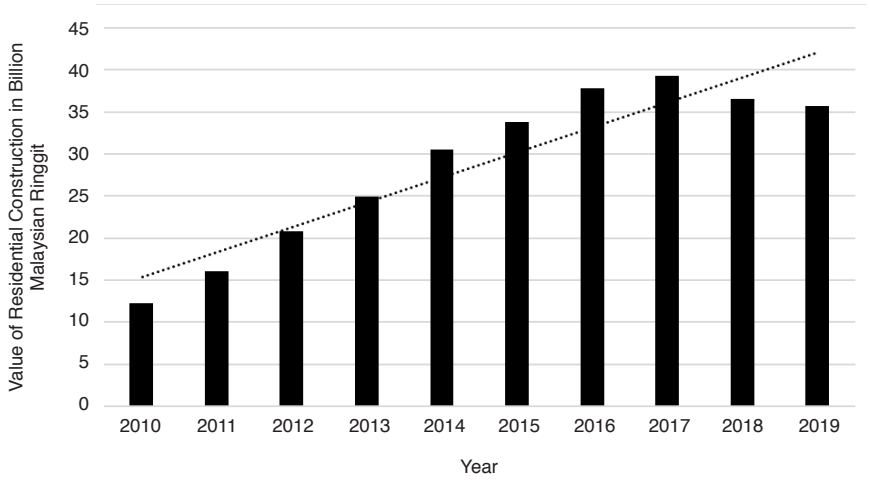

Figure 1.3 Value of Residential Construction in Malaysia [3]

the owner prefers those teams for the project with whom they are previously involved and have good relations. The impact of such projects is directly on the state's economy as it requires a massive amount of capital with greater planning and time. Sometimes, environmental protection regulations imposed by the government become a hurdle for industrial construction.



Figure 1.4 Industrial Construction [4]

1.2.3 Institutional and Commercial Construction

Various projects come under institutional and commercial construction, such as warehouses and light manufacturing plants, schools, colleges and universities, sports and shopping centres, hotels and skyscrapers for offices. The owners of such projects sometimes are not aware of construction practises. However, they get involved in selecting the professionals and arranging constructed facilities financing. Project designing is performed by the architects and engineers, whereas specialised contractors take responsibility for the execution. Due to the higher cost and engineering experience required, the competitors in this market are fewer compared to residential construction.

1.2.4 Infrastructure and Heavy Construction

Tunnels, railroads, dams, ports and harbours, drainage systems, highways, airports, power communication and irrigation system are under the infrastructure and heavy construction category. These projects mainly are financed by the governments as publicly owned projects. A high degree of mechanisation is required in this category; therefore, labours are getting replaced with new technologies. Each construction type under this category requires expert contractors, particularly in this area. However, due to fewer these projects, the contractors get moved to other construction work to make more profit.

1.3 SUSTAINABLE DEVELOPMENT IN CONSTRUCTION INDUSTRY

Sustainability offers a way of interacting with our world which reconciles the ubiquitous human desire for a high quality of life with the realities of our global environment and economics. It calls for unique solutions for improving our welfare that do not come at the cost of degrading the environment or impinging on the well-being of other people [5]. The concept of sustainable development is to fulfil development needs in the present time without affecting future generation needs [6]. Talking about 'development' covers all the activities pursued in other industrial sectors. Being the higher influencer of the environment, it is important to scrutinise the construction industry to reduce its adverse effects on the environment. Thus, sustainable construction emerges. Sustainable construction is the subset of sustainable development which covers the whole project development life cycle [7]. The idea of sustainable construction is to attain sustainability through the construction industry. There are four sustainability attributes, i.e., economic, social, technical, and biophysical, which foster apprehension of the sustainable construction concept [8].

The role of the Malaysian construction industry cannot be omitted in the development phase. The Vision 2020 was launched back in 1990 by the sitting Prime Minister with the main goal that by the year 2020, Malaysia will be a fully developed country. After achieving Vision 2020, the Malaysian government is now heading toward the Sustainable Development

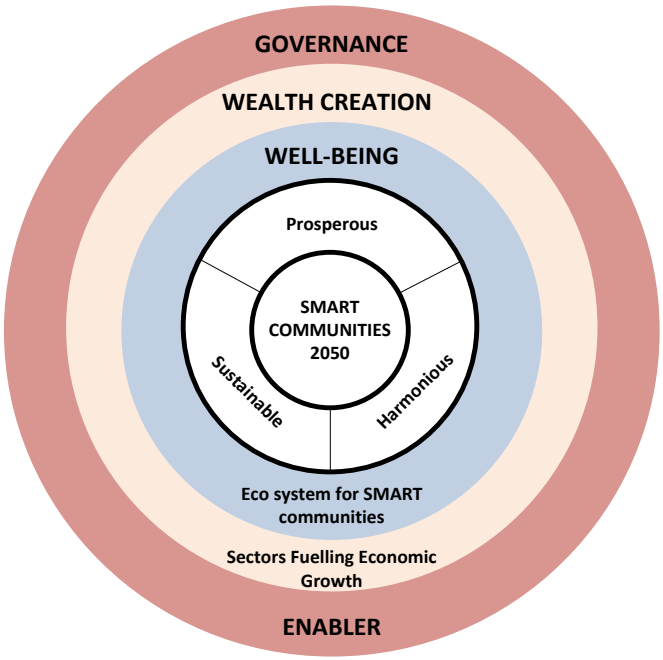

Figure 1.5 Sustainable Development Framework for Malaysia [9]

Goals which will be achieved in 2030. The process of being better does not stop here, where Malaysia introduced National Transformation 2050 (NT50) as an initiative of national development from 2020 to 2050, launched by the sitting Prime Minister. Either Vision 2020, Sustainable Development Goals or NT50, none can be achieved without the input of the construction industry, illustrating its importance in the development of Malaysia. The sustainable development framework for Malaysia is presented in Figure 1.5. This framework aims to eliminate all types of poverty in Malaysia and bring major reforms to the country.

1.4 PROJECT DEVELOPMENT PROCESS

It is critical for all stakeholders to achieve the development of project success. When a project gets completed with the pre-determined specifications and owner's satisfaction under the assigned budget, it benefits all stakeholders [10]. Every project development has a fixed life cycle, followed by initiation, planning, execution, and closeout. Initiation and planning refer to the predevelopment stage, execution is the construction stage, whereas the closeout of a project is the post-development stage [11].

In Malaysia, the project development is divided into three stages having their project life cycle [12], i.e.,

1. Pre-development stage
2. Construction stage
3. Post-construction stage

When initiating a project development process, there are mainly fifty guidelines and laws which need to be considered. The essential laws that need to comply are; the Street, Drainage and Building Act 1974, National Land Code 1965, Environmental Quality Act 1984, Government Act 1976, Town and Country Planning Act (TCPA) 1976 and Uniform Building by Law 1984. A development project closure occurs when it hands over to the owner once stipulated by the Housing Development Act, 2010. The activities flow begins from inception right up to handing over the project is significant in project development planning. Guidelines, laws, and procedures about the project development process are extensive in Malaysia. Figure 1.6 shows the adopted development planning approval process with the functioned Acts within Malaysia.

Decision-makers who acquire processing planning permissions have formulated various development plans, such as; a local plan, a special area plan, a structured plan, and the national physical plan under TCPA 1976. These plans provide overall policies guideline from land development to establishing zones and planning standards about the facilities required for the public, providing car parks, roads, building setbacks, open spaces, etc. The layout plan

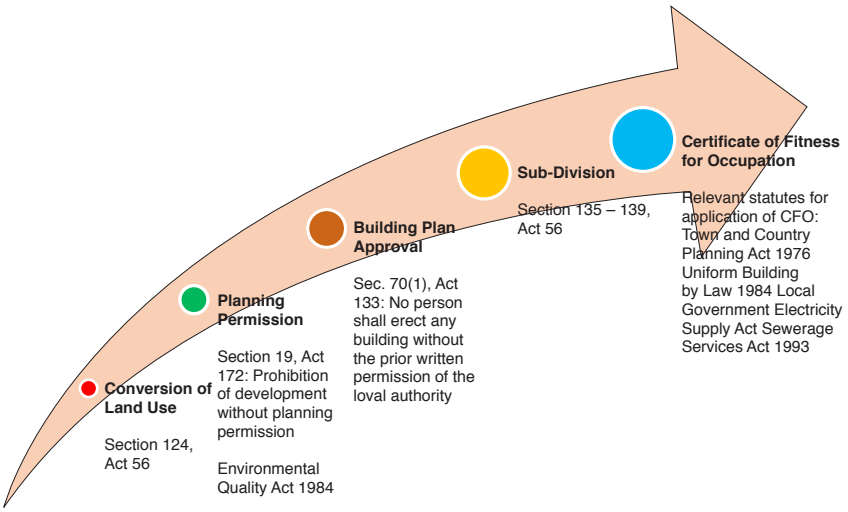

Figure 1.6 Development Approval Process

of any new project must comply with these development plans that are approved by local and governing authorities. National Development Planning, governed by the TCPA 1976, establishes a framework for development in Malaysia known as The National Development Planning Framework (NDPF). The NDPF is based on three levels of planning: the National Physical Council (at the Federal level), the State Planning Committee (at the State level), local authorities, and the council level.

1.5 CONSTRUCTION INDUSTRY IN MALAYSIA

The Malaysian construction industry is distributed into two sectors,

1. Residential, nonpresidential and civil engineering work
2. Special trade works [13]

Earlier, the contractors were working on the engineer's instructions or an architect appointed by the client on a smaller scale as there were very few main contractors who were responsible for the whole construction work. The sub-contracting system strengthened from initial practises is still growing stronger, where the main contractors used to bid and sub-divide the projects on their own. The contracting system adopted in Malaysia follows the British model where the contractors were involved in a 'build only' basis in the public sector. The contractors were restricted to the execution phase only according to the provided design and worked under the consultants as hired by the client. In the early 1980s, the Government initiated and established The Look East Policy, under which the foreign contractors could work in Malaysia. Due to their advanced technologies and financial stability, the government encourage local contractors to adopt new technologies and work as a joint venture with foreign contractors.

In Malaysia, the construction sector is now well developed and contributing extensively to the country's GDP as it realises the importance of this sector early after independence. However, the construction industry has a liability in providing a quality lifestyle in the future based on today's construction work. Keeping the matter into a discussion from the stakeholders' perspective, Malaysia set an institution that has the policy to scrutinise the infrastructure [14]. The value of Malaysian construction work [15] is shown in Figure 1.7.

The construction industry is seen expanding by 9.6 %, which is quite high compared to other sectors. The multiplier effects from this sector are high, given its linkages to other major sub-sectors of the economic growth. In 1994 the Construction Industry Development Board (CIDB) was formed in Malaysia under the ACT 520 to coordinate and govern the industry's stakeholders. The CIDB works under the Ministry of Public Works (Jabatan Kerja Raya JKR), Malaysia, with the authority to monitor the construction work, ensure the value of money, and ensure that the construction is as per the demand of end-users. CIDB bounds all foreign

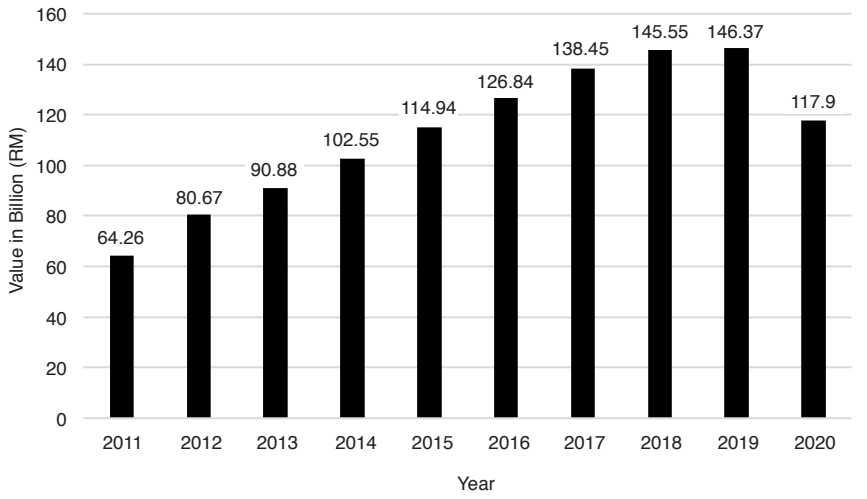

Figure 1.7 Value of Construction Work in Malaysia [5]

and local contractors to register before pursuing business operations in Malaysia in any seven registration grades. The grades are based on the financial capability of the contractors, starting from G1 to G7 [14]. The limit of each grade is defined, i.e., G1 = < RM 200,000, G2 = < RM 500,000, G3 = < RM 1 million, G4 = < RM 3 million, G5 = < RM 5 million, G6 = < RM 10 million and G7 with no limit, as shown in Figure 1.8 [16].

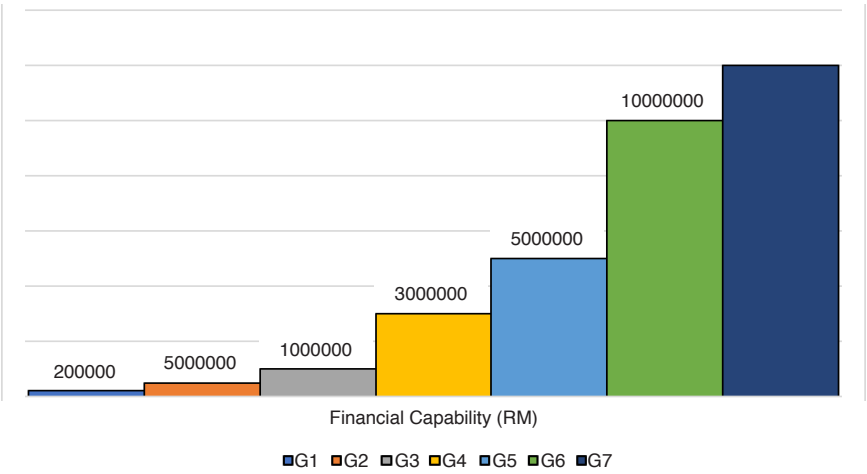

Figure 1.8 Contractors' Financial Capability

1.6 CODES AND REGULATIONS IN MALAYSIA

1.6.1 Overview

Malaysia has a constitutional monarchy with a parliamentary democracy where the Federal, State, and Local are the three tiers of the Malaysian government. In Malaysia, the local government is elected officials, whereas the Federal and State governments have come into power after elections. All three governments have imposed some legislative and regulatory instruments affecting the construction industry regulations. The overview of legislative powers is shown in Figure 1.9.

In Peninsular and East Malaysia, there are 151 local authorities, out of which 98 local authorities are planning authorities in Peninsular Malaysia, as per the Town and Country Planning Act 1976. The Sabah and Sarawak states do not work under the Ministry of Urban Wellbeing Housing and Local Government Malaysia because their ordinances are regulated by state governments as the planning authority. The Federal government has built policies, standards, guidelines, and regulatory requirements adopted by the state governments, which are enforceable to the local authorities for the streamlining and standardisation purpose.

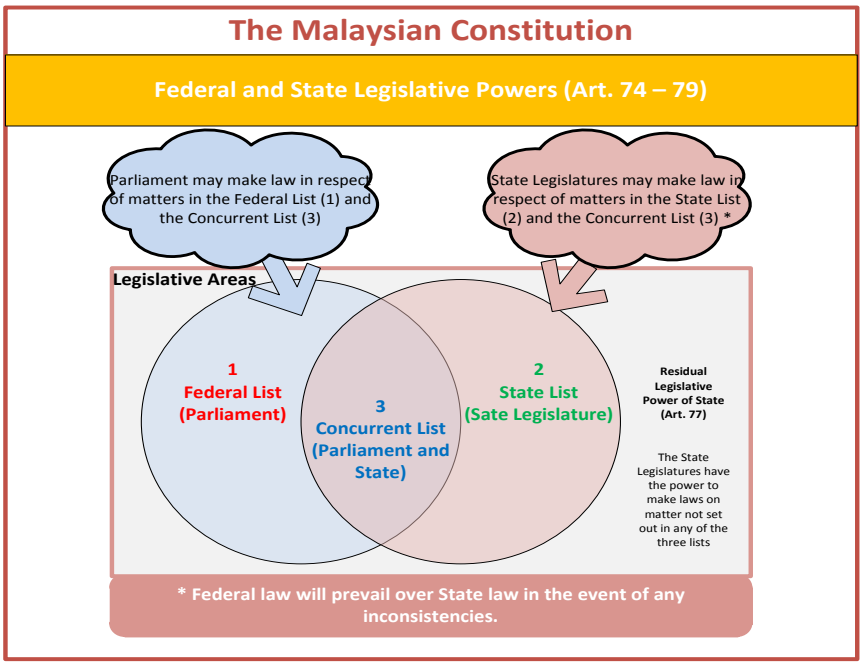

Figure 1.9 Overview of Legislative Powers [17]

The Uniform Building by Laws (UBBL), 1984 is Malaysia's building code, which applies to all the building constructions under local authorities. All the building regulations are administered by the Federal government, whereas their enforcement is made by local authorities (Majlis Daerah) through internal technical departments. The Malaysia Standards get revised every three to five years by the concerned ministry and responsible agencies. However, regulatory requirements under the Public Works Department (Jabatan Kerja Raya JKR) do not have any fixed time for review and revision.

1.6.2 Building Regulations and Enforcement

The Malaysian building regulations are built upon the Street, Drainage and Building Act 1974 and UBBL 1984. To date, 23 Malaysian Standards have been mandated in UBBL 1984. These legal instruments stipulate the process for building planning, approval, execution, and control. UBBL 1984 has been adopted and enforced by the local authorities. The Federal government formulates the laws, which are handover to the State government to make it gazetted and then dispatched to the local authorities for enforcement. As a planning authority, the local authority's main function is the development control with the statutory role, governed by laws and standards. According to UBBL, local authorities (Majlis Daerah) have a mandate for all structures in Peninsular Malaysia, even those owned by the federal government. The legislative enforcement procedures are demonstrated in Figure 1.10.

Following the guidelines can be a good practise unless they have been legalised and embodied as regulations. The guidelines formed by any agency need to be approved by the National

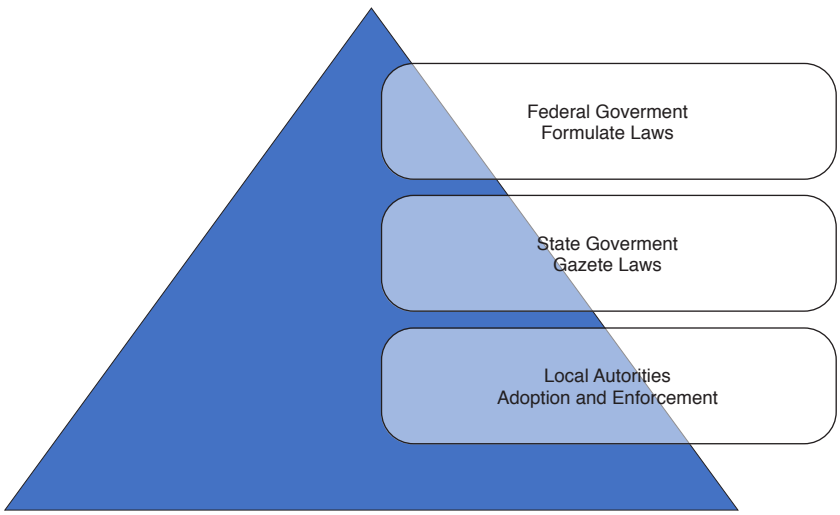

Figure 1.10 Legislative Enforcement Procedures [18]

Council for Local Government (MNKT) before being adopted by the local authority. If gazetted, planning guidelines become part of the planning rules, which were later enforced by the local authority (Majlis Daerah).

1.7 CONSTRUCTION PROJECTS STAKEHOLDERS IN MALAYSIA

Every individual affected by the construction project positively or negatively is a stakeholder in that project. There is a contradiction with this statement as most people think that the stakeholder is the only person who is getting benefits from a particular construction project. However, in reality, if a person receives any benefit and yet is influenced adversely, he or she is still a stakeholder. For example, the Government announces the bid opening of a project in which various contractors will participate and will become the stakeholders of this, despite the fact that only one will get the bidding. In continuation to this example, supposedly, the project gets into the execution phase.

Now, the nearby residents become the stakeholders of that project due to their indirect involvement as the project will influence their day-to-day lives. Professional construction services are usually required in the pre-development or planning stage. The professional construction services consist of electrical, structural, civil engineers, planners, surveyors, draughtsmen, and architects. Every person acts in their role under the various Acts and regulatory bodies. The stakeholders involved in on-site construction are construction managers, contractors and sub-contractors, engineers, labourers, safety officers, site supervisors, and government regulatory body personnel. In this phase of construction, every stakeholder makes sure that they achieve the project quality within the given time and budget, leaving no negative impact on the environment and ensuring the safety of the people involved. The suppliers and the manufacturers of the construction materials also significantly impact the completion of a construction project on time. Whereas, in real estate services, a link between financier, customer, and the owner gets built due to their services such as; leasing agency and brokerage, investment and asset management, integrated property and facilities management, capital markets, and building consultancy, and project management. Once the project comes into the operational phase, due to its development and end-users, the nearby market will flourish making those stakeholders. The example portrays how different stakeholders get involved in the construction project.

Here, only those stakeholders who have direct input in the construction project are discussed. If the main or primary stakeholders of the construction project are concerned, they are mainly three, usually known as Triple C (3C). The 3C are Consultants, Clients, and Contractors whose involvement is mandatory for executing a construction project. Under the 3C many more parties are involved, which act as secondary stakeholders. The involvement of stakeholders with various subsectors in Malaysia's construction industry has been presented in Figure 1.11. In contrast, the key stakeholders involved with the contractor are illustrated in Figure 1.12.

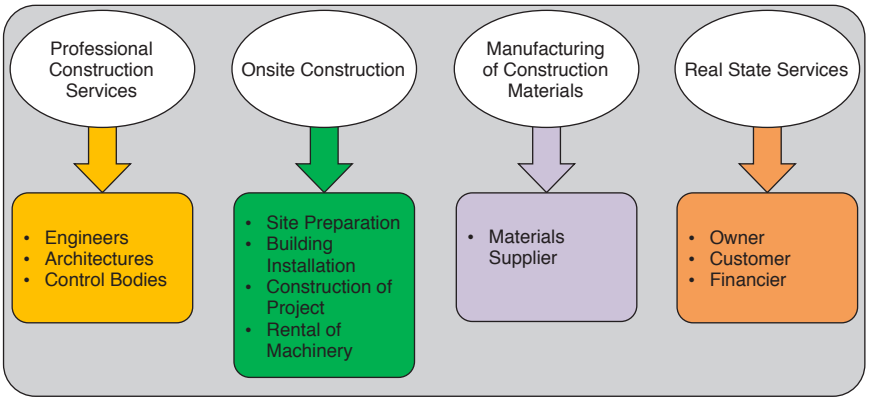

Figure 1.11 Malaysian Construction Sector (Stakeholders' Involvement)

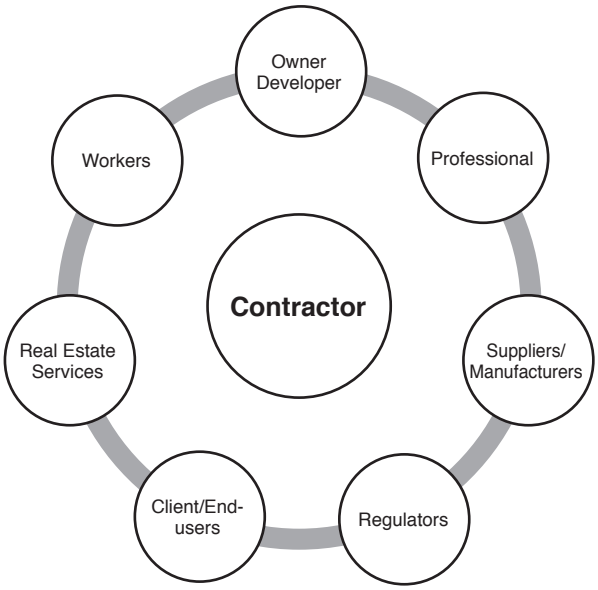

Figure 1.12 Contractor Stakeholders

1.8 ETHICS IN CONSTRUCTION

1.8.1 Overview

At an organisational and professional level, ethics has been developed in the construction industry. Professionals have ethical codes which they need to follow as per their professional

requirements, and so do the organisations. The measurement of ethical behaviour depends on the degree of integrity and trustworthiness based on which the companies perform their businesses. Many construction companies have been fined for breaching ethics. The fine impalement and sometimes the companies get blacklisted for breaching the ethics, signifying the value of ethics in construction. Ethics in the organisation is a vital aspect of a company's Corporate Social Responsibility (CSR) and should be fulfilled at any cost. When ethical practises are not followed properly, it leads to ethical failure within an organisation [19]. The Society for Construction Law considered the importance of ethics in the construction industry and provided the ethical principles for the organisations to which they need to be compiled [20]. The seven sets of ethical principles are presented in Figure 1.13.

Regrettably, unethical practises are very common in the construction industry [21]. Not all the stakeholders adopt unethical practices, though it has been observed that most contractors are unethical while performing the construction work [22]. Many clients are involved in unethical practises by holding the contractors' payment [23]. When any construction stakeholders violate the ethical practises, the impact directly comes on the construction project performance. The project performance and the relationship between the parties suffer, which may impact the execution of future construction projects. Following the ethical practises also boosts the organisation's reputation in the market, where the chances of getting more work increase.

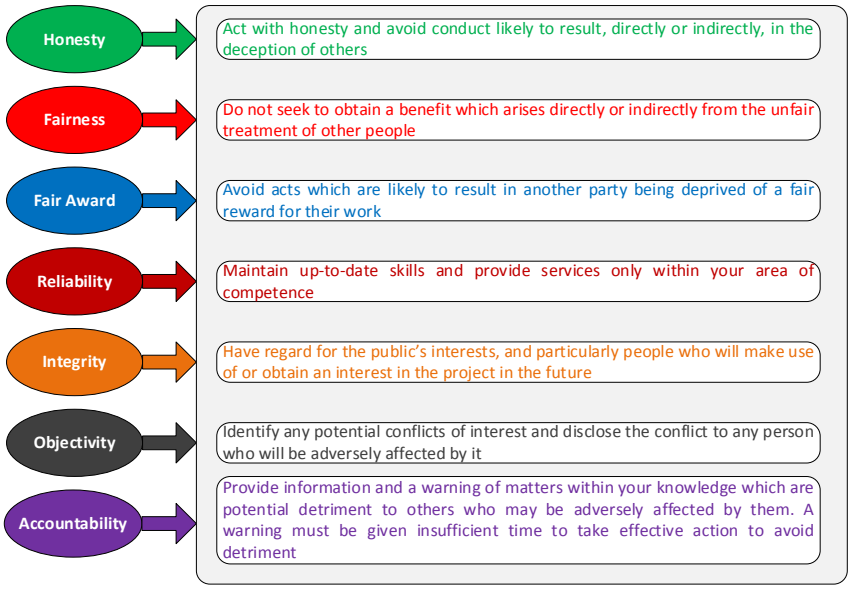

Figure 1.13 Construction Industry Ethical Principles [20]

1.8.2 Unethical Behaviours

The reputation gets ruined when unethical behaviour has been adopted. Not only the current work, but also it will impact future work. Many contractors have faced legal battles and suffered financially by paying large monetary fines. Ensuring ethics in construction is not the contractors' responsibility alone but also the clients. When a client has an unethical reputation in the market, contractors avoid working on their projects, which resulting a higher cost to be paid by the client if he wants to pursue the project. The same is the case with the contractors. If they breach the ethics of suppliers and sub-contractors, it gets difficult for them to run future projects smoothly. The behaviours that are considered unethical in the construction industry are listed below [24],

1. Not ensuring project safety
   It is compulsory to ensure that all the activities carried out during the construction stage are safe where no one gets hurt. Therefore, the violation of safety measures is an unethical safety practises.

2. Poor-quality project
   It is common for the contractors to hide their mistakes and hand over the poor-quality project to the client. Various cases have been reported where buildings have collapsed, resulting in the fatality of many people. Contractors are bound to deliver a quality product due to the signed contract, which enforces them to meet the quality standards. Therefore, not complying with the contract is an offence.

3. Deliberately omitting items or supplying low-quality products
   Contractors try to increase their profit by purchasing low-quality materials and utilizing them in the project. Many cases have been reported where contractors did not provide the required reinforcements in the concrete structures and manipulated the concrete mix design by adding the fine aggregate in an extensive amount as cement replacer.

4. Paying bribes
   It is common in the construction industry where contractors to pay bribes to the client's representatives to get the contract or the approval of the substandard work. Even clients pay bribes to get smooth approval for their projects from the authorities. Bribe culture leads to various financial and productivity issues as the person who received the bribe endorsed that the project is as per the standards.

5. Not paying employees' wages
   Usually, employees prefer cheap workers as they are one of their profit sources. The experienced workers demand a fair wage that is why they are avoided. The project's productivity becomes lesser with the delay in the wages distribution as the workers will not be much motivated to perform the work.

6. Employing illegal migrants
   Illegal migrants work on lesser wages, even below the set minimum wage. That is why some companies prefer them to work for their high profits, which is an ethical breach.

7. Accommodating works in cramped and dirty accommodation
   Workers need to be provided with clean accommodation where all the hygiene and social distancing are fulfilled. The more the workers are satisfied, the higher will be the project productivity.

8. Contractors that fix prices
   Fixing the contracts has been observed where the contractors decide the project allotment. One of the contractors part of that group bids low, where no other contractor bids on the same scale. This leads him to the project allotment. The same strategy is applied to the allotment of different projects. The contractors do this act, so all of them get the projects and profit from them.

9. Clients awarding projects to contractors with very low prices
   When a project is allotted a very low price, the client drags himself into real danger to be constructed with a fair project price. With low prices, the quality of the project gets compromised and if the contractor is not capable of pursuing the project, he can also go bankrupt.

10. Clients bid shop
    The allotment of the contract to the favourable contractors by the clients has been reported within the construction industry. However, even another contractor who submitted the lowest price cannot get the contract, where his time and efforts also get wasted.

11. Contractors do not get paid by clients, subcontractors and suppliers do not get paid by the contractor
    When the payment gets held without any justifiable reason, it affects the reputation of the concerned person, which can impact the future construction project contract.

12. Clients do not respond to variation claims
    Variation in the construction project is common practise. When a variation occurs out of the original project scope, it increases the project cost that clients need to pay; however, sometimes, they refuse to pay which is not good practise.

13. Bogus inflated variation claims
    Sometimes contractors claim bogus inflated claims of a project cost by manipulating the original documents, which impacts their reputation.

14. Vexations legal disputes
Contract documents are well written; however, disputes can still occur, which can be resolved by honest dialogues instead of spending the money on the lawyers.

15. Poor environmental practises
Contractors and clients are often found guilty of dumping hazardous construction waste into normal waste disposal. Hazardous waste is harmful to natural reservoirs and human health. Clients should ensure that all the waste gets a dump in a proper manner that does not breach the environmental laws.

16. Theft
Employees who are not working full hours as they claim or utilise the organisation's property for personal use come under theft, which is unethical.

1.9 PRODUCTIVITY OF THE MALAYSIAN CONSTRUCTION INDUSTRY

An increase in productivity is important for a country as it raises the standard of living. Higher prosperity can be achieved if the growth is in the long run. The construction industry is the primary strategic importance where productivity significantly impacts national economic growth [25]-[26]. Productivity is the most important factor to watch out for in the construction industry after quality and safety [27]. Productivity is measured by applying the production output ratio to the required processes and effort associated with the production. It is a relative definition of distinctions made either over time or between separate production units. It may be viewed in terms of resources, expenditure, labour, or other relevant inputs and outputs. The productivity ratio can relate output to all the resources used (multifactor productivity or 'total factor productivity) or a single factor, such as labour, capital units or energy. Productivity is the output ratio to all or some of the resources (labour, capital, energy, and raw materials) used to produce that output. Therefore, the achievement of perfect productivity requires the convenient use of labour, accurate, complete drawings, no delays other than due to weather conditions, safe work, quality workmanship, and no litigation at the end of the project. The ratio of the job's output generated to the overall cost of input is thus a rational solution to calculating project efficiency [28]-[29]. Many different productivity metrics exist and can be selected according to the intent of calculating productivity and data availability. In general, productivity measurements can be categorised as a single factor or a multi-factor productive measure [30].