A STUDY ON THE FACILITIES-RELATED ISSUES IN HIGH-RISE RESIDENTIAL BUILDING

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

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Oct 2020

DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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APPROVAL FOR SUBMISSION

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ACKNOWLEDGEMENTS

I am thankful to GOD for the health and wellbeing needed to finish this project paper. I want to thank Puan Aqlima Binti Ramli sincerely for her support and valuable advice throughout completing this task. I am very grateful to PA International Property Management Sdn Bhd and my colleagues that providing flexibility and the knowledge, expertise and relevant data required to complete this project.

I would also like to express my gratitude for the family members of Sellathurai's as my backbone and their continuous support whenever I have problems. Without them, at that time I couldn't have done this project. Last but not least, not to forget all my colleagues, who are involved in helping me lead and sharing insightful experiences. Only God know to repay the deeds been done.

This project paper, which also includes my Master degree, would be impossible without the above-listed parties.

Thank you, everyone!

Paurnami Sellathurai

Oct 2020

ABSTRACT

Living in a high-rise residence is now becoming a trend of lifestyle among Malaysian. High-rise residential buildings are a kind of housing with multi-dwelling units constructed on the same site. The rising costs of land have made this form of housing common each year in an urban area. The residents must create a Management Corporation in contrast to their lands on a residential high-rise to control and maintain all of the facilities the developer provides for as stipulated by the Strata Title Act of 1985. In all urban landscape of Malaysia, many residential high-level projects have mushroomed. However, the theory of architectural design, particularly the concept of passive design, is restricted for high-rise buildings. The role represented by management in managing the residential property is crucial to ensuring that all problems solved have an excellent result. Sadly, there have been many problems with the management of high-rise residences, in particular with building maintenance, defects/fault and design/fault design. The semi-structured interview will be conducted with five executive or managers to discuss the issues from a management perspective. And data collection by questionnaire surveys among residents, developers, contractors, architect and other stakeholders. The result found that management has had a range of issues and concerns, such as design, construction defects and insufficient/poorly maintained facilities. To minimise problems and to create excellent conditions of high-rise housing, cooperation between developer, management and the resident is obligatory. The focus of this research is on sustainable facility management, we have used resident satisfaction levels to identify and measure factors that lead to dissatisfaction between buyers and consequences related to the issues.

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CHAPTER 1

INTRODUCTION

1.1 General Introduction

More than decades ago all continents embraced the highly residential phenomenon (Wan Abd Aziz & Musa, 2014). According to (Khalid, et al., 2017) in many high population countries, urbanisation, increased land value, land scarcity in particular in urban areas, and modern urban and suburban lifestyles have led to this phenomenon. In the last 90 years, Malaysia has been rapidly urbanising (Masron, et al., 2012). Urbanization is an increase in urban population relative to rural areas (Zhang, 2016). In 1980, Malaysia had an urban growth rate of 34.2% and in 2000, it grew to 62% and in 2010. It rose to 71%. It is estimated that 75% of the nation's population will be living in urban areas by 2020 (Ismail, 2018). Population growth indirectly raises house demand (Ransford & Prince , 2013).

In Malaysia, there are early awareness of the presence of high residential (HRB) buildings (Nor, et al., 2020). In Malaysia, high housing costs are high, especially in a small primary area such as Kuala Lumpur, Penang Island and Selangor. The idea of high housing development among urban residents is both common and attractive (Abd-Wahab, et al., 2015). This can be seen in the rising demand for HRB every year (Noor, 2011). Besides, 67.4% of non-low cost HRBs have been developed in the Klang Valley area. (Wahab, et al., 2016). The Strata Title Act 1985 (STA) governs the HRB in Malaysia. Introduced by the National Land Code 1965 (NLC) the Strata title was first introduced to the Malaysian Peninsular on 1 January 1966. The definition of title to strata was introduced under the Australian New South Wales Act 1961. E.g., offices suites, condo houses, apartments or townhouses are strata properties managed under the names of strata.

The Strata Living Act 2013 (SMA 2013) is binding upon the implementation of the Strata Management Act which began on 1 June 2015. It sets out rules and regulations where it provides clearer and more strict requirements for the management of high-ranking, stratified buildings, including residential buildings (Kiru, 2018). The success of residential property in strata depends significantly on the management of its facilities and common area. Construction defects and design problems were also

included that render living comfortably and maintain a better living for all the buyers of the strata buildings (Kiru, 2018).

The demand for high-rise residential buildings has been increased each year due to the lack of land for land development in urban areas in Malaysia such as Klang Valley. Improvements in high-rise buildings are seen to resolve the land deficiency and raise the demand for housing. The common reason people want to live in high-rise residential areas is the impact of the current lifestyle in urban areas as well as the facilities provided, such as 24 security systems, gymnasiums, swimming pools and others (Samad, et al., 2018).

Almost 6 million Malaysians out of 20 million urban citizens live in stratified houses, such as apartments and condominiums (Meikeng, 2016). The Urban Wellbeing, Housing and Local Government Ministry has found that approximately 69% of the apartments and condominiums in 2015 accounted for only one and two (below-average) stars in only six regions, namely building defects, collection of funds, security, risk management, maintenance, administration, and compliance with the law in their Strata management system Quality Assessment of standards of common joint management bodies (JMBs) and management corporations (MCs) (Meikeng, 2016).

1.2 Importance of the Study

The goal of this study is to find that property management is an essential process in terms of handling building design, defects and facilities maintenance, since it plays a key role in keeping the tenants satisfied and the building competitive with other properties on the market, while at the same time preserving and improving the profitability of the owner (low costs and high incomes).

1.3 Problem Statement

Residential buildings are distinguished with high levels and high density in almost every major city in Asian countries. Under these conditions, it becomes a very challenging engineering and social problem to achieve a comfortable and safe interior. The continuous development of residential buildings demonstrates that a high-level population in the nation with a high-quality living experience is required to establish successful ownership and property management systems. The current property management practises in Malaysia reported, however, numerous problems that affect

all stakeholders such as developers, property managers, owners and residents of high-rise residences (Azian, 2020).

The key problems in the high-rise residential building can be classified into the poor design, defects and poorly managed facilities (Hashim, et al., 2012). In the case of a defect, the residents typically face problems with the pipe issue between the housing unit. Faults in construction design place a heavy burden and no compensation for the construction for the rest of its life. The responsibility for these situations lies to the designer to carefully consider the completion of the design project according to the required building intention and specification (Haniza, 2007). Leaking of pipes, breakdown of the water supply system, cracking of exterior walls, dampness of concrete walls and defective door knobs also occurred in the residential housing unit (Hamzah, 2012). The highest frequency was found in the waterproofing system, followed by leaks at the jointing and piping system. (Hashim, et al., 2012).

The issues of plumbing and the small size of the kitchen caused PRIMA house, Bandar Baru Bangi's residents to be dissatisfied (Sze, 2000). Next (Hanum, et al., 2016) has also emphasized the facilities-related issues in Pangsa Sulaiman Court which leads to resident's dissatisfaction. The basic needs of the resident are often overlooked and underperformed. For example, the building with limited space for air-conditioning installation, no clothes drying areas, inadequate parking lot, lift breakdown, and cleanliness issues (Tiun, 2003). Also, an excessive effort was required to correct the design mistake that is being reworked. The rework will have an impact on performance and also on the cost of the construction industry (Josephson, 2002).

According to Ahmad (2004) the faults and deficiencies in the buildings due to the numerous problems that the construction industry needs to resolve. For example, honeycombs, hairline cracks on beams, deficient design, building materials, structural cracks on walls, reinforcing bars on columns become rusty due to exposure to sunlight and rainwater, etc. Currently, all developers have their procedures of handling defects complaint from owners/residents, but it is believed that the procedures are inefficient and ineffective, resulting in more complaints from owners/residents (Azmi, 2006).

Besides, Wahab, et al. (2016) and Mohit (2011) has revealed that poor management of facilities such as disruptive lifting, the collection of waste not planned, and damaged losses due to vandalism has been complained about by residents. Wahab, et al., (2016) also claimed that waste areas inside the condo would impact the comfort

of the occupant. The poor and lack of maintenance of common properties, including high-rise buildings, has caused numerous problems and miseries for the owners.

Thus, this justified the need to identify the facilities-related issues, causes and consequence of that facilities-related issues in strata residential. Therefore, it is important to conduct this research to the collective relationship that can be compiled and fair input issues, factors and consequences can be obtained to curb all the problem in promoting a harmonious living in the property in residential strata.

1.4 Aims and Objectives

To study effective property management for the preservation of the property's survival and adequate operating facility.

The study aims to identify the problem in the management of the high-rise residential building that directly aligns with customers' satisfaction and comfort of residents and to meet stakeholder expectations. In completing this study, the following are to be observed:

a) To identify facilities-related issues in high-rise residential building.
b) To identify factors that lead to facilities-related issues in high-rise residential building.
c) To identify consequences of facilities-related issues in high-rise residential to purchasers, property agents and stakeholders.
d) To evaluate the significant relationship between facilities-related issues, factors and consequences in high-rise residential building.

1.5 Scope and Limitation of the Study

This research consists of four (4) groups of respondent population namely the purchasers/resident, property managing agent, housing developer and contractor/architect. This study focuses on facilities-related issues in high-rise residential building.

To gain information, there are several methods to use such as through literature review, questionnaire and semi-structured interview which will be carried out by the researcher. Afterwards, the researcher comes up with the assessment procedures where the information gathered were analysed and evaluated.

Next, some literature included may have older publication dates due to the limited amount of information available specifically about facilities-related issues in

high-rise residential building. The data for numbers of property agent respondents dated recent years is not available on the internet

Due to the unprecedented times that is currently occurring worldwide as well as in Malaysia which is the COVID-19 pandemic, the in-person interview might be shifted to an online interview depending on the convenience and the set of circumstances of the respondents. An online interview might have several setbacks such as it reduces the chance of researchers to observe respondents' nonverbal signals. Likewise, online interviews can provide great savings in costs.

Also, the thumb rule, regardless of the scenario in which the surveys are conducted, the survey should be accurate and concise. Although people may have more time to reply to questions since they work or quarantine, people do not want to spend more than 10 minutes completing surveys (Premise, 2020). Surveys and focus groups are no longer available, but other approaches may be used to gather data such as mobile survey application (Premise, 2020).

1.6 Research Methodology

The methods used to perform this study are discussed in this chapter. In line with the questions of the study, research emphasis and methodologies have increasingly been established. Given the existence of the research issue and the numerous available research methods, the "mixed method" approach should be employed.

Data collection by questionnaire surveys and semi-structured interview is seen along with tables and statistics, as well as data interpretation. Figure 1.1 below provides a short description of the phases of the study. The measures below will ensure the success of this study:

i. Identify the thesis title and understand current issues for further study in the area concerned. Identify the supporting materials by defining the techniques that made this research possible.
ii. The study of Literature includes all the research, hypotheses and problems at this point relating to factors promoting practice changes and the importance of autonomy.
iii. The data collection process is based on primary and secondary data from:
    a. The primary data is obtained from the developers and construction practitioners a questionnaire that illustrates a question of how they view the facilities-related issue of the residential buildings that contribute to

their portfolios. Plus, the interview questions in form of transparent topics that provide interviewed with greater comfort and express the property managing agent' views. The questions raised include concerns relating to the facilities-related issues.

b. Secondary data collection takes place by compiling all the literature, books and press releases on the subject matter. This is important to support the validity and guidance of the research and to provide detailed advice at the end of the study.

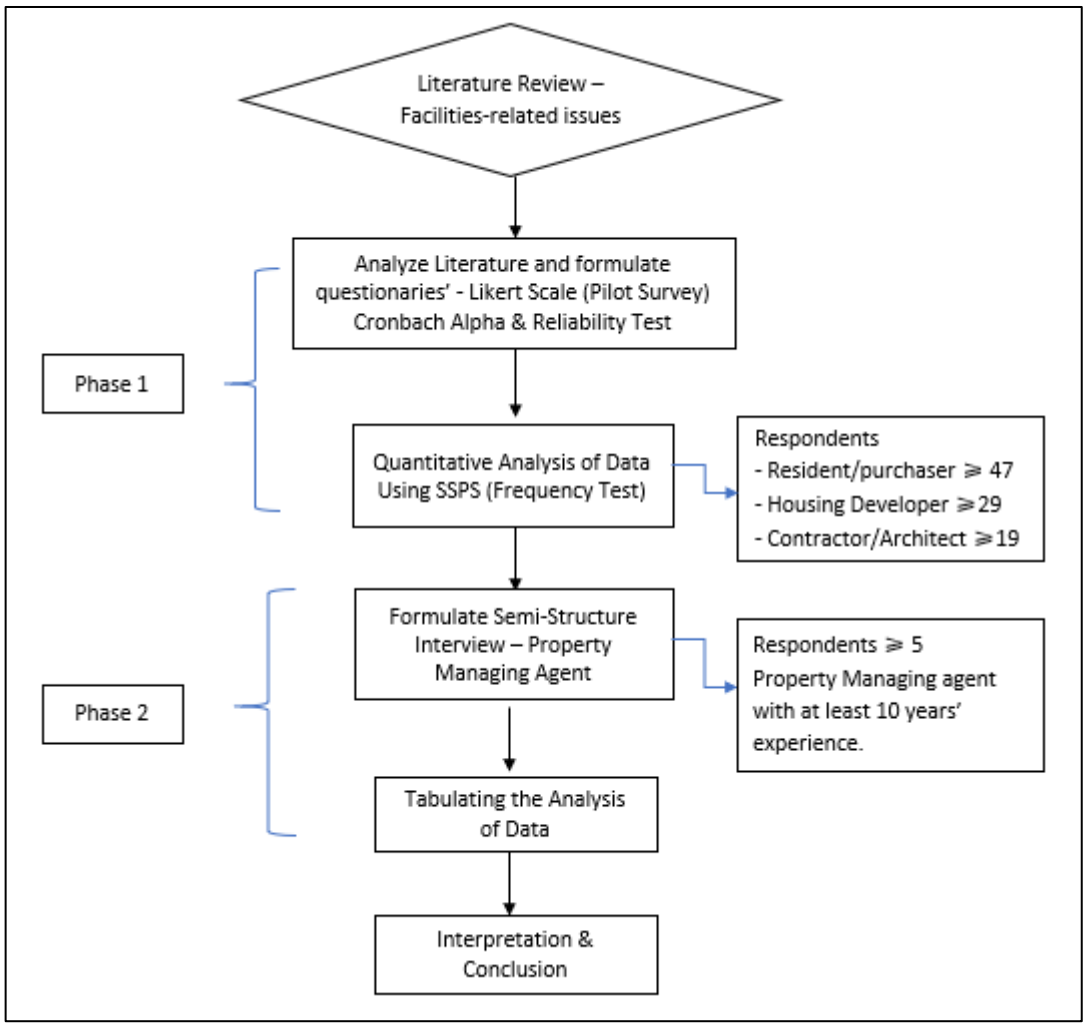

Figure 1. 1: Flow Chart of Research

To explore the possibility of studying high-rise residential buildings for understanding the facilities-related issues, a survey was done among occupants of high-rise residential building, residents, developers, contractors, architects and property managing agents. To collect useful information, this survey aimed to evaluate

the facilities-related issues in terms of defects, factors, and satisfaction levels in high-rise residential buildings.

While this survey is about the high-rise residential building, it is targeted at people involved in the field, the population is selected using stratified random sampling. Stratified random sampling is a method of probability sampling that can be used by a research organization to divide the entire population into several non-overlapping, homogeneous groups (strata) and randomly select final members from different strata for research that reduces costs and improves performance.

Members of each of these groups should be distinguished in such a way that each member of all groups has an equal opportunity to be chosen based on a simple probability. This sampling approach is often referred to as "random quota sampling." (QuestionPro, 2021)

Mixed method analysis was chosen for the thesis because the research goals and issues would benefit from a combination of different methods for triangulation, complementarity, growth, initiation and expansion. Methods to be used include surveys and interviews to classify the latest high-rise facilities in the residential construction sector and to identify the issues generally faced by high-rise residential stakeholders (Rotimi, 2013) . Mix approaches can use the power of both qualitative and quantitative analysis techniques. The combination of strengths and limitations of both qualitative and quantitative research methods can be used to mutually reinforce the results and findings produced (Amaratunga, 2002).

1.7 Contribution of the Study

This research may be used as a reference for the potential study of high-level residential issues. The respondent linked to high-rise residential building added value to recognise the first-hand experience contribution to the study of the issues. The investigation will also raise awareness among high-level residential development practitioners and provide a greater understanding of the purchaser's needs and comfortable living space. The analysis also focuses on identifying the effect of such issues on the ranking of a good high-rise residential building project in Malaysia.

This study looked closely at the major complaint received by property agents and developers in high-performance condominiums, the efficacy of the procedures for managing reports of defects by purchasers, and the problems faced by property management primarily related to the impact of the issues. Maintenance of high-rise

condominiums and apartments is important to ensure that the value of the building remains.

Last but not least. This research would result in a better understanding of related stakeholders in terms of satisfaction among purchasers.

1.8 Outline of the Report

This study is summarised in five (5) key chapters.

Chapter 1: Introduction

This chapter provides a report detailing the goals and objectives and provides an introduction to the ambiguity of the situations or facilities-related problems in high-rises buildings in Malaysia, and the context study has also been addressed. This chapter also contains background studies such as introduction, problem statement, research objectives, research limitation and research methodology and the layout of the Chapter.

Chapter 2: A literature review

This chapter outlines the implementation of a strata building as a residential purpose and defines the elements in the studies that cover the types of issues including poor design, defects and poor facilities and lack of maintenance. Identify causes that lead to problems, identify implications of problems and identify important relationships among problems, factors and consequences in the residential development strata. Studies will be carried out to collect data on the strata of the housing industry in Malaysia to enhance the understanding of the housing industry strata. Information from reading this chapter, as well as other sources including the Internet, articles and journals

Chapter 3: Research Methodology and Work Plan

Address the form and procedures of the study methodology. The process for data collection and analysis is also explained in this chapter. Data collection by close-ended questionnaire surveys and semi-structure interview is seen along with tables and statistics, as well as data interpretation

Chapter 4: Result and Discussions

This chapter offers a comprehensive review of survey findings from property managers, developers, house purchasers, construction professional and stakeholders. The research is to discover the raw data of the respondents, most of whom refer to the residential strata. The data pieces needed for analysis are: -

i. Find the raw data on the background of the respondents and the acquisition of relationships in strata residential building.
ii. The discovery, by the quality of the property, is given in the qualitative aspects, and their attributes related to the buildings design, defect and facilities management, of raw information on the perception and satisfaction of the respondents.

Chapter 5: Conclusion and Suggestion

This chapter will summarise the results of the review of raw data and propose the consistency of the results of the survey with the project goals at the beginning of the report. A description of the situation of the study to improves awareness among residential buildings in the areas around their residential buildings based on the design, defect and quality of facilities. The emphasis is on the opinion of the respondents, and examples of the adaptation of other studies relevant to this research issue.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The chapter begins with the definition of high-rise residential building by various authors followed by the exposition of the upcoming chapter. The introduction to housing highlighted the importance of housing and the housing environment. The category of high-rise residential building is also highlighted. The chapter presents the latest report, which has been reiterated during the study, on facilities-related issues in high-rise buildings.

Apart from that, this chapter shows the types and factors related to facilities-related issues in high-rise buildings that need to be addressed to improve the overall image. This chapter further identifies the consequences of high-rise residential facilities-related issues highlighted in a case study. In the final section, the chapter reviews and evaluates the significant relationship between facilities-related issues, factors and consequences in high-rise residential buildings.

2.2 Introduction to Housing

The housing is made up of physical and social elements (Karim, 2008). Houses, facilities and services are a physical element, whereas the family, neighbours and community are a social element. Also, as per Ismail (2018), housing's function is linked to different segments in society and impacts human health, education, employment, economic development, the environment and social life. Housing is a place for people to live because they need a safe place for rest, sleep, warmth and protection from the sun and rain. It highlighted the value of housing as a place where people live and spend the most time (Ha, 2016). Housing is also a fundamental word for shaping people's quality of life and well-being (Ibem, 2010).

Housing thus becomes a vital aspect of life and must be an excellent environment for an excellent quality of life. Since housing is crucial for the secure indoor environment for residents, we must examine the performance of housing to understand user needs, preferences and satisfaction (Ibem, 2010). Lehrer (2004) also reported that opinion users are crucial to research the performance of buildings to meet the needs and expectations of occupants. Hanif (2010) clarified satisfaction as a

subjective measure for users or customers' perceptions of the output of products or services. The value of accommodation for the customer must therefore be taken seriously as the housing efficiency is assessed to reach the user satisfaction level. The management team is required and acts as an important formation to maintain housing condition to ensure that the performance of the housing is well maintained and quality achieved (Kong , et al., 2017).

The importance of property management is to protect the condition of the building and the resident's well-being. When new construction is constructed, buildings typically have good performance provided they are up to standard design and construction. As per Hui, (2005) property is often subject to wear and tear as a physical asset. Proper maintenance is, therefore, necessary to keep the building running.

2.3 Definition of High-Rise Residential Building

A high building is a multi-story building where the majority of residents rely on lifts to reach their destination. Prominent large buildings are classified in most countries as high-rise buildings and some countries, as well as tower blocks. The following can be described as a high-rise building: -

- "Any structure that has a significant impact on the height of the evacuation" High-Rise Fire Protection International Conference)
- "The interruption point is approximately seven floors for several reasons for high-ranking buildings. Often a high-rise is characterised by seven floors or even higher, and sometimes there are more than seven storeys. The definition is often specified in terms of linear height instead of storeys."
- "A high-ranking hierarchy is usually considered to stretch beyond the full range of fire-fighting equipment available. It was set between 75 feet and 100 feet in absolute numbers"

Modern buildings are expected to provide the requisite human living facilities, such as clean air and water, waste management, optimal thermal and humidity control, privacy, protection and visual/acoustic comfort (Greeno, 2012). These facilities help to achieve thermal convenience, acoustic control, safety, sanitation, fire protection, lighting and ventilation efficiency of the building. Residents perceive building output

as critical to fulfilling their demand. Higher quality of facilities and services offered would result in far happier people.

In the common areas of a condominium building, facilities are common properties under the Strata Management Act 2013 Act 757 describing a common property as a portion of a parcel or accessory parcel. This includes a common property. In other words, any facility not mentioned in the title (strata title) is considered to be common assets. (SMA , 2013)

During the Malaysia Eighth Plan (2001-2005), a total of 10,074 claims were filed with the Tribunal for Homebuyer Claims (Fakhrudin, et al., 2011). One of the reasons given was that developers neglected to maintain the buildings in good condition. Table 2.1 shows the standard facilities offered in a building that meets the use and requirements of the residents of the building.

Table 2. 1 Typical facility provided in a high-rise residential building

No.	Types of facilities
1.	Swimming pool
2.	Gym
3.	Lifts
4.	Car parking
5.	Motorbike parking
6.	Multi-purpose hall
7.	Retail space
8.	Office space
9.	Private green space
10.	Guard house
12.	Children playground
13.	Water fountain
14.	Closed-circuit television (CCTV)
15.	Security door entrance
16.	Air-conditioning and ventilation
17.	Sports facilities
18.	Waste disposal service

Source: (Yong, 2015)

Depending on the use of a building, many different facilities are available in a condominium. Che-Ani (2009) discovered that the majority of residential high-rise buildings were not efficiently maintained. Residents complained about incompetent facility management, such as malfunctioning lifts, inconsistent garbage collection, and vandalism damage. The following sections will clarify the facility-related problems that were used for this analysis to interpret the data adequately.

Strata buildings have individual ownership following the collective ownership of the rest, by a legal body, as part of a house. According to Sherwood Realtors (2018), Strata Property is owned by the Joint Management Body and/or Management Company, which comprises owners of the entire strata development and is defined in terms of share values for their respective areas, such as corridors, clubhouses, outdoor recreational facilities, roads, mechanical and electrical equipment These values are generally determined by their respective units, the built-up floor. There are few high-rise residential buildings such as: -

2.3.1 Flat

The building is a low-cost high-rise, multi-unit residence with a low-cost design. Self-guards and services, such as the pool, the gym or the park, are frequently not conquered or guarded. Normally there is little too little design as these units are designed practically. The materials used for building are simple and not expensive. These developments are very dense and the unit spaces are small (Kiru, 2018).

Figure 2. 1: Flats

2.3.2 Apartments

An apartment in Malaysia is known as a kind of moderate quality high-rise property with basic public amenities, including a gym, swimming pools and multi-story car parking. Available in Malaysia is the most popular kind. This property stage and the above have a dedicated management body and residents have to pay a monthly amount for repairs and sinking funds. Apartments typically have a low density, but they may also be high in certain situations (Kiru, 2018).

Figure 2. 2: Apartments

2.3.3 Condominium

Malaysian people sometimes mean they own the unit instead of renting it when they claim they are living in a condo. In general, a Condo means a high multi-unit rise higher than an apartment, with a sleek interior and beautiful surroundings. It is usually low in density, and the units are larger and better used for its construction the trendier materials are used (Kiru, 2018).

Figure 2. 3: Condominium

2.3.4 Serviced Apartments

Service apartments traditionally belonged to hoteliers who leased out and furnished the apartment. However, the pattern has changed lately as the word 'service' can suggest that the developer builds a condo apartment on commercial grounds and raises the cost of living, such as bills and facilities. This apartment will usually be leased for a limited period (Kiru, 2018).

Figure 2. 4: Serviced Apartment

2.3.5 SOHO

SOHO stands for Small Office's Home Office, which has been introduced from Western countries through this specific idea. This apartment has a small office room. The apartment may have a different entrance to the living room or maybe built to differ from the living room. This form of property was designed for home-builders including self-employed employees and small start-ups. SOHO is typically situated in conjunction with retail and office buildings (Kiru, 2018).

Figure 2. 5: SOHO

2.4 Facilities-related issues in High-rise Residential Buildings

The dilemma of operation of facilities starts from the planning and construction processes. During the design and planning processes, the problems related to building management and maintenance should be addressed carefully. The use of adequate and high-quality construction materials, for instance, the provision of access to building parts requires regular maintenance, as well as high-quality workmanship, which can mitigate defects and reduce potential management workloads (Tiun, 2006)

It is required to oversee and manage the common property, such as the parking area, lighting, cleaning & security services, pool maintenance and lift maintenance (Azian, 2020). Also, it is essential to ensure that all facilities are wisely managed for a safe living (BRE Digest , 2016) by combining environmental and social dimensions.

2.4.1 Defects

Legal definitions of construction defects vary from state to state. Generally speaking, a construction defect means something more than just a lack of proper workmanship (Ha, 2016) .

Building defects usually refer to a building process deficiency – be it design, materials or workmanship – that is leading to a structural failure in some respects and that is causing damaged property or persons (financial or otherwise). Another way to describe a construction defect is that it must include all three of the following (Ahmad, 2004)

- a problem with the building construction (caused by a failure in design, workmanship, or materials);
- the deficiencies must lead to a structural failure (that is being constructed during the project);
- cause damage in the form of financial loss or something similar to a person or property;

Building defects can lead to a lot of building problems (Mydin & Bakri, 2014). According to the Webster dictionary cited in Ahzahar, et al (2011) the concept of defects is briefly defined as imperfection, fault; a blemish or deficiency. Research by Khalid & Mydin (2021) claimed that defects can be due to something that impairs perfection, whereas damage to buildings can be seen if any structure, material, equipment and even building elements were not completely functional. A defect is a shortfall in performance that occurs at any point in the life of the product, element or

building in which it occurs (BRE Digest , 2016) or is perceived as a defect in the element, material or part of the building.

Defects can occur during construction or handling over or during the phases of occupancy. Studies by Chong (2005) found that the defects found during construction and occupancy were typically distinct, even though the defects had similar descriptions. The defects had different origins, and they were different. Author Chong (2005) also stated that building defects sometimes occur after 2 years of the first age of the building or after being occupied. While construction defects arising after 6 or 7 years were assumed to have affected the adoption. In addition to defects, it may also occur and look for longer periods that cannot be calculated.

There can be other problems that are related to the construction site itself. In the event of building defect, we would categorise them as design defect, material defect, and poor workmanship (Haniza, 2007).

There are two categories of building defects—those that are recognised or readily visible upon examination (patent defects) and those that are hidden and are therefore not readily noticeable (latent defects). With patent defects, clear-cut repairs are simple. These defects are superficial and mostly just aesthetic, so the problem is normally not so invasive when accessed and remediated. On the other hand, latent faults are not apparent and typically require a flawed structure in the waste of a project below the soil. Late faults are also somewhat more problem-solving (Chong, 2005).

Ibem (2010) also investigated nine major types of defects (faults) in homes, and the results showed that the most common types of defects were rising damp, framing, cracking, roofing and illegal construction. Framing and roofing problems have been identified as major defects that could complicate other problems.

The common construction defects can include windows, roof, wood floors, ventilation, and drywall. There are a lot of defects, all defects in residential buildings are difficult to identify without a lot of time and visits to the site. In a residential building, these defects can be divided into the following (Meikeng, 2016)

- Internal Wall Defects and External Wall Defects
- Floor Defects, Door Defects and Window Defects
- Plumbing and Sanitary Defects;
- Roof Defects & Ceiling Defects
- Mechanical & Electrical Defects;

The types of defects shown in this kind of study are the typical and most open defects which the dweller would find. Other defects, that is, typically need for a permit to inspect, such as roof or exterior wall of the buildings (Anthony, 2013). The following section will illustrate the study's commonly found defects in high-rise residential buildings at individual units and common areas.

2.4.1.1 Faulty door handles/ door closers

Entrance doors in high-rise residential building are typically part of the common features, and repair of the doors is the condominium's responsibility. When there is a lot of use and poor maintenance, the door handle and door closer are generally worn out (Hyman, 2015).

Figure 2. 6: Faulty door handles/door closers

2.4.1.2 Cracking in external wall

A building feature wall is often found cracked are a common cause of movement, and whether this is due to an external factor (such as subsidence) or the fabric of the building itself (such as a poor grade of cement) (Facilitator, 2021).

Figure 2. 7 Cracking in building external wall

2.4.1.3 Dampness at the concrete wall (Fungi and Small Plant Attack)

Structural dampness is the presence of excessive moisture in a building's construction, which can be caused by either outside absorption or condensation from within the structure. Condensation and rain penetration caused by ambient climate are responsible for a large proportion of damp problems in buildings (Waterstop Solution, 2021).

Figure 2. 8 Dampness at the concrete wall

2.4.1.4 Inter-floor leaking /leakage of pipe

Dampness in buildings caused by water leakage and condensation is referred to as inter-floor leakage. Water will pool and enter the concrete floor if pipes or cavities in the buildings leaked. When dampness increases, the concrete floor deteriorates and the reinforced steel bars inside corrode (EdgeProp, 2017)

Figure 2. 9 Inter-floor leaking

2.4.1.5 Internal wall - Inadequate resistance to the passage of sound

A typical example of flanking is sound transmitted between two spaces through a floor void (or even a floating screed) that runs underneath the separating partition, even though the partition provides good acoustic insulation and prevents direct sound transmission (Design Build, 2020)

2.4.1.6 Uneven floor/ wall finishing

Uneven walls are normally affected by framing that was built at an angle or by a warp in the wood. Uneven floors are rarely caused by issues with the floor itself. The most common cause is settling or shifting of the base under the floors (Crawlspace , 2020).

Figure 3. 1 Uneven wall/floor finishing

2.4.1.7 Hollow/Broken floor & wall tiles

A hollow sound in a tile could mean that there is a gap beneath those hollow sounding spots and/or that the tile is not bonded at those hollow sounding spots. A hollow sound may be caused by the tile assembly's design, or it may be the result of having some form of the membrane under the tile (CTASC, 2021).

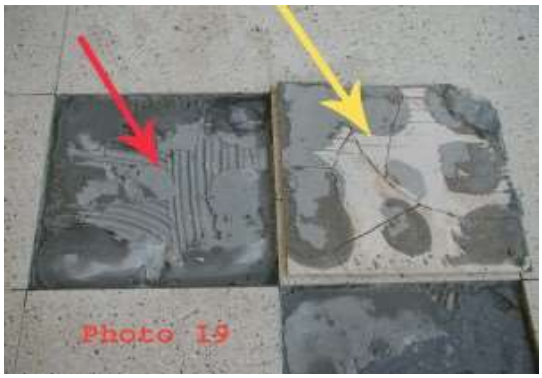

Figure 3. 2 Hollow/Broken Tiles

2.4.1.8 Faulty gasket between the window frame and the glass

In the industry, this window assembly is referred to as an IGU—an acronym that stands for insulated glazing unit or insulated glass unit. Thermal windows are often referred to as thermopanes or insulated windows. The gap between the glass panes of an IGU is vacuumed out of the air and frequently filled with an inert (noble) gas, such as argon or krypton, to delay the passage of heat through the window device. Inert gases conduct less heat than air or a vacuumed room (Wallender, 2021).

Figure 3. 3 Faulty window gasket

2.4.1.9 Faulty sanitary installation

The key idea behind the sanitary system is to introduce clean water into the building and transport polluted water out through the pipes. Faulty pipes and other plumbing fixtures often cause leaks, sewerage backflow and the resulting water damage can be serious (Dussault, 2021).

Figure 3. 4 Toilet Backflow

2.4.1.10 Exposed wires & Rusty pipes

Before it is converted into iron or steel, which are naturally weaker elements, iron ore is a stable substance. As galvanised (zinc) fittings are used on steel tubing, the galvanised (zinc) fitting can corrode. Steel or other metals that are stressed will corrode, whereas unstressed steel will not corrode. This is the cause of rust pitting on steel (Manufacturing.Net, 2002).

Figure 3. 5 Rusty Galvanised pipe

2.4.2 Poor Design

During the design process of high-rise construction, structural and architectural aspects of the building plans and requirements may be updated several times by several design experts, including mechanical, geotechnical, and structural engineers. The result could be several layers of revisions resulting in some complex design features that provide both aesthetics for the owner and structural stability and functionality for the engineers, but which are difficult or even impossible for a contractor to incorporate or accomplish in the field.

As a result, contractors and subcontractors may take construction shortcuts (deviations from design drawings) in an attempt to meet the design purpose by using a seemingly more realistic manner and method of construction (Nicholas , 2015). The following section will illustrate the study's commonly found design defects in high-rise residential buildings at individual units and common areas.

2.4.2.1 Water seepage from parking slab

Leaks can range from a minor discolouration on the slab's surface to significant quantities of water entering the slab. These leaks can range from being merely unsightly and distracting to causing harm by leaking on vehicles and creating possible slipping hazards. Leaks in the parking slab may also pose concerns about the structural effect of moisture inside the wall itself (Matthew, 2020).

2.4.2.2 Failed water proofing at the rooftop

Waterproofing is a vital factor for maintaining and sustaining the integrity of homes and commercial buildings. Poor waterproofing can lead to cracks, mould formation, and design problems such as concrete cancers. Failure of your waterproofing will result in safety concerns, a substantial decrease in the value of your land, and unfitness for occupation (Projex, 2018).

2.4.2.3 The poor floor trap system

Traps are an essential part of every plumbing scheme. Traps are designed in such a way that they hold a body of water that serves as a water seal. Often the issue isn't with the pipes or any waste clogging the floor drain. A floor trap choke may be caused by a larger issue, such as a clogged sewer pipe (Kiasuplumber, 2017).

2.4.2.4 Poor drainage system

In most high-rise buildings, sanitary drainage is provided by vertical drainage stacks that link various occupied rooms. The only way to avoid cross-contamination between rooms is to have a trap with a water seal inside. Inadequate guidelines for building drainage vent construction can cause problems in the building drainage system, especially in high-rise buildings (Daniel, et al., 2006).

2.4.2.5 Expose airwalls cause multi-level building floor flood during the raining

External corridors are an essential component of multi-story residential buildings. Water leaks in corridors can quickly start the electrochemical corrosion process since they are exposed to a more hostile atmosphere than other wet areas in the door, resulting in damage and spall concrete (Wong & Hui, 2005).

2.4.2.6 Poor rainwater harvesting system at multilevel parking area/corridors

The conveyance system in the RHS is responsible for transferring rainwater from the multi-level building catchment into the storage tank, which usually involves the gutters and downpipes. Factors such as the shallow depth of the pit, the possibility of clogging of the recharge bore pit by infiltrating coarse sand mixed with silt and clay entering with rain water into the bore hole as well as through the pebbles, the unmentioned size of the pebbles, and the uncertain importance of the diameter of the pit are all likely to jeopardise the efficiency of this structure design (Silveron, 2019).

2.4.2.7 Faulty sewerage pipe ventilation system, cause foul smells inside the unit

Most of the time, this is due to soil vent pipe being too small or fitted with a restrictive cowl, which can produce a semi-vacuum, taking water out of the trap and letting the stench into units and soil vent pipe ends in roof field, which works as planned most of the time, but on very still days, the hydrogen sulphide (a 'heavy' gas) can leak back into the units (Waterless Co., 2017).

2.4.2.8 Faulty in lighting arrestor system.

Most failures are caused by dielectric breakdown, in which the internal structure has weakened to the point that the arrester is unable to withstand applied voltage, whether standard device voltage, temporary power frequency overvoltage (e.g., following external line faults or switching), or lightning or switching surge overvoltage's (M. Whelan, et al., 2003).

These defects are the result of a design professional's inability to create reliable and well-organized construction records. Design defect arises as a result of a mistake or omission. Errors typically necessitate redesign and replacement of a component portion, while omissions can be corrected by expanding a contractor's scope of work via change orders (Bennaroche , 2019).

2.4.3 Poor Facilities Management

FM has many meanings, but they can be summed up as 'integral management and implementation of accommodation, facilities and other means that lead to a better output of the primary process (in terms of productivity of versatility and creativity) in the evolving environment (primary process, market, social and technological) (Haris & Adnan, 2008). Research and facility management activity started in the USA in the 1950s, followed by Europe in the 1980s. After the 1990s, facility management activities have been applied to the countries of Asia and Africa. The value of its practices makes the facility management industry one of the fastest-growing industries in the world (IFMA, 2009).

Management of facilities (FM) will provide substantial help in resolving the problem of building and maintenance inefficiency. Facility management is a form of asset management that incorporates all elements of the built environment, including personnel, method, location and technology, to ensure that the built environment system functions optimally (IFMA, 2009). Considering that the design or built environment is a dynamic system, the management of the facility also requires multidisciplinary expertise, including architecture, civil engineering, behaviour, accounting, management, and so on.

It has been believed that Facilities Mangers only had to deal with buildings and not with many other parts of it like building maintenance and heating. However, since as the industry is growing it has become common around the world how we have to employ facilities management now (Teicholz, 2001). Since the management of facilities comprises a wide range of services, facilities management is seen as a factor that is critical for succeeding or failing to perform building output in the optimum manner (Chotipanich, 2008).

In order to manage resources efficiently and reduce repair and substitution cost in addition to reducing overall risks and defective equipment, an effective maintenance strategy is required (Chandrashekaran, 2008). The facility will also coordinate the people involved in building operations and maintenance to ensure that the building is functional and cost-effective and meets consumer expectations and features (H. Hashim, 2011).

2.4.3.1 Common area cleaning

The most common mistake an apartment complex can make is allowing the common areas to become filthy by failing to invest in recurring cleaning services. Maintaining a respectable reputation necessitates a clean environment. The cleanliness of your space's common areas will quickly deteriorate if they are not scrubbing, particularly if you have snow-filled winters! All of the foot traffic brings dirt in, which will eventually clog the hallways, elevators, and lounge areas. The only way to prevent this is to provide a service that runs regularly, varying from daily to weekly (Azian, 2020).

2.4.3.2 Poor multi-level parking lot management

At the strategic level of planning, it is crucial to assess current parking facilities to improve service standards to make better plans and operations. The following are examples of issues that may arise in a high-rise residential building. Inadequate parking signs, inefficient use of existing parking space, awkward parking allocation where parking and building entrance is far for some people, and the typical issue of no parking allocated for motorcycles (Janak, et al., 2020).

2.4.3.3 Poor Safety and security system

Creating a feeling of protection and giving residents peace of mind is just as critical as enforcing physical protection measures. The effectiveness of a protection system is heavily influenced by the design of the property and the management controls- SOP in place. Issues such as a failing CCTV system and ineffective guards often cause conflict and dissatisfaction among high-rise residential stakeholders (Joseph, 2012).

2.4.3.4 Refuse room maintenance/Rubbish disposal management

Solid waste damps are causing havoc on the environment in developing countries. The solid waste management situation is deteriorating day by day due to a lack of adequate preparation. Waste management, especially in high-rise residential areas, not only creates frustration among stakeholders but also decreases the value of the building (N. Ejaz, et al., 2010).

2.4.3.5 Lacking in monitoring energy consumption

Energy-saving is a significant feature of residential design. It is due to the community's overuse of electrical equipment. The goal of energy conservation is to reduce the use of non-renewable resources. Besides, it helps reduce negative effects on the environment, reduces the emissions of toxic gases, which can harm humans and mainly reduce cost (Robiah , et al., 2018). However, in most high-rise residential building less importance is given to study on energy consumptions.

2.4.3.6 Less Facilities Provided

Because of the high demand for housing and the shortage of land in the town area, the provision of high-rise residential schemes has increased. The owners of this type of housing are different, but they all share the same land lot and common facilities. As a result, building and common facility maintenance must be well coordinated. In most high-rise buildings nowadays, no proper research was performed on the purchaser's requirements, and keys were handed over without adequate facilities, which often caused the resident community to spend money on it (Che-Ani, et al., 2016).

2.4.3.7 Frequently breakdown lifts

The maintenance industry is also dealing with serious housing quality issues, one of which is the lift system. A lift system, as the most costly and critical transportation system in a high-rise building, necessitates frequent maintenance and inspection to provide secure and efficient service to occupants. Unfortunately, the majority of Malaysian lift systems are not properly maintained (Peng Au & Azmi, 2018).

2.4.3.8 Unplanned water disruption and poor water quality

There are various reasons why water is pumped to plumbing fixtures at low pressure or not delivered at all. Often the municipal water supply pressure is insufficient to meet the needs of the building in question, necessitating the installation of a pressure-boosting system (Azian, 2020).

However, even if the supply pressure is sufficient, internal plumbing problems can impede water delivery. When there is a problem with water pressure in a high-rise house, the first step is to find out what's causing it, since installing the wrong solution is a waste of money. Installing a booster pump, for example, when low pressure is caused by clogged piping wastes energy and may cause pipes to burst (Bipat, 2021).

2.4.3.9 Poor communication

Building management communication is dependent on the efficiency, protection, and service of its system between maintenance management and building occupants, especially on operation and maintenance activities. The findings revealed that unsafe practices, insufficient management, and unprofessional maintenance management were caused by miscommunication among them in the overall level tasks. Furthermore, significant problems with maintenance management resources such as unavailability of building policies, inadequate record management, and poor control of maintenance activities all led to an ineffective communication system in maintenance management (Yahya & Ibrahim, 2012).

2.4.3.10 Complicated access card system

Properly built access card systems would be spread across the structure in a high-rise setting, and architects must integrate enough space into the programme for the system to be controlled and administered, as well as to properly house the front-end systems. The efficacy of the access card system can be jeopardised if there is insufficient space. And if that room is not used in the original design, it would be more expensive to instal it after the building has been completely programmed (Ahrens, 2006).

2.4.3.11 Lack facilities maintenance

The purchasers suffered a variety of problems and miseries as a result of the lack of maintenance of common assets, especially those involving high-rise buildings. One of the key issues confronting the management body is the lack of sufficient public services in residential housing (Azian, 2020).

2.4.3.12 Poor lighting at multi-level parking

Multi-story parking garages are often regarded as dim, filthy, narrow, and dangerous environments. Fortunately, as indoor parking lots become more upscale, this image is increasingly changing. Architects, owners, and designers are realising that a more visually pleasing area with quality lighting will reassure users, minimise complaints from residents, and enhance the environments (Azmi, 2006).

2.4.3.13 No important is given to fire drill exercises.

A fire in an apartment building normally affects more than one unit, resulting in the injuries of several residents. The dense nature of the apartment building inevitably causes smoke, heat, and fire to spread. Any apartment complex must ensure that its fire safety equipment is in good working order. Each resident should be educated on how to use it and it should be easily available. However, fire drills are generally regarded as less necessary in high-rise residential buildings (CommonFloor , 2012).

2.5 Factors Lead to Facilities-related issues in High-rise Residential Buildings

Defects are a fairly common occurrence in the building industry. There are several publications in the literature/experiments conducted to investigate the causes of defects. Based on the literature review, it is possible to assume that the key causes of construction defects are poor material quality, poor workmanship quality, and ineffective construction work control (Ahzahar, et al., 2011). Aside from that, climatic conditions, a lack of maintenance, the external environment, a lack of time, and a lack of money would all cause defects to occur (Anthony, 2013). The following sections will present the factor of defects identified by various authors.

2.5.1 Factor lead to defects in high-rise residential building

To better interpret the results, the following sections will explain the factors that lead to facilities-related issues in high-rise residential buildings in terms of construction and design defects that were used for this study.

2.5.1.1 Defects in construction material

According to Atkinson (2016), if there are limited resources, the contractor can reduce the cost of materials as well as labour. This would have an effect not only on the nature of the products used but also on the labour supplied. It is because using low-quality materials, such as inferior materials, can result in building defects. A lack of labour would result in insufficient time to complete the project, necessitating a time extension (EOT).

2.5.1.2 Lack of training/education

According to Okuntade (2014), defects on the work site arise as a result of the contractor's inability to explain the drawing to the staff due to his lack of technical background. This will inevitably result in a defective design, which will necessitate rework.

According to Ali & Siang (2012), the allocation of manpower on a construction site has an impact on the quality of the buildings. This is because a shortage of manpower can cause work to be performed in a rushed manner, affecting efficiency.

2.5.1.3 Lack of supervision by site engineer during the inspection

Oversight is a significant factor in avoiding incidents on building sites, both big and small. Typical supervisory roles include job preparation, decision making, performance and compliance management, leadership and team-building and employee participation. The supervision, therefore, plays an important role in the implementation of a typical building project, particularly in the efficient management of health and safety (Croner-i, 2020).

2.5.1.4 Specifications & Structural

The main factors influencing the occurrence of defects during the design stage of residential buildings were identified, and a survey was performed, revealing three major design errors: missing or improperly conducting the ground survey, a lack of, competent oversight over the drawings, and conflicts between architectural and structural drawings (Tayeh, et al., 2020).

A defect that occurs in the design normally is due to the failure caused by the design professionals. This is due to their failure to create an accurate and complete collection of drawings as well as construction documents. An error in design is described as a mistake in which the elements of the design were constructed or were in the process of being constructed and which necessitates the replacement of the components to correct the error (Olanrewaju & Abdul-Aziz, 2015).

2.5.1.5 Less important given to ventilation & waterproofing work

Most high-rise buildings are not designed to provide ventilation to residents with mechanical ventilation systems. The standard pressure systems are installed to monitor the transmission of scents between suites and supply make-up air to substitute air for exhaust fans in the kitchen and bathroom. The construction assumes that the air ventilation is supplied to the occupant through the operating windows, through penetration through the wrapped building and in some cases by the air supplied by the corridor pressure system (William, 2014).

Waterproofing is a construction measure used to keep water from damaging a house. It can be done before or after construction to protect the structure from water damage caused by rain, moisture, and leaks. Water damage can have significant consequences for a building's construction and appearance. It can cause harm not only to the floor but also to the health and safety of those in the vicinity of the affected building (Titan, 2014).

2.5.1.6 Climatic Condition/Soil impact

Extreme weather conditions, according to (Dai,, et al., 2009), are one of the factors influencing construction labour efficiency and workmanship. This will result in the element that causes defects in new buildings. Extremely hot conditions will not only wreak havoc on the workmanship but will also inflict crack lines on the walls that face the sun. This is because hot temperatures consume all of the moisture and water in the concrete.

2.5.1.7 Working condition and workmanship

In Malaysia's construction industry, poor workmanship has always been a focus in the media, especially through newspapers, and the product of poor workmanship and low-quality materials being used, which have been reported as major causes of defects occurring in construction projects while constructing new buildings. Aside from that, factors that lead to poor workmanship include a lack of supervision, a lack of experience and competency on the part of the labourers, a language barrier, and a lack of communication (Razak , et al., 2010).

According to the study, 82% of the survey respondents described the general issue that they face on the construction site as a language barrier while attempting to interact with foreign labourers. As a consequence, a contact and language barrier can

cause confusion between local and foreign labourers when working, resulting in poor workmanship (Augusto , et al., 2009)

2.5.2 Factors Lead to Poor Facilities Management in High-rise Residential Buildings

High-rise residential buildings must be professionally managed by those with the necessary expertise. The term "maintenance" can be interpreted in a variety of ways. According to (Azlan, 2009), maintenance is "any work undertaken to repair or rebuild each facility," for example, any part of a site, house, and anything connected to a building must be of acceptable quality.

Building maintenance is a mixture of technical and administrative measures designed to ensure that the item and all elements relevant to the building meet the desired quality requirements to perform the desired purpose (Francis, et al., 2001). Building maintenance is an important part of facilities management; it also plays an important role in providing sustainable housing (Croal, et al., 2003). Successful maintenance begins with the design stage and continues throughout the life of the house. Maintenance consists of both short-term (daily and routine) and long-term activities. If maintenance work is delayed or not done perfectly, any complex will become obsolete quickly.

The financial aspect of high-rise residential building is often viewed as a limited resource that must be managed prudently (Hui, 2005). If there is a financial crisis, facilities management would be rendered ineffective, particularly if the maintenance charges and sinking fund are inadequate to cover facility expenses (Sapian , 2003). Maintenance of the common property field, quit rent, maintenance bills for the common property, building insurance, and other costs are included in the expenses. The factor of poor facility management found by various authors is presented in the following sections.

Based on external factors such as environment and visibility and internal factors such as usage and inability to maintain, buildings are subject to decrease regulation, as they cannot be conserved over time in the original shapes. Furthermore, the efficiency of construction decreases over its longevity due to usage, wear and tear, weather and dampness, inadequate maintenance and other facilities (Watt, 2007). A building is not only prone to degradation over the years, but building defects can also occur due to poor workmanship and poor quality of materials.

2.5.2.1 Poor quality control and lack of building maintenance standard procedures

The building's age, the older the building, the greater the need for maintenance. When a building approaches the end of its useful life, it depreciates rapidly and the cost of repair appears to be higher than when it was first occupied (Gahlot, 2016).

Inadequate expertise on the part of the designer, unsatisfactory design specifics, the builder's inability to follow specifications/drawings, inadequate testing of the system before commissioning, failure to follow maintenance instructions, and the owner's inability to operate the system as ordered can all lead to maintenance issues in building structures. Other factors that contribute to poor maintenance include insufficient routine maintenance, an inefficient maintenance programme, a lack of proper inspections regularly, changing requirements or/and preferences, and insufficient data to enable the preceding items to be properly carried out (Olufemi, et al., 2012).

2.5.2.2 Lack/ Unavailability of training and skills of the maintenance team

Poor workmanship and the poor quality of replacement parts and materials, according to El-Haram & Horner (2002), are affecting facilities management, also the lack of maintenance management, budget restrictions, inability to conduct maintenance on time, and poor budgetary control.

Human factors may be socio-cultural or economic. Socio-cultural considerations can include the developer's educational level, the competency of the professionals involved in the project's design, construction, and management, and the attitude and culture of the building's end-users. Furthermore, building owners' desire for modernity without regard for environmental implications could result in high maintenance costs. The human factor can be interpreted in two ways; Building residents misuse buildings and maintenance workers lack a maintenance culture (Azemina , 2018).

2.5.2.3 Defective materials used for maintenance work

Faulty material used in building construction is close to the impact of human factors on maintenance. The following factors contribute to poor construction quality, which in turn leads to future maintenance issues: incorrect material and specification selection, use of substandard materials, and inadequate inspection of materials, provision of inadequate storage facilities on-site, inconsistent mixing of materials on-site, use of inappropriate materials with use, and use of stale/emergency materials. In the long run, lower-cost materials can necessitate more frequent maintenance than higher-quality materials (Ishak, et al., 2007).

2.5.2.4 Overlooked site conditions

The magnitude of these environmental factors is determined by the building's location and orientation. A structure constructed on firm, uniformly sloped, well-drained, and stable soil, for example, would require less maintenance. Some building materials are affected by environmental factors such as temperature, rainfall, and humidity. Extreme heat and cold, for example, may cause cracks in concrete if sufficient expansion joints are not provided. While in areas such as Maiduguri and Jos in Nigeria, intense sunlight and regular rains can cause paints on exposed external walls to fade faster. High humidity can also affect certain metabolic fittings, causing rust to form (Karmakar, et al., 2016).

2.5.2.5 Insufficient funds to maintain the buildings

Inadequate funds and facilities can be a major cause of poor facility management. Financial and human resources will be included in these resources. Budget constraints on the amount to be spent on maintenance, lack of knowledge on property maintenance by the facility manager, and the facility owners' and managers' delayed maintenance attitude have also been identified as some of the causes of poor management in high-rise residential buildings (Meera, 2020).

Insufficient maintenance services provided by top management; maintenance staff have trouble assessing a building's maintenance level. Organizational and maintenance priorities are not adequately recognised at the top management level; as a result, maintenance resources are distributed insufficiently to meet maintenance needs. Funds for repair work are not given when they are due, resulting in delays in

completion, further degradation of building materials, and additions to maintenance backlogs (Olanrewaju , et al., 2010).

2.5.2.6 Non-response to maintenance request. (resident complaints) on timely basis

The building's occupants also contribute to its degradation, which can take several forms. One of such ways is vandalism, which is the deliberate destruction and disfigurement of a building and its components such as doors, windows, furniture, electrical and sanitary fittings. Lack of protection, a lack of knowledge among users about the importance of keeping their surroundings clean, and a failure to repair areas damaged by vandalism are some of the factors that contribute to further degradation in buildings. Overuse and overcrowding of buildings will hasten deterioration and contribute significantly to the structures' deplorable living conditions (UKEssays, 2018).

2.5.2.7 Non-availability of replacement parts and components in the market

In general, this is due to a lack of technology and other persuasive factors (like economic limitations, environmental conditions, etc.). As a result, assistance is becoming increasingly important to improve system efficacy and reduce unplanned downtime. Product support, also known as after-sales service, refers to the various types of assistance and support that suppliers give to consumers to help them get the most out of their goods. Installation, installation, and repair facilities, as well as the availability of replacement parts, are examples of traditional technological types of support (Ghodrati, 2005).

2.5.2.8 Lack of communication between contractor, clients (owners) and users

Faulty construction/poor workmanship factors can cause maintenance problems during the building's service life; lack of supervision during the construction period, failure to monitor the work adequately, failure to understand and follow exactly the specifications/drawings, failure to replace the defective work, lack of skilled labour, and over-emphasis on the need for quantity rather than quality (Ha, 2016).

Inherent design issues, such as complicated specifications, incorrect design decisions, and incorrect estimation of load conditions under which the building will be exposed and subjected, will affect potential building maintenance. Failure of a building

part will result from the use of unsuitable materials due to a lack of knowledge of their properties and the use of structural members that are too small. Faulty construction will hasten the degradation of the building structure (Okosun & Olagunju, 2017)

2.6 Consequences of Facilities-Related Issues in High-Rise Residential Building to high-rise residential stakeholders'

This segment addresses cases in which stakeholders' frustration has been identified as a result of facility-related problems in high-rise residential buildings. Significant lessons can be taken from the events and survey articles below, in which unexpected circumstances due to construction defects, design defects, and poor facilities management combine to cause severe frustration among high-rise residential building stakeholders.

Facilities-related issues in high-rise residential buildings, such as defects from poor workmanship and low material quality, design defects such as not adhering to standards and faulty design, limited time and expense, external climate, and poor facilities management, have several implications for high-rise stakeholders. In Malaysia, there are far too many unabated defects in new buildings, with the effects of high maintenance costs, low customer satisfaction, danger to occupants, and buildings that cannot work properly (Hang, 2016). The consequences illustrated in this study are shows in the following sections.

2.6.1 Reduce housing quality sustainability

Land movement or apparent design flaws, as well as improperly managed internal features such as missing taps or mouldy walls, are both factors to consider. This is particularly significant in the secondary market, as recently constructed assets are less likely to display signs of wear and tear. Much as property valuation and sustainability can be impacted by upkeep, the expectation of consistency provided by certain developers can offer peace of mind that demands a premium (Property, 2017).

2.6.2 Building dampness related to health problems to the occupant

Building dampness promotes microbial growth in the form of bacteria, fungi, and mould. These biologicals have been linked to the development of asthma, asthma attacks, allergic reactions, and other upper respiratory problems such as bronchitis,

cough, infection, and rhinitis. High indoor humidity can facilitate the spread of dust mites, which are a recognised allergen with respiratory consequences (PureAir, 2017).

2.6.3 Financial impacts for managing the rectification process

Building defects may also cause major issues for future owners who take on responsibility for a building without having completed the necessary work. This is because there will be no contract argument unless the new owner was granted separate rights or a guarantee. If this case happens and the resulting owner has no contractual recourse, it begs the question of whether the owner will reclaim the costs and damages in any other manner, such as tort. The basic concept is that damage to a building that is caused by a fault in its construction is not recoverable, and affecting the management body (Out-Law, 2011).

2.6.4 Defect rework affects the performance and productivity of construction projects

In construction projects, rework is described as the unnecessary effort of redoing a process or operation that was implemented incorrectly the first time. Rework in building projects can be caused by several causes, including mistakes, omissions, delays, adjustments, poor communication, and poor coordination. Rework can harm efficiency and productivity, as well as profit margins. Previous research, for example, found that rework costs could add up to 10% of overall project costs (Ekambaram, 2006).

2.6.5 The negative effect of consumer complaints on social media

If a dissatisfied user vents on social media, it is typically an indication that something was lacking in the customer service process. They did not obtain the desired response from the related party, and an answer to their dilemma remained elusive. This “escalation from frustration” is the source of viral media grievances, which can be extremely detrimental to a property's online image. As a result, finding and responding to feedback on social media should be a top priority for all customer service staff. Furthermore, it has a significant effect on the developer's credibility as well as the property's image (Gnadt, 2020).

2.6.6 Construction defects exert significant impacts on project performance, time and cost increase

The defects and design elements are important for achieving a high-performance tall building: site context, landscape, structure and material usage, energy consumption, water use, ecological balance, and community growth. Because of the numerous aspects of architecture for tall buildings, which have immense sizes as a building type, the amount of knowledge that directs the design is often quite complicated and exchanged by experts from various disciplines. Furthermore, design factors may take various forms, including conceptual, schematic, physical, economic, environmental, and socio-cultural. This necessitates intelligent and integrated architecture, which holds the key to high-performance buildings (Navaei, 2015).

2.6.7 Degradation of the various building components caused by defects may eventually lead to wastes of resources and energy

The lack of focus from designers in the building process, and the buildability of design purpose are some causes of building waste. Too many materials and sizes can lead, because of the minimum order or production specifications of suppliers, to the ordering of large volume materials in the construction project. In actual building, this material is not applicable and can remain on-site as waste. Designs that do not have standard sizes may cause waste to match the shape or size of an installed area. Faulty details and improvements are also a result of the lack of awareness of the Standard Size of real constructional materials on the market and the production of waste in the design process (Sepa, 2017).

2.6.8 Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment

As the number of complaints about the quality of service in the apartments rises, the emphasis on the essential qualities of service that lead to satisfaction is more and more crucial. Today people begin to understand that good real estate management in high-end living conditions can preserve the value of their property and maintain high investment profits (Mat Noor, et al., 2021).

The continuing growth of high-rise residential buildings shows that an efficient ownership and management system is essential to provide high-rise inhabitants of that

country with a quality living experience. The new real estate management activity in Malaysia, however, raises several problems affecting all the concerned parties: developers, property management agents, owners and residents of high-rise residential complexes (Isa, 2001).

2.6.9 Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being

It is critical to have the requisite facilities for human living in a house. However, most high-rise building unit owners do not understand the value of good property management until their buildings and common areas have deteriorated. As a result, it is critical to ensure that proper maintenance is provided to build and maintain a safe living atmosphere for high-rise households. Residents are much more satisfied with the amenities in the newer condominium (Kong , et al., 2018).

2.6.10 Expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost

It is well known that design quality is important to the success of construction or manufacturing processes, and relatively minor design changes can often have significant consequences for production cost and effectiveness as well as the utility, buildability and marketability of the product particularly in the creation of high-speed residential land (Azlan, 2009).

2.7 Case Study

The case study below highlights cases involving the consequences of facility-related issues in high-rise residential buildings.

2.7.1 Case Study 1: Man Smashes His KL Luxury Condo After Paying over RM2 Million but Gets Low-Quality Unit

On April 12, 2019, a man went viral after filming a series of videos complaining about the quality of his recently purchased luxury condominium near KLCC, which is priced at more than RM 2 million. He bemoaned the bad workmanship of the exorbitantly priced device and even began smashing the tiles with a hammer. He complained about the shortcomings in his unit, emphasising that each unit must be the same.

However, although other residents may opt to go to court, he chooses to make a larger statement. He took matters into his own hands by spray painting the cracked and defective marble tiles red. On a vendetta against the developers, the owners' grievances spread beyond the tiles to the so-called "smart" doors, which work with the touch of a finger. Netizens who posted on the video seemed to be on the same page as the enraged homeowner. The enraged homeowner also drew parallels between the KLCC condo unit and other condo units. It's understandable for someone to be upset when they receive something that isn't worth their money, especially when they've spent millions on it.

The problems were caused by the poor quality of the materials used, design defects, and the negligence of the property developers and contractor, all of which put in jeopardy the developers' credibility among other potential purchasers.

2.7.2 Case Study 2: Taman Desa condo collapse not caused by rain or landslide

On February 14, 2020, the partial collapse of an under-construction condominium in Taman Desa. According to Federal Territories Minister Khalid Samad, preliminary reports from authorities confirmed this. He also said that there is a good chance that the structure collapsed because it was insufficiently strong. “As the slab gave way and fell from the sixth to the first floor, the supports, pillars, or columns could not have met specifications,” he said, dismissing speculation that it was caused by heavy rain on the day of the incident. He also claimed that the project's contractors had employed their civil structure consultant to survey the site. Investigations were also being conducted by the Department of Occupational Safety and Health (DOSH).

Kuala Lumpur Mayor Datuk Nor Hisham Ahmad Dahlan immediately issued a stop-work order, and for the time being, only parties interested in the investigation are permitted on the site. Khalid said that “the problem is one of compliance and checks,” and that while the contractor and DOSH were responsible for monitoring and enforcing good practices during the construction process, City Hall was responsible for violations of approved building designs. At the end of the day, the contractor does not need to cut corners or take shortcuts. Such events benefit no one. Contractors must adhere to the specifications for planning, design, designing, and construction, as well as the architect's duty to study the construction plan property in every aspect before submitting it to the contactor.

2.7.3 Case Study 3: Most High-rises in Malaysia Are Poorly Managed

According to a survey conducted by the Ministry of Urban Wellbeing, Housing, and Local Government, 69 per cent of apartments and condominiums nationally received one or two stars, or fewer, in an assessment of property management quality in 2015. This represents a decrease from 2014 when 65 per cent were rated below par. Meanwhile, just 1%, or approximately 74 of Peninsular Malaysia's 7,325 high-rise residential properties, earned the highest five-star mark. According to Mohammad Ridzwan Abidin, the ministry's urban service division under-secretary, approximately 70% of residents are only aware of what needs to be done in managing their property and have yet to understand the advantages of cooperating and building a better living culture. According to Ridzwan, one big issue is the reluctance of certain condominium owners to pay maintenance fees. Other issues include issues with compliance and construction defects.

The survey is part of the ministry's annual Strata Scheme Management Quality Evaluation, or 'Star Rating,' which rates management companies or joint management bodies of condominiums and apartments. The ranking is based on how well these organisations perform in seven areas: administration, risk management, protection, maintenance, fund collection, legal enforcement, and community support. Ridzwan reported that six million of the city's 20 million inhabitants currently live in stratified buildings such as condominiums and apartments, with the number projected to grow in the future due to urbanisation. According to the ministry official, people's mindsets should be modified to promote civic-minded communities within high-rise buildings.

2.8 Chapter Summary

This chapter consists of various type of literature review to support the objectives of this research which is to identify the facilities-related issues in high-rise residential building, to identify factors that lead to facilities-related issues in high-rise residential building and to identify consequences of facilities-related issues in high-rise residential to purchasers, property agents and stakeholders. Moreover, it also explains the significant relationship between facilities-related issues, factors and consequences in high-rise residential

CHAPTER 3

METHODOLOGY AND WORK PLAN

3.1 Introduction

This chapter covers the conduct of research, data collecting, sampling design, data collection and analysis. The research approach attempts to achieve the goals and objectives of the research.

3.2 Research Methodology

Research Methodology is a comprehensive means of addressing the dilemma of research. There are several types of testing techniques that can be used to objectively study research. Creswell (2014) had defined analysis as a systematic and comprehensive examination of a subject to understand more about the process that is a way to do things. It may be achieved in a quantitative, qualitative or mixed-method. The first phase of the study was to identify related journal articles, book information, prior research papers, conference proceedings from open databases and web pages concerning the facilities-related issues in high-rise residential building.

Distributing questionnaires uses part of the quantitative process. The questionnaire is a well-established instrument in social science study to collect information on participant social traits, current and past actions, behavioural expectations or behaviours and their views and motives for action on the issue under investigation (Diane Kelly, 2006). This usually involves data collection strategies in which everyone concerned was questioned in a predetermined sequence to answer the same questions. It is the most simple and reliable approaches to gather the data required since it was developed to collect the data and knowledge needed to accomplish this research purpose. Research is a method of gathering and reviewing knowledge to deepen comprehension of a problem or issues (Creswell, 2014).

It consists in essence of 3 key sequential steps as a question occurs, data are gathered to answer the question and an answer to the question is given. Furthermore, analysis is also a method of refining or abandoning arguments for some other claims that have been better justified (Creswell, 2014). This research is performed using quantitative and qualitative research approaches as discussed above. In terms of

quantitative analysis, data are gathered by surveys to better evaluate and view data by using the characteristics inherent in them, such as tables and bar charts. Fundamental applications such as Microsoft Excel and SSPS used for data analysis and ranking of variables. (include Data analysis was conducted using the following tests including a) Cronbach's Alpha and b) Correlation Coefficient and c) Frequency Analysis)

3.2.1 Literature Review

The literature review is a survey on a specific topic to present the knowledge related to the research topic. The literature review could help the other researcher on how the previous study been done.

At the end of the research, each research has its objective and goals. A comprehensive summary of all previous research into a similar subject of research can be found in the literature review.

3.2.2 Quantitative Method

In general, this method is taken as numbers and its analysis involves counting or quantifying which leads to a conclusion. There will be large data sets involved and statistically rigorous methods used to analyse them. It usually offers a macro view because it includes large samples. For this analysis, a quantitative approach was chosen to track the relationship between the variables. The explanation for this approach is that more sample size can be obtained, so testing is more accurate. In addition to this, the system is also ideal for the collection of data from every facilities firm in this sector. The goal is to identify characteristics, count them, and build mathematical models to try to understand what is observed.

3.2.2.1 Instrument Design

This study questionnaire was created in response to facilities-related issues in high-rise residential buildings, which included construction defects, design defect, and poor facilities management. The questionnaire was distributed to a sample of at least 46 high-rise residential residents/purchaser, at least 29 housing developers and at least 18 contractor/architects. The survey also consists of the analysis of the consequences that arise from the facilities-related issues in high-rise residential building management. The respondents were expected to respond to items based on a five-point Likert scale;

these items inquired about the respondent's level of satisfaction. Figure 3.6 shows the scale's range: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral (neither pleased nor dissatisfied), 4 = Agree, and 5 = Strongly Agree. 2, The Statistical Package for Social Sciences (SPSS) version 12 was used to analyse the results.

Figure 3. 6 Questionnaire Scales' Range

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(1)	(2)	(3)	(4)	(5)

A Likert scale assumes that an attitude's strength/intensity is linear, i.e., on a spectrum from strongly agree to strongly disagree and that attitudes can be measured. For example, each of the five answers could be given a numerical value that would be used to determine the attitude under consideration (Diane Kelly, 2006).

The survey was conducted in 4 sections, using it to determine the frequently identified facility-related issue at high-rise residential building. As well as the factors and consequences of the facility-related problems in the development of high-rise residential buildings that have affected stakeholder expectations of high-rise residential buildings. The content of the questionnaire is as follows:

a) Section A - This segment describes details on the profile of respondents, such as the level of industry experience, years of involvement in high-rise residential buildings. The role and educational history of the respondent is also taken into account to ensure that they have sufficient experience in the field.
b) Section B – This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed).
c) Section C - This section is meant to assess the limiting factor to facilities-related issues in high-rise residential buildings. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed).
d) Section D – This section specifies the consequences of the problems related to the facilities in residential high-rise buildings. It was also demanded that a

LIKERTY scale of 1 to 5 be calculated (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed)

3.2.3 Qualitative Method

The qualitative method offers a complex description of how people learn about the issues. It provides information on the "human side of a subject that can often be contrasting to peoples' behaviour, convictions, opinions, emotions and relations. It also works in identifying intangible aspects in topics that may not be easily evident, such as social standards, status, gender role, knowledge and other roles. When this method is implemented, the research helps to understand the complex reality of the common qualitative research method is observation, in-depth interview and focus group. Each method here is especially suitable for collecting certain data types (Creswell, 2012). The aim is to provide a complete and detailed overview of the study.

3.2.3.1 Structure of Experiences

In the study, the researcher will use the qualitative method of data collection. The primary data interviewed will be used to interview people working in the property management sector. Five (5) interviewees will be interviewed virtually and will have experience in the property management industry for at least 5 years.

The expertise was acquired by the study of facilities in high-rise residential buildings. This discovery is being made in high-rise buildings across Malaysia, also, knowledgeable and experienced people in the property management sector were collected to provide suitable suggestions to meet expectations in the market for further improvement.

Respondents were asked questions based on the study objectives to gain more detailed information and answers from the Property Management perspective and to develop a better report.

i. Based on your observation from the property managing agent aspect what are the facilities-related issues in high-rise residential building are frequently found in high-rise residential building?
ii. Based on your experience as a property managing agent what caused defects in high-rise residential buildings?

iii. What the consequences to the building and the stakeholder of the building if there is no action taken over the facilities-related issues in a high-rise building?

iv. From the point of view of the property manager, what is the significant relationship between facilities-related issues, factors and consequences in high-rise residential buildings?

3.3 Sampling

The survey will be used to gather necessary data for this study since it is a crucial instrument for primary data collection and the data collected will be used for this analysis. The targets are individuals working in the high-rise building industry and property management. The sample size is not determined under a fixed thumb law. However, some researchers use the sample size to maintain a rule of thumb.

There is no certain rule of thumb to determine the size of the sample. However, some researchers do support a thumb rule when using the sample size. For example, in the regression analysis, several researchers suggest there should be at least 10 observations per variable. If we use three independent variables, the simple rule will be to have a minimum sample size of 30. Some researchers adopt a mathematical method to determine the size of the sample. (Statistic Solutions , 2021).

Determining sample sizes necessitates consideration of both resource and statistical issues. When the population is high, researchers usually consider 100 participants to be the required sample size (Cohen, et al., 2007).

This study will have at least 100 sample, the selected sampling frame is 1769 high-rise residential building (Abd-Wahab, et al., 2015), 187 property consultant/managing companies (CIDB, 2020) 1120 housing developers and 703 construction/architects' firms (REHDA, 2021). The sample collection is based on the stratified method of sampling. The distribution of the sample is thus mentioned in Table 3.1 within each of the four primary sampling frames. The survey was conducted in Google and all interviewees were told to react further.

Table 3. 1 Sample Size at least 100

Role	Resident/ purchaser	Property Agent	Housing Developer	Contractor/ Architect	Total
Number of people in stratum	1769	187	1120	703	3779
Strata sample size	47	5	29	19	100

The size of the strata sample is mainly resident/purchaser calculated as (1769/3779) x 100 = 47. The same approach is used for classes of roles. In other words, at least 29 housing developers will be randomly selected from the entire population, at least 19 contractor/architect will also be randomly selected from the population, and 5 property managing agent will also be selected.

The sample size for a property management company is small, in a quantative survey research, 20 to 50 samples should be identified for each main sub-group in the population (Cohen, et al., 2007). As such the property management agent respondents are selected based on the study parameters by getting the semi-structured interview, where out of five (5) samples from the property management agent with mixed from of properties experience. This form of study can be used to discover any patterns in thinking and opinion.

Sample sizes of qualitative studies are typically small to accommodate the depth of case-oriented learning that is central to this style of inquiry (Vasileiou, et al., 2018). As a result, purposive sampling – as opposed to chance to sample used in quantitative analysis, picks cases that are ‘information-rich (Patton , 2000)

3.3.1 Ethical Practices in Conducting Research

It is important to engage in ethical practice when undertaking research. Since analysis includes gathering data from individuals and people (Punch, 2006), writing on this ethical subject is necessary to explain a study and is a significant topic in the research format.

Researchers need to protect study participants to develop trust and promote research credibility. A dynamic area of practice ethics is followed by a variety of static

standards, such as those from professional societies or compliance with guidelines from administrative oversight bodies. Researchers' position in intercultural contexts and issues of personal privacy through online data collection are evident in issues such as personal correspondence, accuracy and legitimacy of the research report (Hay, 2006). All phases of the study process tend to concern the compilation, reporting and dissemination of results more directly than any other type of research (Creswell, 2012).

3.3.2 Reliability

Reliability means that there are no differences in results if the research is to be repeated (Collis & Hussey, 2014). Reliability is the ability of a measuring instrument to elicit the same response time after time in the same situation. Data reliability concerns the data source and the recognition of the role occupied by the study subject in the completion of the questionnaire (Oppenheim, 2000) .

It was therefore critically necessary that only the respondents' concerned high-rise residential building stakeholders had completed the questionnaire. It was also imperative that those with ample expertise and experience in high-rise residential construction be interviewed. This analysis aims to restrict the scope and scope of the study in such a way that the findings will be robust and repeatable in the sense of high-rise residential buildings that make up the results of the survey.

However, the low response rate does, in certain ways, restrict the reliability of the study, although the total number of responses was statistically significant. However, it was expected that the combination of the first survey (the questionnaire) and the second survey (the interviews) would restrict any threat to the reliability of the sample.

As per (Komu, 2008) that the scientific rigour is not determined by the sample size in research, but by the accuracy, the systematic nature and fitness for the purposes concerned.

3.3.3 Validity

Validity is the ability to generalise results beyond a sample, measurement accuracy and proper use of methods (Neuman, 2003). (Creswell, 2003) defines 8 methods to verify the accuracy of the study results, including:

- Triangulation of various information sources.
- To assess the exactness of the qualitative result, use participants' checks.

- To express these results, we use a rich thick definition.
- The analysis clarifies the preconceptions of the researcher.
- Presenting negative or inconsistent facts contrary to the topics.
- Extended time spent on the ground.
- To maximise transparency, the use of peer debriefing.
- To revisit the whole project with everlasting auditors.

Furthermore, the researcher may have followed the procedure outlined above to ensure that the results correctly represent their goals. As indicated in the study context, the review findings have been validated using techniques of an interview with topic experts. This study can also be considered legitimate as it was structured to quantify what was proposed to be measured in accordance with research objectives (Funmilayo, 2013).

3.4 Chapter Summary

This chapter will clarify the use of quantitative and qualitative approaches in research work by the researcher. In the first phase, data will be obtained by questionnaires from at least ninety-five respondents from construction/architects, housing developers and high-rise residential building purchasers. The second phase, which is the interview method, will be used to collect relevant information based on the objectives of people's experience in the field of property management. Five (5) respondents will be interviewed virtually to gather various types of findings based on their job experience and knowledge of the property management industry. The results will be interpreted and generated in chapter 4.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This section of the study provides the results from the analysis of the questionnaires and interview findings. The first part of the results and findings section highlights response from residents/purchaser, contractor/main contractor and housing developer. It begins by summarising the responses according to the profile of the respondent. Respondents' profile includes the presentation of results on the extent of common facilities-related issues identified by high-rise residential building stakeholders, the analysis of their factors leading to such facilities-related issues, and the consequences of facilities-related issues for high-rise residential buildings. Research participants are referred to as high-level residential building stakeholders and these terms will be used interchangeably in this chapter.

The second part of the analysis of the responses received through a semi-structural interview with property managers with at least 5 years of experience in managing high-rise residential buildings. Besides, the researcher will use secondary data, which are existing data, such as articles, relevant books and other types of references that the researcher may use for research purposes.

4.2 Summary of respondents to the survey

The key categories of participants in the survey have been summarised in this section. The participants were chosen randomly from the stakeholders for high-rise buildings. The study aimed to target stakeholders in the high-rise buildings sector to represent noticeable facilities-related problems as opposed to problems related to absorption and/or maintenance of residential buildings.

4.2.1 Questionaries survey

Data from high-rise residential building stakeholders in Malaysia have been collected for this report. Questionnaires distributed to high-level residential building stakeholders, 101 were returned, with 100 per cent returned, primarily 52 from high-level residence buyers, 29 developers and 20 construction contractors and architects.

The number of questionnaires distributed collected is shown in Table 4.1. This indicates that high-level residential building residents/purchasers got the largest number of questionnaires.

Table 4. 1 Analysis of surveys/questionnaires received

Role	Sample required	Questionnaire received
Resident/purchaser	47	52
Housing Developer	29	29
Contractor/Architect	19	20

For this context, there are three main parts (A to D) in the semi-structured survey (the result provided in this chapter): the respondent profile, facilities-related issues, factors that lead to facilities-related issues and consequences from the facilities-related issues. The questions were focused primarily on a five-point Likert scale, from one point (Strongly Disagree) to 5 (Strongly Agree), which allowed participants to comment on questions related to facilities in the residential high-rise sector.

A further examination of the returned questionnaires was carried out to identify the facilities-related issues in high-rise residential buildings in response, this is displayed in the next sections.

4.2.2 Semi-structure interview

The researcher will also use a qualitative approach to gather information from the property manager via a semi-structured interview. Five samples of the property manager of high-rise buildings with at least five years' experience were given a semi-structural interview. The interview would assess their perspective on the issues.

Table 4.2 displays the respondents' details and their experience; the data have been obtained virtually. Besides, the researcher will use the secondary data as data that have existed which is articles, relevant books and other types of references that the researcher may use for research work purposes.

Table 4. 2 The respondents' details and their experience

No	Interviewee's Name	Position	Working Experience
1.	Yogeshwaran Manimaran	Building Manager	5.5 years
2.	Shafiq Hakim Chuni	Building Manager	5 years
3.	Christina Raman	Area Manager	6 years
4.	George Fernandez	Area Manager	7 years
5.	Velayutham Seenivasagam	Area Manager	8 years

4.3 Reliability Test

The accuracy of the measure was tested to determine its reliability. Consistency ensures dependability on the coefficient of dependability; the variable's Cronbach's alpha was calculated to determine data reliability. In general, 0.70 is considered an appropriate amount of Cronbach's alpha. Tables 4.3, table 4.4, table 4.5, table 4.6, table 4.7 and table 4.8 display the Cronbach's alpha determined for each survey data collection.

This is a method for comparing the internal consistent score of one variable to the cumulative scores of the other variables. According to (De Vaus, 2004) variables with a Corrected Item-Total Correlation value, less than 0.30 should be excluded; however, since all variables had a Corrected Item-Total Correlation value greater than 0.30, no variables were removed.

a) Section B – Commonly reported facilities-related issues in high-rise residential building tabulated in the table below.

Table 4. 3 Reliability statistics of data for variable Part 1: Construction Defects

Reliability Statistics

Cronbach's Alpha	N of items
.962	10

Table 4. 4 Reliability statistics of data for variable Part 2: Design Defects

Reliability Statistics

Cronbach's Alpha	N of items
.964	8

Table 4. 5 Reliability statistics for data for variable Part 3: Facilities Management

Reliability Statistics

Cronbach's Alpha	N of items
.973	13

b) Section C - Factors that lead to facilities-related issues in high-rise residential building tabulated in the table below.

Table 4. 6 Reliability statistics for data variable Part 1: Construction Faults

Reliability Statistics

Cronbach's Alpha	N of items
.958	7

Table 4. 7 Reliability statistics for data variable Part 2: Poor Management

Reliability Statistics

Cronbach's Alpha	N of items
.969	8

c) Section D – Consequences from the facilities-related issues

Table 4. 8 Reliability statistics for data variable section D: Consequences from the facilities-related issues.

Reliability Statistics

Cronbach's Alpha	N of items
.978	10

As a result of the measured values, the reliability of survey alpha is too high, which may imply that certain items are redundant since they measure the same query but in a different guise. A high alpha value (> 0.90) can indicate redundancy and indicate that the test duration should be reduced.

4.4 Demographic Information for research participants (Section A)

This section of the questionnaire was structured to collect demographic information from research participants. Section A-Respondent Profile is classified as part of the questionnaire and included seven relevant questions (see Appendix 1). The questions covered: the role of the high-rise residential building industry, the type of high-rise building survey participants involved, the years in which you've been involved/staying with high-rise buildings, and the educational background.

These 6 questions are shown in the first column of Table 4.9, which summarises the answers from the research participants. The purpose of the questions here is to understand the context of the research participants, which will enable a better understanding of the essence of their responses to the upcoming sections of the questionnaire.

The response to the first question indicates that the majority of research participants are residents/purchasers of high-rise residential buildings (51%). As the focus population for this study is on facilities-related issues in high-rise residential buildings, the occupant's result is consistent with the objective of this analysis.

The second question in the section allows the participants to show the form of high-rise building participants involved. This question provides an understanding of the type of home-related inequalities in the existence and types of facility-related issues. The results show that the majority of participants (27%) fall to the condominium, apartment and flat, the same amount of response received from the occupants of the condominium (27%).18% of the participants are apartment occupants, while 3 per cent of the participants are living in flats.

In response to the question on how long respondents have been involved with high-rise buildings, the result indicates that 36% of participants have been involved in high-rise residential for more than 10 years, followed by participants who stated that they have been involved in high-rise residential buildings for 7 years – 10 years is 33%. 19% of the participants have been involved in high-rise residential buildings, while 13% have been involved for less than 3 years.

The respondents also are required to indicate their educational background, the results show that 59% of the respondents possess bachelor degree qualifications, 23% respondents possess diploma qualification while 14% possess master degree qualification and 3% possess PhD qualification, 3% possess SPM and 1% of the respondents possess certification qualification. The majority of respondents do have diploma and degree qualification, hence it indicated that most of them are from good knowledge background and ability to understand the research needs.

Respondents are also expected to indicate their educational background, the results show that 59% of respondents have Bachelor's degree qualifications, 23% have Bachelor's degree qualifications, 14% have Master's degree qualifications while 3% have PhD qualifications, 3% have SPM qualifications and 1% of respondents have

certification qualification. The majority of respondents have Diploma and Graduate Qualifications, which means that most of them have a strong knowledge experience and are capable of understanding the study needs.

Table 4. 9 Frequency and percentage demographic details (Section A)

Respondents Profile		Frequency	Percentage (%)
Role in the high-rise residential building	Resident/purchaser	52	51
	Housing Developer	29	29
	Contractor/Architect	20	20
Type of high-rise building respondents is involved.	Condominium	27	27
	Condominium, Apartment & Flat	27	27
	Condominium & Apartment	26	26
	Apartment	18	18
	Flat	3	3
Years of respondents have been involved with high-rise buildings.	Less than 3 years	13	13
	3 years to 6 years	19	19
	7 years to 10 years	33	33
	More than 10 years	36	36
Education Background	SPM	3	3
	Diploma	23	23
	Bachelor Degree	57	56
	Master Degree	14	14
	PhD	3	3
	Others	1	1

Demographic details summarised in Table 4.9 shows that the survey covered the research target population. The findings tend to show that the respondents chosen for this analysis are reliable for the study of high-rise residential building stakeholders, the level of expectations, the level of satisfaction and the point of view of high-rise residential buildings. The findings in this section have generally been consistent with

the study objective. In addition, the numerous questions posed provided the basis on which successive parts could be constructed and understood.

4.5 Facilities-related issues (Section B, Section C & Section D)

This segment highlights a list of the most commonly reported facility-related problems in high-rise residential buildings related to facility management. The purpose of this section is to detect common defects and the extent of defects in high-rise residential buildings. By knowing these issues, further analyses can be carried out to determine the relationship between the number and extent of defects and the level of satisfaction of high-level residential stakeholders.

4.5.1 Reliability Analysis of Section B Facilities-related issues

The respondent was asked to demonstrate what effect a count of 1 to 5 may have based on the LIKERTY scale (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed). Three parts were used in these sections (see Appendix 1). Part 1: Construction Defects, Part 2: Design Defects and Part 3: Facilities Management Issues. Table 4.10 displays the statistical results for reliability analysis for this section's analysis.

Table 4. 10 Section B Facilities-related issues Statistical result for reliability analysis

Facilities-related issues	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Part 1 –Defect				
Faulty door knobs/ door closers	34.34	60.726	.837	.957
Cracking in external wall	34.25	62.308	.807	.959
Dampness at concrete wall (Fungi and Small Plant Attack)	34.34	60.626	.908	.955
Inter-floor leaking /leakage of pipe	34.27	62.178	.684	.964

Internal wall - Inadequate resistance to the passage of sound	34.44	62.268	.714	.962
Uneven floor/ wall finishing	34.26	60.113	.901	.955
Hollow/Broken floor & wall tiles	34.30	60.231	.931	.954
Faulty gasket between the window frame and the glass. (rain water seeping through window frame)	34.37	60.294	.813	.958
Faulty sanitary installation	34.42	60.145	.885	.956
Exposed wires & Rusty pipes	34.55	59.410	.839	.957
Part 2 - Poor Design				
Water seepage from parking slab.	26.51	39.152	.781	.963
Failed water proofing at the rooftop.	26.62	37.077	.915	.956
Poor floor trap system; small floor trap piping and cause flood during raining.	26.70	37.951	.852	.959
Poor drainage system; uneven scupper drains at multi-level parking.	26.57	37.347	.896	.957
Expose airwalls cause multi-level building floor flood during rain.	26.63	37.474	.896	.957
Poor rainwater harvesting system at multilevel parking area/corridors- cause parking/corridor flood during the raining time.	26.71	37.567	.845	.960

Faulty sewerage pipe ventilation system, cause foul smells inside the unit.	26.62	37.597	.866	.959
Faulty in lighting arrestor system.	26.59	38.044	.823	.961
Part 3 Poor facilities management.				
Common area cleaning (parking, corridor, walk way, common toilets, refuse room & etc.)	44.93	110.725	.883	.883
Multi-level parking lot management (blind spot management/no secure parking for motorcycles)	44.96	110.858	.857	.857
Poor Safety and security system (CCTV/Guard inefficiency/Fire Fighting system)	44.99	111.610	.776	.776
Refuse room maintenance/Rubbish disposal management.	44.97	110.569	.850	.850
Lacking in monitoring energy consumption.	44.92	112.714	.790	.790
Less Facilities Provided. (Safety box/Non-Covered walkway)	45.00	110.480	.886	.886
Frequently breakdown lifts.	44.89	112.478	.766	.766
Unplanned water disruption and poor water quality (cloudy & muddy water supply)	45.10	108.450	.904	.904
Poor communication (late response email & phone calls/ not updated notice board)	45.05	109.168	.876	.876
Complicated access card system	45.05	110.968	.891	.891

Lack facilities maintenance. (swimming pools/gym/sport hall)	45.08	108.494	.887	.887
Poor lighting at multi-level parking.	45.08	109.274	.912	.912
No important is given to fire drill exercises.	44.89	113.138	.724	.724

4.5.2 Reliability Analysis of Section C Factors that lead to facilities-related issues

The respondent was asked to demonstrate what effect a count of 1 to 5 may have based on the LIKERTY scale (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed). Two parts were used in these sections (see Appendix 1). Section C Part 1: Construction Faults and Part 2: Poor Management. Table 4.11 displays the statistical results for reliability analysis for this section's analysis.

Table 4. 11 Section C Factors that lead to facilities-related issues Statistical result for reliability analysis

Factors that lead to facilities-related issues	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Part 1 – Factor to facilities-related issues in high-rise residential buildings related to defect and poor design				
Defects in construction material. (maintenance and quality)	23.08	26.034	.787	.957
Lack of training / educations. (training about design and constructions)	23.11	25.578	.879	.950
Lack of supervision by site engineer during the inspection.	23.25	24.628	.874	.950

Specifications & Structural. (misunderstandings of design concept between parties; architects, developers & engineers)	23.14	25.041	.905	.948
Less important given to ventilation & waterproofing work.	23.20	25.020	.879	.950
Climatic Condition/Soil impact.	23.24	25.303	.818	.955
Working condition and workmanship	23.23	25.078	.849	.952
Part 2 - Factor to facilities-related issues in high-rise residential buildings related to poor management.				
Poor quality control and lack of building maintenance standard procedures.	26.48	36.472	.818	.968
Lack/ Unavailability of training and skills of the maintenance team.	26.52	35.512	.913	.963
Defective materials used for maintenance work.	26.50	35.872	.813	.969
Overlooked site conditions.	26.42	35.485	.907	.964
Insufficient funds to maintain the buildings.	26.48	35.332	.876	.965
Non response to maintenance request. (resident complaints) on timely basis	26.50	35.292	.905	.964
Non-availability of replacement parts and components in the market. (usually for developer's customize materials)	26.50	35.392	.898	.964

Lack of communication between contractor, clients (owners) and users.	26.48	35.332	.899	.964

4.5.3 Reliability Analysis of Section D Consequences from the facilities-related issues.

The respondent was asked to demonstrate what effect a count of 1 to 5 may have based on the LIKERTY scale (1-strongly disagreed, 2-disagreed, 3-neutral, 4-agreed & 5-strongly agreed), see Appendix 1. Table 4.12 displays the statistical results for reliability analysis for this section's analysis.

Table 4. 12 Section D Consequences from the facilities-related issues Statistical result for reliability analysis

Consequences from the problems related to the facilities	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Reduce housing quality and affects the building's sustainability	34.73	61.378	.916	.974
Building dampness and mould cause respiratory and asthma-related health problems to the occupant.	34.82	61.948	.806	.978
Financial impacts for occupants (owners, investors and tenants) and committees managing the rectification process.	34.70	61.711	.871	.976
Defect rework creates non-value adding activity which affects the performance and	34.76	61.463	.898	.975

productivity in construction projects.				
The negative effect of consumer complaints on future customers has increased with the growing use of social media, including customer complaint media.	34.67	61.942	.913	.975
Construction defects can exert significant impacts on project performance, time and cost increase.	34.80	61.700	.878	.976
Degradation of the various building components caused by defects may eventually lead to wastes of resources and energy.	34.65	61.489	.922	.974
Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment.	34.72	61.302	.872	.976
Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being.	34.71	61.967	.904	.975

Expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost.	34.76	61.443	.947	.974

4.5.3.1 Significant Relationship Between Facilities-related Issues, Factors and Consequences in High-rise Residential Building.

This study aims to create a significant relationship between facility-related issues, factors, and consequences in high-rise residential buildings. The correlation test will be used to test three aspects of the significance relationships, which are as follows:

a) significance relationship between commonly reported constructions defect, design defect and factors contributed to the defect's issues
b) significance relationship between commonly reported of facilities managements issues and factors contributed to the poor facilities management.
c) significance relationship between factors of facilities-related issues and consequences from the facilities-related issues

The correlation coefficient abbreviated "r," is commonly used to calculate the strength of a relationship and is stated in a range of -1 to +1. A correlation coefficient, r, near -1 or +1, indicated a strong relationship between the variables. The presence of an "r" value close to 0 means that there is little or no relationship between the two variables. Furthermore, a positive correlation or "r" value indicates that the two variables are increasing in the same direction, while a negative correlation or inverse correlation indicates that the two variables are decreasing in the same direction (Yacob, et al., 2019).

4.5.3.2 Significance relationship between commonly reported constructions defect, design defect and factors contributed to the defect's issues

The Spearman correlation coefficient was used in the correlation test to determine the significance of the relationship between commonly reported construction defects, design defects, and factors contributing to the defects. The correlation calculations (using SPSS) the ranking of the relationship between commonly reported construction defects, design defects, and factors contributing to the defects shows in Table 4.13.

As dependent variables, twenty-five (25) variables were defined from the defects and factors that led to the defect.

Table 4. 13 Ranking Significant Relationship (a)

Faculties Related Issues	Correlation Coefficient
Faulty door knobs/ door closers	**.913****
Cracking in external wall	.850**
Dampness at the concrete wall (Fungi and Small Plant Attack)	.866**
Inter-floor leaking /leakage of pipe	.889**
Internal wall - Inadequate resistance to the passage of sound	.904**
Uneven floor/ wall finishing	.864**
Hollow/Broken floor & wall tiles	.898**
Faulty gasket between the window frame and the glass	**.910****
Faulty sanitary installation	.905**
Exposed wires & Rusty pipes	**.913****
Water seepage from parking slab	.808**
Failed water proofing at the rooftop	**.910****
The poor floor trap system	.805**
Poor drainage system	**.910****
Expose airwalls.	.878**
Poor rainwater harvesting system	.831**
Faulty sewerage pipe ventilation system	.845**
Faulty in lighting arrestor system	.845**
Defects in construction material	.774**
Lack of training/educations	.888**
Lack of supervision by site engineer during inspection	.888**
Specifications & Structural	.883**
Less important given to ventilation & waterproofing work	.852**
Climatic Condition/Soil impact	.820**
Working condition and workmanship	.820**

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

According to the correlation table 4.13, there appears to be a strong, positive, and statistically significant correlation between these three variables. The top five (5) defects are faulty door knobs/ door closers, the faulty gasket between the window frame and the glass, exposed wires & rusty pipes, failed water proofing at the rooftop and poor drainage system has positive correlation which means these defects is mostly reported defects and highly factors contribute to building defects.

4.5.3.3 Significance relationship between commonly reported facilities managements issues and factors contributed to the poor facilities management.

In the correlation test, the Spearman correlation coefficient was used to assess the significance of the relationship between commonly reported facilities management and factors contributing to poor facilities management. The ranking of the relationship between widely reported facilities management and factors leading to poor facilities management is shown in Table 4.14.

Twenty-one (21) variables were described as dependent variables from the defects and factors that contributed to the defect.

Table 4. 14 Ranking Significant Relationship (b)

Faculties Related Issues	Correlation Coefficient
Common area cleaning	.849**
Multi-level parking lot management	.848**
Poor Safety and security system	.858**
Refuse room maintenance/Rubbish disposal management.	.798**
Lacking in monitoring energy consumption.	**.864****
Less Facilities Provided	.759**
Frequently breakdown lifts.	.871**
Unplanned water disruption and poor water quality	**.909****
Poor communication	.851**
Complicated access card system	**.909****
Lack facilities maintenance	**.883****
Poor lighting at multi-level parking.	.871**

No important is given to fire drill exercises.	.798**
Poor quality control and lack of building maintenance	.790**
Lack/ Unavailability of training and skills of the maintenance team	.858**
Defective materials used for maintenance work	.792**
Overlooked site conditions	.860**
Insufficient funds to maintain the buildings	.867**
Non-response to maintenance request on a timely basis	.860**
Non-availability of replacement parts and components in the market	**.876****
Lack of communication between contractor, owners and users	.876**

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

According to the correlation table 4.14, these two variables tend to have a solid, positive, and statistically significant correlation. The top five (5) defects are a lack of monitoring energy consumption, unplanned water disruption and poor water quality, a complicated access card system, a lack of facilities maintenance, and a lack of replacement parts and components in the market, all of which have a positive correlation, implying that these defects are often reported as poor facilities management and highly factors contribute to dissatisfaction among high-rise residential stakeholders.

4.5.3.4 Significance relationship between factors of facilities-related issues and consequences from the facilities-related issues

The Spearman correlation coefficient was used in the correlation test to assess the significance of the relationship between factors leading to facility-related issues and the consequences of those factors. Table 4.15 demonstrates the rating of the relationship between commonly documented factors contributing to poor facility management and the consequences of the factors.

From the factors that contributed to the defect and its consequences, twenty-five (25) variables were listed as dependent variables.

Table 4. 15 Ranking Significant Relationship (c)

Faculties Related Issues	Correlation Coefficient
Defects in construction material.	.791**
Lack of training/educations	.888**
Lack of supervision by site engineer during inspection.	.888**
Specifications & Structural	.883**
Less important given to ventilation & waterproofing work	.852**
Climatic Condition/Soil impact.	.820**
Working condition and workmanship	.841**
Poor quality control and lack of building maintenance standard procedure	.834**
Lack/ Unavailability of training and skills of the maintenance team.	.863**
Defective materials used for maintenance work	.856**
Overlooked site conditions	.863**
Insufficient funds to maintain the buildings	.872**
Non-response to maintenance request	.868**
Non-availability of replacement parts and components in the market	.880**
Lack of communication between contractor, owners and users.	.880**
Reduce housing quality and affects the building's sustainability	**.913****
Building dampness and mould cause respiratory and asthma-related health problems to the occupant.	.850**
Financial impacts for occupants (owners, investors and tenants) and committees managing the rectification process.	.866**
Defect rework creates non-value adding activity which affects the performance and productivity in construction projects.	.868**
The negative effect of consumer complaints on future customers has increased with the growing use of social media, including customer complaint media.	.880**

Construction defects can exert significant impacts on project performance, time and cost increase.	.864**
Degradation of the various building components caused by defects may eventually lead to wastes of resources and energy.	**.898****
Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment	**.910****
Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being.	**.905****
Expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost.	**.910****

These three variables have a strong, positive, and statistically significant correlation, according to the correlation table 4.15. The top five (5) defects are reduce housing quality and affect the building's sustainability, degradation of the various building components caused by defects, which may eventually lead to wastes of resources and energy, occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment, failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being and expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost. This which have a positive correlation, meaning that these well-documented factors are leading to poor facility management and the consequences of the factors.

4.6 Frequency Analysis of Independent Variable

A frequency analysis was performed to determine the normal distribution of the data gathered from the selected sample. A frequency distribution graph shows how the research's selected sample of participants reacted to the questions. The frequency distribution graph indicates whether the responses were skewed in one direction or whether they were not properly answered. The answers are not biased if there is a

normal distribution curve (Amaratunga, 2002). A summary of the questions asked and the corresponding responses (frequency and percentages) is provided in Table 4.16.

Table 4. 16. Summary of responses to survey questions

Section B Part 1: Construction Defects			
Statement	Response Options	Frequency	Percentage
1) Faulty door knobs/ door closers	Strongly Disagree	2	2.0
	Disagreed	3	3.0
	Neutral	39	38.6
	Agreed	23	22.8
	Strongly Agreed	34	33.7
2) Cracking in external wall	Strongly Disagree	-	-
	Disagree	3	3.0
	Neutral	37	36.6
	Agree	26	25.7
	Strongly Agree	35	34.7
3) Dampness at the concrete wall (Fungi and Small Plant Attack)	Strongly Disagree	1	1.0
	Disagree	2	2.0
	Neutral	42	41.6
	Agree	24	23.8
	Strongly Agree	32	31.7
4) Inter-floor leaking /leakage of pipe	Strongly Disagree	2	2.0
	Disagree	4	4.0
	Neutral	38	37.6
	Agree	15	14.9
	Strongly Agree	42	41.6
5) Internal wall - Inadequate resistance to the passage of sound	Strongly Disagree	2	2.0
	Disagree	5	5.0
	Neutral	42	41.6
	Agree	21	20.8
	Strongly Agree	31	30.7
6) Uneven floor/ wall finishing	Strongly Disagree	1	1.0
	Disagree	3	3.0

	Neutral	38	37.6
	Agree	21	20.8
	Strongly Agree	38	37.6
7) Hollow/Broken floor & wall tiles	Strongly Disagree	1	1.0
	Disagree	2	2.0
	Neutral	40	39.6
	Agree	24	23.8
	Strongly Agree	34	33.7
8) Faulty gasket between the window frame and the glass. (rain water seeping through window frame)	Strongly Disagree	2	2.0
	Disagree	7	6.9
	Neutral	35	34.7
	Agree	22	21.8
	Strongly Agree	35	34.7
9) Faulty sanitary installation	Strongly Disagree	1	1.0
	Disagree	5	5.0
	Neutral	44	43.6
	Agree	19	18.8
	Strongly Agree	32	31.7
10) Exposed wires & Rusty pipes	Strongly Disagree	4	4.0
	Disagree	6	5.9
	Neutral	45	44.6
	Agree	16	15.8
	Strongly Agree	30	29.7
Section B Part 2: Design Defects			
Statement	Response Options	Frequency	Percentage
1) Water seepage from parking slab.	Strongly Disagree	-	-
	Disagree	3	3.0
	Neutral	39	38.6
	Agree	23	22.8
	Strongly Agree	36	35.6
2) Failed water proofing at the rooftop.	Strongly Disagree	2	2.0
	Disagree	3	3.0
	Neutral	40	39.6

	Agree	24	23.8
	Strongly Agree	32	31.7
3) Poor floor trap system; small floor trap piping and cause flood during raining.	Strongly Disagree	2	2.0
	Disagree	4	4.0
	Neutral	41	40.6
	Agree	27	26.7
	Strongly Agree	27	26.7
4) Poor drainage system; uneven scupper drains at multi-level parking.	Strongly Disagree	2	2.0
	Disagree	3	3.0
	Neutral	36	35.6
	Agree	27	26.7
	Strongly Agree	33	32.7
5) Expose airwalls cause multi-level building floor flood during rain.	Strongly Disagree	2	2.0
	Disagree	2	2.0
	Neutral	42	41.6
	Agree	24	23.8
	Strongly Agree	31	30.7
6) Poor rainwater harvesting system at multilevel parking area/corridors-cause parking/corridor flood during the rainy time.	Strongly Disagree	2	2.0
	Disagree	5	5.0
	Neutral	43	42.6
	Agree	21	20.8
	Strongly Agree	30	29.7
7) Faulty sewerage pipe ventilation system, cause foul smells inside the unit.	Strongly Disagree	2	2.0
	Disagree	4	4.0
	Neutral	37	36.6
	Agree	27	26.7
	Strongly Agree	31	30.7
8) Faulty in lighting arrestor system.	Strongly Disagree	3	3.0
	Disagree	-	-
	Neutral	41	40.6
	Agree	24	23.8
	Strongly Agree	33	32.7
Section B Part 3: Facilities Management Issues			

Statement	Response Options	Frequency	Percentage
1) Common area cleaning (parking, corridor, walk way, common toilets, refuse room & etc.)	Strongly Disagree	2	2.0
	Disagree	1	1.0
	Neutral	43	42.6
	Agree	23	22.8
	Strongly Agree	32	31.7
2) Multi-level parking lot management (blind spot management/no secure parking for motorcycles)	Strongly Disagree	3	3.0
	Disagree	-	-
	Neutral	44	43.6
	Agree	23	22.8
	Strongly Agree	31	30.7
3) Poor Safety and security system (CCTV/Guard's inefficiency/Fire Fighting system)	Strongly Disagree	3	3.0
	Disagree	2	2.0
	Neutral	45	44.6
	Agree	18	17.8
	Strongly Agree	33	32.7
4)Refuse room maintenance/Rubbish disposal management.	Strongly Disagree	2	2.0
	Disagree	4	4.0
	Neutral	41	40.6
	Agree	22	21.8
	Strongly Agree	32	31.7
5) Lacking in monitoring energy consumption.	Strongly Disagree	-	-
	Disagree	5	5.0
	Neutral	41	40.6
	Agree	22	21.8
	Strongly Agree	33	32.7
6) Less Facilities Provided. (Safety box/Non-Covered walkway)	Strongly Disagree	3	3.0
	Disagree	2	2.0
	Neutral	40	39.6
	Agree	29	28.7
	Strongly Agree	27	26.7
7) Frequently breakdown lifts.	Strongly Disagree	3	3.0
	Disagree	-	-

	Neutral	40	39.6
	Agree	24	23.8
	Strongly Agree	34	33.7
8) Unplanned water disruption and poor water quality (cloudy & muddy water supply)	Strongly Disagree	4	4.0
	Disagree	5	5.0
	Neutral	42	41.6
	Agree	22	21.8
	Strongly Agree	28	27.7
9) Poor communication (late response email & phone calls/ not updated notice board)	Strongly Disagree	4	4.0
	Disagree	4	4.0
	Neutral	40	39.6
	Agree	24	23.8
	Strongly Agree	29	28.7
10) Complicated access card system	Strongly Disagree	1	1.0
	Disagree	5	5.0
	Neutral	44	43.6
	Agree	25	24.8
	Strongly Agree	26	25.7
11) Lack of facilities maintenance. (swimming pools/gym/sport hall)	Strongly Disagree	4	4.0
	Disagree	4	4.0
	Neutral	45	44.6
	Agree	17	16.8
	Strongly Agree	31	30.7
12) Poor lighting at multi-level parking.	Strongly Disagree	3	3.0
	Disagree	3	3.0
	Neutral	47	46.5
	Agree	20	19.8
	Strongly Agree	28	27.7
13) No important is given to fire drill exercises.	Strongly Disagree	2	2.0
	Disagree	3	3.0
	Neutral	38	37.6
	Agree	23	22.8
	Strongly Agree	35	34.7

Section C Part 1: Construction Faults			
Statement	Response Options	Frequency	Percentage
1) Defects in construction material. (maintenance and quality)	Strongly Disagree	-	-
	Disagree	3	3.0
	Neutral	34	33.7
	Agree	28	27.7
	Strongly Agree	36	35.6
2) Lack of training/educations. (training about design and constructions)	Strongly Disagree	-	-
	Disagree	2	2.0
	Neutral	36	35.6
	Agree	30	29.7
	Strongly Agree	33	32.7
3) Lack of supervision by site engineer during the inspection.	Strongly Disagree	2	2.0
	Disagree	2	2.0
	Neutral	43	42.6
	Agree	22	21.8
	Strongly Agree	32	31.7
4) Specifications & Structural. (misunderstandings of design concept between parties; architects, developers & engineers)	Strongly Disagree	1	1.0
	Disagree	-	-
	Neutral	41	40.6
	Agree	25	24.8
	Strongly Agree	34	33.7
5) Less important given to ventilation & waterproofing work.	Strongly Disagree	1	1.0
	Disagree	2	2.0
	Neutral	41	40.6
	Agree	25	24.8
	Strongly Agree	32	31.7
6) Climatic Condition/Soil impact.	Strongly Disagree	1	1.0
	Disagree	3	3.0
	Neutral	43	42.6
	Agree	22	21.8
	Strongly Agree	32	31.7

7) Working condition and workmanship.	Strongly Disagree	1	1.0
	Disagree	3	3.0
	Neutral	42	41.6
	Agree	23	22.8
	Strongly Agree	32	31.7
Section C Part 2: Poor Management			
1) Poor quality control and lack of building maintenance standard procedures.	Strongly Disagree	1	1.0
	Disagree	1	1.0
	Neutral	45	44.6
	Agree	25	24.8
	Strongly Agree	29	28.7
2) Lack/ Unavailability of training and skills of the maintenance team.	Strongly Disagree	1	1.0
	Disagree	3	3.0
	Neutral	43	42.6
	Agree	28	27.7
	Strongly Agree	26	25.7
3) Defective materials used for maintenance work.	Strongly Disagree	1	1.0
	Disagree	4	4.0
	Neutral	44	43.6
	Agree	21	20.8
	Strongly Agree	31	30.7
4) Overlooked site conditions.	Strongly Disagree	1	1.0
	Disagree	2	2.0
	Neutral	39	38.6
	Agree	28	27.7
	Strongly Agree	31	30.7
5) Insufficient funds to maintain the buildings.	Strongly Disagree	1	1.0
	Disagree	4	4.0
	Neutral	41	40.6
	Agree	24	23.8
	Strongly Agree	31	30.7

6) Non-response to maintenance request. (resident complaints) on timely basis	Strongly Disagree	2	2.0
	Disagree	3	3.0
	Neutral	38	37.6
	Agree	32	31.7
	Strongly Agree	26	25.7
7) Non-availability of replacement parts and components in the market. (usually for developer's customize materials)	Strongly Disagree	1	1.0
	Disagree	3	3.0
	Neutral	43	42.6
	Agree	25	24.8
	Strongly Agree	29	28.7
8) Lack of communication between contractor, clients (owners) and users.	Strongly Disagree	1	1.0
	Disagree	4	4.0
	Neutral	39	38.6
	Agree	28	27.7
	Strongly Agree	29	28.7
Section D - Consequences from the facilities-related issues			
1) Reduce housing quality and affects the building's sustainability	Strongly Disagree	1	1.0
	Disagree	3	3.0
	Neutral	38	37.6
	Agree	26	25.7
	Strongly Agree	33	32.7
2) Building dampness and mould cause respiratory and asthma-related health problems to the occupant.	Strongly Disagree	3	3.0
	Disagree	3	3.0
	Neutral	39	38.6
	Agree	25	24.8
	Strongly Agree	31	30.7
3) Financial impacts for occupants (owners, investors and tenants) and committees managing the rectification process.	Strongly Disagree	1	1.0
	Disagree	2	2.0
	Neutral	41	40.6
	Agree	20	19.8
	Strongly Agree	37	36.6
4) Defect rework creates non-value adding activity which	Strongly Disagree	1	1.0
	Disagree	4	4.0

affects the performance and productivity in construction projects.	Neutral Agree Strongly Agree	38 26 32	37.6 25.7 31.7
5) The negative effect of consumer complaints on future customers has increased with the growing use of social media, including customer complaint media.	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 - 40 25 35	1.0 - 39.6 24.8 34.7
6) Construction defects can exert significant impacts on project performance, time and cost increase.	Strongly Disagree Disagree Neutral Agree Strongly Agree	2 2 41 26 30	2.0 2.0 40.6 25.7 29.7
7) Degradation of the various building components caused by defects, may eventually lead to wastes of resources and energy.	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 1 38 24 37	1.0 1.0 37.6 23.8 36.6
8) Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment.	Strongly Disagree Disagree Neutral Agree Strongly Agree	2 2 39 22 36	2.0 2.0 38.6 21.8 35.6
9) Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being.	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 37 29 32	1.0 2.0 36.6 28.7 31.7
10) Expectation of occupants, delay and failure in report problems and accessibility to	Strongly Disagree Disagree Neutral	- 2 46	- 2.0 45.5

the property give effect to maintenance cost.	Agree Strongly Agree	20 33	19.8 32.7

The construction defect frequency analysis results show that 43 of the respondents strongly agree on inter-floor leaking/pipe leakage as the most frequently found construction defect in high-rise residential buildings. 45 respondents said exposed wires and rusty pipes were the most commonly reported construction defect, while 44 said the faulty sanitary installation was the most commonly reported construction defect, and 40 said hollow/broken floor and wall tiles were the most commonly reported construction defect.

In the meantime, 43 respondents preferred neutral in response to design defects for a weak rainwater harvesting system at multilevel parking areas/corridors, resulting in parking/corridor flooding during the rainy season. And 42 voted neutral for airwalls causing a multi-level building floor flood during heavy rain, and 41 voted neutral for a poor floor trap system; limited floor trap piping causing a flood during a rainstorm. Answer review for facility management issues reveals that the majority of responses are neutral for all issues. Most respondents have neutral accepted requirements and structural. (misunderstandings of design concept between parties; architects, developers, and engineers), less importance is given to ventilation & waterproofing work, climatic condition/soil effect, working condition, and workmanship as most commonly reported construction defects in high-rise residential buildings.

The results of the frequency study on poor facilities management show that 45 respondents preferred neutral poor-quality control and a lack of building maintenance standard procedures, with the majority reporting construction defects in high-rise residential buildings. 43 respondents were also neutral on the lack/unavailability of maintenance training and skills, while 44 respondents identified defective materials used for maintenance work, as well as poor facility management.

Respondents tentatively voted neutral for occupant expectations, delay and failure to report issues, and accessibility to the house, all of which have an impact on maintenance costs. 41 respondents voted neutral on the financial impacts for occupant and committees overseeing the rectification process, and the negative effect of consumer complaints on prospective consumers has increased with the growing usage

of social media, including customer complaint media, as a result of facility-related problems in high-rise buildings. In the meantime, 46 respondents indicated that construction defects can have a major effect on project efficiency, timeliness, and cost increases in high-rise residential building construction.

4.7 Analysis of Interview

The research participants were asked to provide information on facility-related issues in high-rise residential buildings based on their working experience as property management agents in the high-rise residential sectors (see Appendix 2).

4.7.1 Objective 1: To identify facilities-related issues in high-rise residential building.

Based on Table 4.17, the answers of the interviewees' opinions and to identify the commonly reported facilities-related issues in high-rise residential building. Altogether there are seven facilities-related issues as mentioned by the interviewees. The seven facilities-related issues include the frequent breakdown of equipment such as water pump, Genset and multi-level parking poor waterproofing, design issues such as rainwater ingress into house or lift and high energy consumption due to poor workmanship. The suitability of the installed facilities i.e., the size of lifts, the traffic flow of the carpark, the type of playground equipment etc.

As well as the majority of issues are unexplained (unresolved) common area defects and evaluation of the condition of all common area equipment such as pumps, lifts, water tanks, facade, fire-fighting equipment, electrical installations. water seepage, defective cold-water pipe, defective drainage system, poor corrective and preventative maintenance. Besides this overlooked safety and security issues and a lacks of professionalism in property management. Responses of the survey responded to the question are shown in Table 4.17

Table 4. 17: Response for Question 1 on the identification of facilities-related issues in high-rise residential building

No	Interviewees	Answers
1.	Yogeshwaran Manimaran	As per my record and experience, the usual reported in high-rise residential building related to facilities

		management is frequent breakdown of equipment such as water pump, Genset and multi-level parking poor waterproofing. Design issue such as rainwater ingress into house or lift and high energy consumption due to poor workmanship
2.	Shafiq Hakim Chuni	The suitability of the installed facilities i.e., the size of lifts, the traffic flow of the carpark, the type of playground equipment etc. The poor management of the facilities is also a major concern.
3.	Christina Raman	The majority of issues are unexplained (unresolved) common area defects. Usually, after the establishment of the joint management body (JMB), an evaluation of the condition of all common area equipment such as pumps, lifts, water tanks, facade, fire-fighting equipment, and electrical installations is needed.
4.	George Fernandez	The commonly reported facilities-related issues in high-rise building are water seepage, defective cold-water pipe, defective drainage system and defective electrical installation. As well as poor corrective and preventative maintenance.
5.	Velayutham Seenivasagam	Overlooked safety and security issues, lacks professionalism in property management and maintenance and improper design & planning.

4.7.2 Objective 2: To identify factors that lead to facilities-related issues in high-rise residential building.

Responses of the survey respondents to the question are shown in Table 4.18. The table summarises the answers of the interviewees' opinions on the cause of the facilities-related issues in high-rise residential building. Altogether there are six factors cause facilities-related issues as mentioned by the interviewees. The six facilities-related issues include a high turnover of facilities usage, wrong installation or not suitable installation of machinery and poor planning during development.

Interviewees also state that most often the JMB is often unable to adequately diagnose unsolved (unidentified) types of defects and JMB/Management do not plan for preventive or planned maintenance. And also, improper workmanship from poor finishing by developers cause the facilities-related issues in high-rise residential building.

Table 4. 18: Response for Question 2 on factors that cause facilities-related issues in high-rise residential building

No	Interviewees	Answers
1.	Yogeshwaran Manimaran	As per our record and knowledge facility-related issue in high-rise building always cause by high turnover of usage example gym, lift, doorknob, door closer and facility commonly used by residents which will neglect the instruction safety measures given by management which cause damage or faulty equipment example uses swimming pool with no proper attire, gym equipment without safety measure, holding lift door. Besides facilities-related issue also can be caused by the wrong installation or not suitable installation example swimming pool pump install in negative discharge, MSB relay install after incoming which will not start the Genset in case incoming TNB supply trip and not servicing the equipment on time or before the due date example Genset not service or check monthly which will cause battery faulty, pumps airlock, valve stuck.
2.	Shafiq Hakim Chuni	Most probably due to poor planning during the development phase i.e., no proper SWOT analysis was done, poor choices of materials, not appointing proper management etc.
3.	Christina Raman	The JMB is often unable to adequately diagnose unsolved (unidentified) types of defects because

		they are highly technical. Some of these general area defects may have been caused by insufficient maintenance during the defects liability period (DLP), resulting in their reappearance after the DLP period.
4.	George Fernandez	Improper workmanship from poor finishing, such as swimming pool floor tiles that keep falling off – this can be rectified once if the contractor uses the right materials, such as glue, but they attempt to rectify it many times because they use the wrong material. No proper defect meeting – several problems can be illustrated by the managing agent with the developer's main-con. While in most cases, there is completion contact and joint inspection based on the defects report given. However, there are cases where the defects are ostensibly complete and acknowledged, only to turn out to be more serious than initially recorded.
5.	Velayutham Seenivasagam	JMB/Management do not plan for preventive or planned maintenance, as well as lifecycle repairs and replacements. For example, lifts, pumps, and repainting are a few examples. Failure to perform basic and less expensive maintenance such as replacing worn-out bearings and changing oil/filters may cause a device to fail. This will necessitate costly maintenance that the JMB or management firm cannot afford.

4.7.3 Objective 3: To identify consequences of facilities-related issues in high-rise residential to purchasers, property agents and stakeholders.

Responses of the survey respondents to the question are shown in Table 4.19. The table summarises the answers of the interviewees' opinions on consequence faced by stakeholders due to the facilities-related issues in high-rise residential building.

Altogether there are eight consequences from the facilities-related issues as mentioned by the interviewees. The eight facilities-related issues include the standard outcome of facility problems is that building valuations will collapse, and purchasers who purchased houses for investment will find it difficult to rent out the units. Eventually, where is there many building issues PIAM will not authorise the purchase of insurance for the property.

Improper facilities management can lead to additional costs and the involvement of a large number of manpower and consume more time to settle the issues which might leave them high and dry (no funds for daily operations). The negative impact of consumer feedback on potential consumers has grown and caused. Interviewees also stated that in most cases, owner dissatisfaction with managing agents will result in the termination of the property management business, and cause occupant unhappiness and resulting in a delay in maintenance fee payment

Table 4. 19: Response for Question 3 on the consequences of facilities-related issues in a high-rise to residential building

No	Interviewees	Answers
1.	Yogeshwaran Manimaran	The standard outcome of facility problems is that building valuations will collapse, and purchasers who purchased houses for investment will find it difficult to rent out the units. Eventually, where is there any building defects PIAM will not authorise the purchase of insurance for the property. In most cases, owner dissatisfaction with managing agents will result in the termination of the property management business, and owners will fail to pay management fees will inevitably lead to a cash flow shortfall, and the cost of restoring work will rise.
2.	Shafiq Hakim Chuni	With the building with defects and other facilities issues, the value and market value of the land will both decline. It is difficult for stakeholders to sell or rent the land.

3.	Christina Raman	If no action is taken to address the issues, the building deteriorates as a result of ineffective maintenance and management. It can result in large costs later on as the remedial work is more expensive. This problem may be triggered by the developer or JMC because it would necessitate insurance claims to repair the facilities. These arguments could also fail if it is proved that the cause was due to poor maintenance. Owners would have to spend more money just to fix the issue, which might leave them high and dry (no funds for daily operations).
4.	George Fernandez	A case in point is the Savanna Suites in Bangi, where the air-conditioning workers had to re-lay the floor tiles in the pools at least four times a year. This "practise" is used because the defect's liability duration can be as long as 24 months, and rectification work can be postponed or drawn out over that time. Such plans can trigger dissatisfaction among development stakeholders. Besides the reporting of defect is important because down-pipes were clogged at one of our site Savanna Suites. It was triggered by washing leaves from trees on the facility floor into the floor-trap along the scupper drains. These leaves would become entangled in the building debris that washed into the downpipes by the employees. When the pipes were flushed, the management discovered hard cement, sand, and other products. This results in additional costs and the involvement of a large number of manpower and consumes more time to settle the issues.
5.	Velayutham Seenivasagam	With the increased usage of social media, including customer complaint media, the negative impact of

		consumer feedback on potential consumers has grown. Occupant unhappy with parking, community halls, disabled facilities, and protection, resulting in a delay in maintenance fee payment.

4.7.4 Objective 4: To evaluate the significant relationship between facilities-related issues, factors and consequences in high-rise residential building.

Table 4.20 shows answers from the survey that answered this query. The table summarises the interviewees' views on the significant relationship between issues related to facilities in high-rise buildings and how their effect on the residential high-rise stakeholders.

Table 4. 20: Response for Question 4 on the significant relationship between facilities-related issues in a high-rise to residential building

No	Interviewees	Answers
1.	Yogeshwaran Manimaran	Based on my experience, the significant relationship between facilities-related issues in high-rise residential buildings is facility is the main attraction of the high-rise building as managing agent must concentrate on taking good care of facility would display efficiency of managing agent. It is recommended that the managing agent perform a building audit once a year to keep track of the equipment's ageing. Residents would not file complaints against the Managing Company if the facility is well run.
2.	Shafiq Hakim Chuni	The facilities provided in a building, as well as how they are maintained and treated, will contribute to the building's longevity and value. If a building is well-equipped with adequate facilities and the management takes excellent care of the building, the building's longevity and property value (sale/rent) will undoubtedly increase.

3.	Christina Raman	Most construction flaws that result in building segment collapsing are avoidable if a legitimate support culture and procedure is established right from the start of the work. Defects and damage to the building are described as the building's inability to provide services as intended. Inefficiency in managing defects or damage to buildings systematically has to have different consequences and a detrimental impact on users and the building's owner.
4.	George Fernandez	The service in a building and the way it is handled and stored contribute to the sustainability and value of the building. If an entire structure is well equipped, and the management takes good care of the building, the durability and value of the property (sale/rental) of the building will without a doubt increase.
5.	Velayutham Seenivasagam	The main attraction of the high-rise building is management agents need to focus on ensuring that the management agent is efficient. The managing agent is advised to conduct a building audit to monitor the ageing of the equipment and for the facility to managed properly.

4.8 Summary

The interview approach will be used in this chapter to obtain data from the property management company. Based on the interview session with the various interviewees, various types of data will be collected. The next move will be to analyse the data once it has been collected. Then, generate the data. This chapter will also identify the study's objectives.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This paper accomplished its goal of exploring facility-related issues in high-rise residential buildings, and a conclusion was reached based on the results of the chapter 4 studies. To achieve the study's objectives, a set of high-rise residential building facilities-related issues and potentials, which serve as the primary data for research, was successfully gathered from published work. The objective of qualitatively evaluating the array of issues was then met. Different issues were allocated to different structures in these exercises, such as commonly reported facilities-related issues, factors, and consequences, and the significant relationship between factors and consequences of issues on these facilities-related issues was determined.

Aside from that, the findings are collected from the interview sessions with the property managing agent. Throughout the entire interview process, priorities were established. The four objectives are to determine the type of facilities-related issues, the factors of facilities-related issues, and the consequences of facilities-related issues, as well as to evaluate the significant relationship between facilities-related issues, factors, and consequences in high-rise residential buildings.

According to the findings of the research in Chapter 4, there are many styles, causes, and consequences that are commonly encountered by Project Managers, Contractors & Architects, Developers, and purchasers of the high-rise residential building sectors. The reason for conducting this research is that I will acquire more information about facility-related problems and will be able to apply that knowledge in the facilities management industry.

5.2 Conclusion: The Results and Objectives

The findings from the mixed –methodologies will be summarised in this section. It enabled the researchers to not only investigate the study's topic but also to gain a better understanding of the underlying facilities-related issues in high-rise buildings. This has provided for accessible exploration and comprehension of the topic.

5.2.1 Quantitative

The main objective of this study, as mentioned in Chapter 1, is to identify the commonly reported facilities-related issues in high-rise residential building. According to the results of the inferential study (see chapter 4, 4.6), inter-floor leaking /pipe leakage was chosen as strongly agreed out of ten (10) construction defects. Water seepage from the parking slab was identified as strongly agreed as one of eight (8) design defects. In addition, no importance is given to fire drill exercises among the thirteen (13) facilities management issues chosen as strongly agreed by respondents.

The second objective of the study is to identify factors that lead to facilities-related issues in high-rise residential building. It is clear from the results shown in Chapter 4, paragraph 4.6, that specifications & structural. (misunderstandings of design concept between parties; architects, developers & engineers) is mainly caused by the construction defect. On the other hand, defective materials used for maintenance work overlooked site conditions and insufficient funds to maintain the buildings cause poor facilities management.

The third objective of the study is to identify consequences from the facilities-related issues, financial impact for occupants (owners, investors, and tenants) and committees managing the rectification process and degradation of various building components caused by defects can eventually lead to wastes of resources and energy, as strongly agreed.

The last independent objective to evaluate the significant relationship between facilities-related issues, factors and consequences in high-rise residential building. From the result shown in chapter 4, paragraph. shows having a strong, positive association between two variables.

5.2.2 Qualitative

Besides, based on finding is shows the most reported facilities-related issues in high-rise residential building are the frequent breakdown of equipment such as water pump, Genset and multi-level parking poor waterproofing, design issue such as rainwater ingress into house or lift and high energy consumption due to poor workmanship. The suitability of the installed facilities i.e., the size of lifts, the traffic flow of the carpark, the type of playground equipment etc. Overall, this demonstrates that the majority of

issues are relevant to the residents' basic needs and can have an effect on their living conditions.

Furthermore, findings also indicate that the typical factors that lead to the issues are high turnover of facility use, incorrect or insufficient implementation of equipment, and inadequate preparation during construction.

The consequence identifies thru the study is that housing valuations will crash, and purchasers who bought houses for investment will find it impossible to rent out the units. Finally, where there are several construction problems PIAM would not authorise the procurement of home insurance.

The finding for objective 4 thru qualitative study is the service in a building, as well as how it is treated and processed, contribute to the building's longevity and value. It is recommended that the managing agent perform a building audit to track the deterioration of the equipment and to ensure that the facility is well maintained.

5.3 Recommendation

Based on the study, few suggestions can be made in future studies to strengthen the problems pertaining to the amenities of high-rise housing buildings. The following recommendations can be made for future research:

a) To identify possible solutions to facility-related issues in high-rise buildings.
b) To investigate the relationship between facility-related issues and costs in high-rise residential buildings.
c) To study the procedures used throughout the maintenance of facilities management in high-rise residential buildings.

5.4 Chapter Summary

This is the final chapter of the study. This chapter will explain the conclusion based on four objectives: determining the types of facilities-related issues in high-rise residential buildings, determining the factors that cause the facilities-related issues in high-rise residential buildings, and determining the consequences of the facilities-related issues to high-rise building stakeholders. Furthermore, the objectives of the research have been determined based on the findings from questionnaire surveys, interview surveys, data analysis, journals, articles, and books. Finally, in this chapter, recommendations for further research have been made.

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APPENDICES

A STUDY ON THE FACILITIES-RELATED ISSUES IN HIGH-RISE RESIDENTIAL BUILDING

This questionnaire seeks to identify issues and factors related in the facilities-related issues and the impact of problems on the purchaser, contractor, property agent and stakeholder of buildings on the facilities-related issues in high-rise residential buildings.

The results of the questionnaire will also be used to determine the important relation between the problems, factors and consequences of the facilities-related issues in high-rise residential buildings.

In order to achieve the objectives of the report, cooperation among respondents was necessary. I would like to thank all those parties who have cooperated in answering these questions and spending their time. With your cooperation, this research will be fruitful.

All information you submit is deemed confidential and is not used for any purpose other than academic.

PREPARED BY:
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* Required

A STUDY ON THE FACILITIES-RELATED ISSUES IN HIGH-RISE RESIDENTIAL BUILDING

Section A - Respondent Profile

This segment covers details of survey respondents include the level of industry experience, years of participation in high-rise residential buildings. The respondent's position and education history are taken into account in order to ensure adequate expertise in the profession.

1. 1. Which role in the high rise residential building industry most represents you? *

Mark only one oval.

- ◯ Resident/purchaser
- ◯ Housing Developer
- ◯ Contractor/Architect
- ◯ Resident/purchasers
- ◯ Other: _____

2. 2. Please indicate type of high rise building you are involved in. (you can choose more than one) *

Check all that apply.

- ☐ Condominium
- ☐ Apartment
- ☐ Flat
- Other: ☐ _____

3. 3. How many years you have been involved/staying with high rise buildings? *

Mark only one oval.

- ◯ Less than 3 years
- ◯ 3 years to 6 years
- ◯ 7 years to 10 years
- ◯ More than 10 years

4. 4. Education Background *

Mark only one oval.

- SPM
- Diploma
- Bachelor Degree
- Master Degree
- PHD
- Other: _____

Section B - Facilities-related issues (Part 1 : Construction Defects)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to construction defect. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

5. 1) Faulty door knobs/ door closers *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

6. 2) Cracking in external wall *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

7. 3) Dampness at concrete wall (Fungi and Small Plant Attack) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

8. 4) Inter-floor leaking /leakage of pipe *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

9. 5) Internal wall - Inadequate resistance to the passage of sound *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

10. 6) Uneven floor/ wall finishing *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

11. 7) Hollow/Broken floor & wall tiles *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

12. 8) Faulty gasket between the window frame and the glass. (rain water seeping through window frame) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

13. 9) Faulty sanitary installation *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

14. 10) Exposed wires & Rusty pipes *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section B - Facilities-related issues (Part 2 : Design Defects)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to design defects The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

15. 1) Water seepage from parking slab. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

16. 2) Failed water proofing at rooftop. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

17. 3) Poor floor trap system; clogged floor trap with renovation debris/small floor trap piping; cause flood staircase during raining. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

18. 4) Poor drainage system; uneven scupper drain at multi level parking. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

19. 5) Expose airwell cause multi level building floor flood during raining. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

20. 6) Poor rainwater harvesting system at multilevel parking area/corridors- cause parking/corridor flood during raining time. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

21. 7) Faulty sewerage pipe ventilation system, cause foul smells inside the unit. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

22. 8) Faulty in lighting arrestor system. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section B - Facilities-related issues (Part 3 : Facilities Management Issues)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to facilities management. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

23. 1) Common area cleaning (parking, corridor, walk way, common toilets, refuse room & etc.) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

24. 2) Multi level parking lot (blind spot management/no secure parking for motorcycles) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

25. 3) Poor Safety and security system (CCTV/Guards inefficiency/Fire Fighting system) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

26. 4) Refuse room maintenance/Rubbish disposal management. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

27. 5) Lacking in monitoring energy consumption. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

28. 6) Less Facilities Provided. (Safety box/Non Covered walkway) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

29. 7) Frequently breakdown lifts. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

30. 8) Unplanned water disruption and poor water quality (cloudy & muddy water supply) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

31. 9) Poor communication (late response email & phone calls/ not updated notice board) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

32. 10) Complicated access card system *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

33. 11) Lack facilities maintenance. (swimming pools/gym/sport hall) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

34. 12) Poor lighting at mutli-level parking. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

35. 13) No important is given for fire drill exercises. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section C - Factors that lead to facilities-related issues (Part 1 : Construction Faults)

This section is meant to assess the limiting factor to facilities-related issues in high-rise residential buildings related to construction faulty. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

36. 1. Defects in construction material. (maintenance and quality) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

37. 2. Lack of training / educations. (training about design and constructions) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

38. 3. Lack of supervision by site engineer during inspection. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

39. 4. Specifications & Structural. (misunderstandings of design concept between parties; architects, developers & engineers) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

40. 5. Less important given to ventilation & waterproofing work. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

41. 6. Climatic Condition/Soil impact. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

42. 7. Working condition and workmanship. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section C - Factors that lead to facilities-related issues (Part 2 : Poor Management)

This section is meant to assess the limiting factor to facilities-related issues in high-rise residential buildings related to poor management. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

43. 1. Poor quality control and lack of building maintenance standard procedures. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

44. 2. Lack/ Unavailability of training and skills of maintenance team. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

45. 3. Defective materials used for maintenance work. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

46. 4. Overlooked site conditions. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

47. 5. Insuffient funds to maintain the buildings. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

48. 6. Non response to maintenance request. (resident complaints) on timely basis *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

49. 7. Non-availability of replacement parts and components in the market. (usually for developer's customize materials) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

50. 8. Lack of communication between contractor, clients (owners) and users. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section D - Consequences from the facilities-related issues

This section specifies the consequences from the problems related to the facilities in residential high-rise buildings. It was also demanded that a LIKERTY scale of 1 to 5 be calculated.

51. 1) Reduce housing quality and affects the building's sustainability *

Mark only one oval.

	1	2	3	4	5	
Lowest Impact	◯	◯	◯	◯	◯	Highly Impact

52. 2) Building dampness and mould cause respiratory and asthma related health problems to occupant. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

53. 3) Financial impacts for occupants (owners, investors and tenants) and committees managing the rectification process. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

54. 4) Defect rework creates non-value adding activity which affects the performance and productivity in construction projects. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

55. 5) The negative effect of consumer complaints on future customers has increased with the growing use of social media, including customer complaint medias. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

56. 6) Construction defects can exert significant impacts on project performance, time and cost increase. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

57. 7) Degradation of the various building components caused by defects, may eventually lead to wastes of resources and energy. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

58. 8) Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

59. 9) Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

60. 10) Expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section A - Respondent Profile

This segment covers details of survey respondents include the level of industry experience, years of participation in high-rise residential buildings. The respondent's position and education history are taken into account in order to ensure adequate expertise in the profession.

61. 1. Which role in the high rise residential building industry most represents you? *

Mark only one oval.

- ◯ Resident/purchaser
- ◯ Housing Developer
- ◯ Contractor/Architect
- ◯ Resident/purchasers
- ◯ Other: _____

62. 2. Please indicate type of high rise building you are involved in. (you can choose more than one) *

Check all that apply.

- ☐ Condominium
- ☐ Apartment
- ☐ Flat
- Other: ☐ _____

63. 3. How many years you have been involved/staying with high rise buildings? *

Mark only one oval.

- ◯ Less than 3 years
- ◯ 3 years to 6 years
- ◯ 7 years to 10 years
- ◯ More than 10 years

64. 4. Education Background *

Mark only one oval.

- SPM
- Diploma
- Bachelor Degree
- Master Degree
- PHD
- Other: _____

Skip to question 65

Section B - Facilities-related issues (Part 1 : Construction Defects)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to construction defect. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

65. 1) Faulty door knobs/ door closers *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

66. 2) Cracking in external wall *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

67. 3) Dampness at concrete wall (Fungi and Small Plant Attack) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

68. 4) Inter-floor leaking /leakage of pipe *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

69. 5) Internal wall - Inadequate resistance to the passage of sound *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

70. 6) Uneven floor/ wall finishing *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

71. 7) Hollow/Broken floor & wall tiles *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

72. 8) Faulty gasket between the window frame and the glass. (rain water seeping through window frame) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

73. 9) Faulty sanitary installation *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

74. 10) Exposed wires & Rusty pipes *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Skip to question 75

Section B - Facilities-related issues (Part 2 : Design Defects)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to design defects The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

75. 1) Water seepage from parking slab. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

76. 2) Failed water proofing at rooftop. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

77. 3) Poor floor trap system; clogged floor trap with renovation debris/small floor trap piping; cause flood staircase during raining. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

78. 4) Poor drainage system; uneven scupper drain at multi level parking. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

79. 5) Expose airwell cause multi level building floor flood during raining. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

80. 6) Poor rainwater harvesting system at multilevel parking area/corridors- cause parking/corridor flood during raining time. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

81. 7) Faulty sewerage pipe ventilation system, cause foul smells inside the unit. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

82. 8) Faulty in lighting arrestor system. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Skip to question 83

Section B - Facilities-related issues (Part 3 : Facilities Management Issues)

This section is highlighting the list of most commonly reported facilities-related issues in high-rise residential building related to facilities management. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

83. 1) Common area cleaning (parking, corridor, walk way, common toilets, refuse room & etc.) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

84. 2) Multi level parking lot (blind spot management/no secure parking for motorcycles) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

85. 3) Poor Safety and security system (CCTV/Guards inefficiency/Fire Fighting system) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

86. 4) Refuse room maintenance/Rubbish disposal management. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

87. 5) Lacking in monitoring energy consumption. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

88. 6) Less Facilities Provided. (Safety box/Non Covered walkway) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

89. 7) Frequently breakdown lifts. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

90. 8) Unplanned water disruption and poor water quality (cloudy & muddy water supply) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

91. 9) Poor communication (late response email & phone calls/ not updated notice board) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

92. 10) Complicated access card system *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

93. 11) Lack facilities maintenance. (swimming pools/gym/sport hall) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

94. 12) Poor lighting at mutli-level parking. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

95. 13) No important is given for fire drill exercises. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Skip to question 96

Section C - Factors that lead to facilities-related issues (Part 1 : Construction Faults)

This section is meant to assess the limiting factor to facilities-related issues in high-rise residential buildings related to construction faulty. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

96. 1. Defects in construction material. (maintenance and quality) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

97. 2. Lack of training / educations. (training about design and constructions) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

98. 3. Lack of supervision by site engineer during inspection. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

99. 4. Specifications & Structural. (misunderstandings of design concept between parties; architects, developers & engineers) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

100. 5. Less important given to ventilation & waterproofing work. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

101. 6. Climatic Condition/Soil impact. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

102. 7. Working condition and workmanship. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Skip to question 103

Section C - Factors that lead to facilities-related issues (Part 2 : Poor Management)

This section is meant to assess the limiting factor to facilities-related issues in high-rise residential buildings related to poor management. The respondent was asked to show what could impact a count of 1 to 5 based upon the LIKERTY scale.

103. 1. Poor quality control and lack of building maintenance standard procedures. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

104. 2. Lack/ Unavailability of training and skills of maintenance team. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

105. 3. Defective materials used for maintenance work. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

106. 4. Overlooked site conditions. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

107. 5. Insuffient funds to maintain the buildings. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

108. 6. Non response to maintenance request. (resident complaints) on timely basis *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

109. 7. Non-availability of replacement parts and components in the market. (usually for developer's customize materials) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

110. 8. Lack of communication between contractor, clients (owners) and users. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section D - Consequences from the facilities-related issues

This section specifies the consequences from the problems related to the facilities in residential high-rise buildings. It was also demanded that a LIKERTY scale of 1 to 5 be calculated.

111. 1) Reduce housing quality and affects the building's sustainability *

Mark only one oval.

	1	2	3	4	5	
Lowest Impact	◯	◯	◯	◯	◯	Highly Impact

112. 2) Building dampness and mould cause respiratory and asthma related health problems to occupant. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

113. 3) Financial impacts for occupants (owners, investors and tenants) and committees managing the rectification process. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

114. 4) Defect rework creates non-value adding activity which affects the performance and productivity in construction projects. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

115. 5) The negative effect of consumer complaints on future customers has increased with the growing use of social media, including customer complaint medias. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

116. 6) Construction defects can exert significant impacts on project performance, time and cost increase. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

117. 7) Degradation of the various building components caused by defects, may eventually lead to wastes of resources and energy. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

118. 8) Occupant dissatisfied with facilities of car parks, community halls, disability facilities and security and lead to delay in maintenance fee payment. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

119. 9) Failure to maintain and sustain the environment in high-rise living is likely to lead to deterioration in the residents' well-being. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

120. 10) Expectation of occupants, delay and failure in report problems and accessibility to the property give effect to maintenance cost. *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

UNIVERSITI TUNKU ABDUL RAHMAN

LEE KONG CHIAN FACULTY OF ENGINEERING AND SCIENCE

MASTER OF PROJECT MANAGEMENT

MEBH15109 FINAL YEAR PROJECT

TITLE: A STUDY ON THE FACILITIES-RELATED ISSUES IN HIGH-RISE RESIDENTIAL BUILDING

Interview Questions:

1. Based on your observation from the property managing agent aspect what are the *facilities-related issues in high-rise residential building are frequently found in high-rise residential building?
2. Based on your experience as property managing agent what caused the *facilities-related issues in high-rise building?
3. What the consequences to the building and the stakeholder of the building if there is no action taken over the *facilities-related issues in high-rise building?
4. From the point of view of property manager, what is the significant relationship between *facilities-related issues, factors and consequences in high-rise residential buildings?

*** Facilities related issues such as construction defect, design defect, etc. in high-rise residential building. And poor management of facilities and lack of facilities in high-rise residential buildings, for examples common area cleaning, safety and security, waste room maintenance/rubbish disposal management and lack of control of condo energy use and etc.**