Competencies for Managing Green Buildings: Aligned Components from Malaysia's Facilities Management Service Provider

Mohd Hafizal Ishak[1, *], Siti Nur Ayunie Ismail[2], Azlina Md. Yassin[3], Nurul Afiqah Ahmad[4]

[1, 3] Centre of Project, Property and Facilities Management Services (PROFMs), Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Malaysia.
[1, 2, 3] Department of Real Estate Management, Faculty of Technology Management and Business, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Malaysia.
[4] Studies of Real Estate, School of Real Estate and Building Surveying, Collage of Built Environment, Universiti Teknologi Mara, 40450 Shah Alam, Malaysia.

*Email: *mhafizal@uthm.edu.my*

Abstract

The increased development of green buildings in Malaysia has necessitated the need for facility management businesses to upgrade their competencies. However, as evidenced by past studies, a shortage of competences among practitioners has emerged as an uncertainty about firms' capacity for managing green buildings. Therefore, the purpose of the research is to acquire insight into the competency features of FM service providers in Malaysia for managing green buildings and to make recommendations for competency improvement. The qualitative approach was adopted, and interview was used to achieve the goals, the data was examined using content analysis. Based on the experiences of seven (7) managers who have managed green buildings, the five (5) core strengths of facilities management service providers in managing green buildings are sustainable procurement, operations, resource management, repair and maintenance, and environmental health. This study demonstrated common themes between facilities management and green building management competencies.

Keywords: Competency, facilities management, green buildings, service provider

1.0 INTRODUCTION

Green building is additionally known to offer multiple environmental advantages. Green buildings have a less significant environmental impact than conventional ones. Buildings that are environmentally friendly outperform conventional buildings with regard to energy savings, depletion of resources, and wellness and preservation of the environment. The nation's growing urbanisation has culminated in a rise in carbon dioxide emissions (Isa et al., 2019). In a study by Dwaikat and Ali (2018), a "green building" was a building the fact that is designed and built utilising environmentally conscious building concepts.

Upon completion, the facility managers will continue to track the environmentally friendly structure to guarantee that it stays functional. In the past few years, the facilities management (FM) sector has become known to be one of the most rapidly expanding industries. Lowering maintenance expenses whilst safeguarding facility performance constitutes a few of the objectives of facilities management (Isa et al., 2016). Malaysian facilities management professionals were found to lack competencies and primarily practise tactical and operational levels of their services (Kamaruzzaman et al., 2018). The Green Building Index (GBI) evaluating tool helps builders as well as building owners in developing and building green, environmentally friendly buildings that preserve electricity and water, offer an optimal indoor climate, enhance accessibility to transit, and apply reuse and recycling and greenery to their construction endeavours, while also decreasing the ecological footprint (Algburi et al., 2016).

The nation's rapid urbanisation has culminated in higher emissions of carbon dioxide (Isa et al., 2019). As defined by Dwaikat and Ali (2018), a "green building" is a structure that has been constructed and designed utilising environmentally friendly building principles. According to Green Beats (2016), Malaysia possesses 983

acknowledged green buildings. However, just 570 of those are recognised. That indicated that the other 413 green buildings weren't meeting the GBI's minimal standards. This raises the issue of how green buildings continue to fall short of GBI demands, as well as the level of competency of Malaysian facilities management service providers in managing green buildings. Green building index recognition will not be revoked as long as facilities management (FM) service providers demonstrate the necessary property abilities for managing green buildings with as little waste as possible. Among those are procurement for environmentally friendly operations, handling resources, maintenance and repair administration, and the preservation of the environment. In order to give recommendations for FM service providers to undertake competency enhancements for managing green buildings, the goal of this research is to examine the competence characteristics of FM service providers in Malaysia. The research provides data to facilities management service providers, enabling companies to collaborate on the competency enhancement of facilities management service providers for managing green buildings, guaranteeing that such green buildings are properly managed.

2.0 ENHANCE FM COMPETENCIES IN MANAGING GREEN BUILDINGS

Green building management, on the other hand, will be difficult for managers who lack the necessary competency traits. These are some examples: According to Eco-Business (2013), disregarding completed construction components leads to for a long-time inefficiency. Green building designers and facilities management teams frequently voice doubts about their ability to self-manage. However, Malaysian facility managers continue to ignore green building management mainly because they believe it is irrelevant. This demonstrates a lack of deep expertise and comprehension of green building management.

Incorrect assessments are a common cause of annoyance for facilities management staff. Managing certified green buildings necessitates high-accuracy data obtained through costly building management systems. These devices, however, are often installed by incompetent individuals and are not thoroughly tested. As a result, the system fails to gather the data needed by the management team or energy inspector to comprehend the state of the facility, making it impossible to execute the essential energy-saving strategies. A plethora of issues develops when facility managers neglect to apply their competence features to green building management. However, when the skill attributes are employed, it has been found to produce a variety of benefits for users (Khoshbakht et al., 2018).

Growing awareness of the environment and social accountability among businesses, as well as rising proof that green buildings make economic sense, will continue to drive up interest in green buildings, according to prior surveys. Despite rising fascination, ambiguity remains a barrier to green construction investment. It may be concluded that facility management expertise needs to be improved (Aliagha et al., 2013; Ismail & Ishak, 2021).

Sustainability facilities management practices, such as developing novel techniques for meeting sustainability evaluation requirements and assisting facilities managers in taking on new responsibilities, are becoming increasingly important (Firdauz, et al, 2015; Sarpin, 2016). To ensure job standards are met, facilities managers must have a strong set of competencies. Workplace behaviour, technical expertise, and motivation are all examples (Michie et al., 2011).

Effective management of green buildings has the potential for lowering operational costs and maximise profitability (Goodman, 2008). However, previous research revealed a number of issues that the management must address. The initial issue is the high price of replacement since numerous green building materials are more expensive. Assume a LEED-certified building suffers damage during a hurricane. In that case, property owners should expect to pay more for maintaining the LEED certification of the structure than it might cost to substitute it with one that meets non-LEED standards. Additional factors that may raise the overall price of reconstructing include the difficulty in obtaining green construction materials and the possibility of unavailable substitute components.

The second difficulty that managers face when it comes to HVAC concerns for green buildings is sufficient ventilation, which is especially important when the structure is wet. LEED certification takes into account the amount of outside air that enters a building (Odom et al., 2009). When exceeding the minimal outside air criteria, the designer must consider the increased energy load (and expense) as well as the sizing of the HVAC system required to effectively dehumidify a facility. Water and mold can enter a green building through the massive intrusion of water or a rise in relative humidity caused by the HVAC system (heating, ventilation and air conditioning). Moisture issues can devastate a building, eventually leading to its destruction. If the mold spreads into other areas of the structure, it could

pose health issues (Odom et al., 2009). Finding a construction company with an in-depth knowledge of green building materials is becoming easier, but it is still not assured. As green technology advances, builders are weeding out items that haven't been on the market for a long.

Finally, because the construction process is constantly changing, property owners are not getting what they paid for when it comes to building green in the present and future. As a result, business insurance encourages businesses to ensure that the experts and advisers they hire are qualified to meet expectations. Furthermore, risk managers must consider the structure's ability to deliver on its promises. As a result, in order to successfully manage green buildings, facilities managers must be skilled in the abilities required for green building management. We may be able to lower the number of green buildings that do not acquire green building index certification as a result of this strategy.

2.1. Competency for Managing Green Buildings

Sustainable operation management is essential in managing green buildings. It is relating to the techniques, processes, methods, and operational policies that can promote economic and environmental goals. The second definition involves sustainable operation management, which is defined as the planning, coordination, and control of a system in order to provide cost-effective results while safeguarding the planet's resources and the environment (Gimenez et al., 2012; Gunasekaran et al., 2014).

Resource oversight includes both organic and synthetic resources employed in green building management. It encourages resource utilisation, which leads to reduced pollution (Kakkar, 2014). In addition, resource management is a critical discipline since it leads to decreased operational costs, increased efficiency, and earnings, and increased corporate competitiveness. The advantages of resource management typically extend beyond energy and water management (Aghili et al., 2017). Traditionally, environmental policy has focused on the most serious environmental challenges. Yet, consumers and governments have become more concerned about resource consumption and its environmental consequences (Jones, 2015).

Green buildings, like any other, must contend with environmental conditions and vulnerabilities over the course of their lifespan (Thaheem & De Marco, 2014). To ensure the building is in optimal condition, a strategic repair and maintenance programme must be in place, as one of the abilities required for managing a green building (Thomson, 2012). Effective and timely maintenance decreases negative effects on the environment and people, improving residents' quality of life (De Oliveira et al., 2014; Sikdar, 2014). Last but not least, competencies for managing green buildings must be concerned with people's health and living quality. It must incorporate environmental management theory and practices that may have an impact on present and future generations (Frumkin, 2016).

3.0 RESEARCH METHODOLOGY

This study aimed to acquire insight into the competency features of FM service providers in Malaysia for managing green buildings and to make recommendations for competency improvement. In the process of achieving the aim of the study, a qualitative approach via systematic in-depth interviews was employed with seven (7) facility managers in Klang Valley. The selection of the interviewees was based on their business profile which they actively participated in facility management including green building in Klang Valley and depends on their willingness to participate in this research and share as much information as required in achieving the research objective. In addition, the use of academic literature databases is used as Google Scholar, Research Gate, Science Direct and Emerald, where the literature is searched systematically using the years and relevant keywords. The literature gathered was analysed qualitatively, and the content was analysed qualitatively where exploration and descriptive strategy are employed. As a result of this analysis, the researcher evaluates the competency attributes of the FM service providers stated in the literature review in managing green buildings (see Table 1 - research methodology summary).

Table 1. Research Methodology Approach

Objectives	Method	Variables	Analysis	Output
To study the competency attributes among facilities management service providers towards managing the green building in Klang Valley.	Qualitative method (Seven respondents – experience in managing green buildings)	(Competency in Facilities Management Service) ▪ Communications ▪ Performance & Quality ▪ Real Estate ▪ Project Management ▪ Facility Information Management & Technology Management ▪ Operations & Maintenance ▪ Risk Management ▪ Sustainability ▪ Leadership & Strategy ▪ Occupancy & Human Factors ▪ Finance & Business	Content analysis	Competency attributes among facilities management service providers towards managing the green building
To propose competency improvement by facilities management service providers in managing the green building.		(Competency to Managing Green Buildings) ▪ Sustainable Procurement ▪ Sustainable Operations ▪ Resources Management ▪ Repair and Maintenance Management ▪ Environmental Health		Recommendations for competencies improvements

4.0 RESULTS AND DISCUSSION

A total of seven (7) respondents had participated in this survey after several selections to achieve the objectives of this study. The selection is based on their position as the person who manages the green building projects and their years of experience in the facilities management industry (refer to Table 2)

Table 2. Respondent's Background

Respondent	Company	Certification	Year of Experiences
Respondent 1 (R1)	RPH Global Property Management SDN. BHD.	PM 12923	7 years
Respondent 2 (R2)	IPC Property Management Sdn Bhd (PTJ)	-	6 years
Respondent 3 (R3)	TH Properties Sdn Bhd	Master in Facilities Management	12 years
Respondent 4 (R4)	Jangka Prestasi Sdn Bhd	Degree in Electrical Engineering	9 years
Respondent 5 (R5)	Raine, Horne & Zaki Property Management Sdn Bhd	PM 2573	5 years
Respondent 6 (R6)	Jangka Prestasi Sdn Bhd	Degree in Mechanical Engineering	12 years
Respondent 7 (R7)	AWC Berhad	Certified Energy Manager from Suruhanjaya Tenaga	20 years

The general subject of competencies for facilities management service providers towards managing the green building in Klang Valley is based on the eleven (11) core competencies for facilities management (see Table 3). Initially, for communication skills: Control of an Issue, Good Technical and Legal Experience, Building Façade/System, Certification and Elements, and Key Performance indicators (KPI) are the five (5) themes that have been identified. It is discovered that R3, R4, R5, and R6 all make four (4) mentions of the building facade or system. Second, concerning Performance & Quality, eight (8) themes have been determined: Rate Our Performance, Feedback, Sensitive Element, Green Building Index (GBI), Specific Green Element, The Familiarity of Staff Towards the System, Person's Ability to Pay and Quality Goods. It can be seen that The Familiarity of Staff Towards the System is expressed twice by R4 and R6.

Real Estate competencies have determined seven (7) themes namely, High-Quality Goods, The Highest Cost of Heating, Ventilation, And Air Conditioning (HVAC), Good Water and Air Quality, Landscaping and Branding, Safety and Health and Indoor Environment Quality (IEQ). It is clearly shown that High-Quality Goods are repeated three (3) times by R1, R4 and R6. Next, the competency in maintaining green building is Project Management. Seven (7) themes have been determined: Standard Operating Procedure (SOP), Building Facade/System, Green Building Index (GBI), Identify the Problem's Trait, Assign the Technician and Engineer, and More Job Scopes and Staffing. It has been proven that Identify the Problem's Trait and Assign the Technician and Engineer are mentioned twice, both by R4 and R6.

Facility Information Management & Technology Management competencies found three (3) themes namely: Financial System, Building Maintenance System, Resident and Management System, High-Tech System, and Computerised Maintenance Management System (CMMS). R2, R5 and R7 agree on High-Tech System while Computerised Maintenance Management System (CMMS) is mentioned three (3) times by R3, R4 and R6. In Operations & Maintenance, seven (7) themes have been determined, namely Preventive Maintenance, Energy Efficiency, Building Facade/System, Green Element, Energy Saving, Gas District Cooling (GDC) and Green Building Index (GBI). R1 and R7 agree on Energy Efficiency while R4 and R6 mention Energy Saving and Gas District Cooling (GDC) twice.

Five (5) themes from risk management competency have been determined: Experienced People, Insurance Coverage, Training of Competent Officers, Quality Safety and Health Department (QC), and Call a Specialist. It is clearly shown that Insurance Coverage is repeated four (4) times by R1, R2, R5 and R7. Sustainability competency has four (4) themes namely: Environmentally Beneficial, Waste Management, Power Generation, and Energy Consumption. It can be seen that Energy Consumption is mentioned as many as four (4) times by R4, R5, R6 and R7. For Competency in Leadership & Strategy, four (4) themes have been determined: Planned Progressive Maintenance (PPM), Non -Technical Moral, Building Functioning, and Set Up a Team. Planned Progressive Maintenance (PPM) is mentioned two (2) times by R1 and R2, Non -Technical Moral is indicated by R3 and R7, and R4 and R6 mention Building Functioning.

Occupancy & Human Factors is also one of the competencies for managing green building. Three (3) themes have been determined: Take Care of Our Clients, Customer Satisfaction Survey (CSS), and Safety and Health. It can be seen that Take Care of Our Clients is mentioned five (5) times by R1, R2, R4, R5 and R6. Finally, for Finance & Business, three (3) themes have been determined, namely Energy-Saving System, Expensive Elements and Updated System and Advanced Technology. It is clearly seen that Expensive Elements is mentioned five (5) times by R2, R3, R4, R5 and R6.

Table 3. Discussion on Theme of Competencies for Facilities Management

Respondent (R)	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**
Communications							
Building Facade / System			✓	✓	✓	✓	
Control An Issue	✓						
Good Technically and Legal Experience	✓						
Certification And Elements		✓					
Key Performance Indicator (KPI)							✓
Performance & Quality							
Rate Our Performance	✓						
Feedback	✓						
Sensitive Element		✓					
Green Building Index (GBI)		✓					
Specific Green Element			✓				
The Familiarity of Staff Towards the System				✓		✓	
Person's Ability to Pay					✓		
Quality Goods							✓
Real Estate							
High-Quality Goods	✓			✓		✓	
The Highest Cost of Heating, Ventilation, And Air Conditioning (HVAC)		✓					
Good Water and Air Quality			✓				
Landscaping					✓		
Branding							✓
Safety And Health							✓
Indoor Environment Quality (IEQ)							✓
Project Management							
Standard Operating Procedure (SOP)	✓						
Building Facade/System		✓					
Green Building Index (GBI)			✓				
Identify The Problem's Trait				✓		✓	
Assign The Technician and Engineer				✓		✓	
More Job Scopes					✓		
Staffing							✓
Facility Information Management & Technology Management							
Financial System, Building Maintenance System, And Resident and Management System	✓						
High-Tech System		✓			✓		✓
Computerized Maintenance Management System (CMMS)			✓	✓		✓	
Operations & Maintenance							
Preventive Maintenance	✓						
Energy Efficiency	✓						✓
Building Facade/System		✓					
Green Element			✓				
Energy Saving				✓		✓	
Gas District Cooling (GDC)				✓		✓	
Green Building Index (GBI)					✓		
Risk Management							
Experienced People	✓						
Insurance Coverage	✓	✓			✓		✓
Go to Courses for Training		✓					
Quality Safety and Health Department (QC)			✓				

Call A Specialist				✓		✓	
Sustainability							
Environmentally Beneficial	✓						
Waste Management		✓					
Power Generation			✓				
Energy Consumption				✓	✓	✓	✓
Leadership & Strategy							
Planned Progressive Maintenance (PPM)	✓	✓					
Non -Technical Moral			✓				✓
Building Functioning				✓		✓	
Set Up a Team					✓		
Occupancy & Human Factors							
Take Care of Our Clients	✓	✓		✓	✓	✓	
Customer Satisfaction Survey (CSS)			✓				
Safety And Health							✓
Finance & Business							
Energy-Saving System	✓						
Expensive Elements		✓	✓	✓	✓	✓	
Updated System and Advanced Technology							✓

The overarching topic of competencies for facilities management service providers towards managing the green building in Klang Valley is based on the five (5) competencies in managing the green building (Table 4 - Discussion on the topic of Competencies for Managing Green Building). First, for skills in sustainable procurement, there are now four (4) main themes: Building Facade/System, Strong Commitment to GBI, Increase Staffing Levels, and Revision of Green Building Contract Price. It is discovered that R1 and R2 have mentioned the building facade/system twice, and R4 and R6 have also mentioned the addition of a sufficient number of staff twice. Secondly, with respect to Sustainable Operation, five (5) themes have been determined: Reporting on Operation Always on Track, Planned Preventive Maintenance (PPM), Hire A Qualified Person, go to Courses for Training, and Key Performance Indicator (KPI). It can be seen that Planned Preventive Maintenance (PPM) is expressed twice by R2 and R7 while Go to Courses for Training is mentioned by R4 and R6.

Six (6) themes have been identified in relation to resource management: quality goods, building audits, building facade/system, going to training courses, public relations (PR), and hiring third-party consultants. It is evident that R4 and R6 repeated Go to Courses for Training, Public Relations (PR) twice. Repair & Maintenance Management is the following competency in maintaining a green building. Building Management System (BMS), Planned Preventive Maintenance (PPM), Building Facade/System, and Add a Sufficient Number of Staff are the five (5) themes that have been chosen. It has been established that R3, R4, and R6 all make three (3) mentions of the building facade/system. Energy Consumption, Better Air Quality, Natural Lighting, Waste Management, Indoor Environment Quality (IEQ), Relative Humidity, Safety, and Health are the seven (7) topics that have been identified for environmental health. R4 and R6 both include two (2) mentions of relative humidity.

Table 4. Discussion on Theme of Competencies for Managing Green Building

Respondent (R)	R1	R2	R3	R4	R5	R6	R7
1) Sustainable Procurement							
i. Building Facade/System	✓	✓					
ii. Strong Passion Towards GBI			✓				
iii. Add A Sufficient Number of Staff				✓		✓	
iv. Revise The Price for Green Building Contract							✓
2) Sustainable Operation							
i. Reporting On Operation Always on Track	✓						
ii. Planned Preventive Maintenance (PPM)		✓					✓
iii. Hire A Qualified Person			✓				
iv. Go To Courses for Training				✓		✓	
v. Key Performance Indicator (KPI)							✓
3) Resource Management							
i. Quality Goods	✓						
ii. Building Audit		✓					
iii. Building Facade/System			✓				
iv. Go To Courses for Training				✓		✓	
v. Public Relations (PR)				✓		✓	
vi. Hires A 3rd Party Consultant							✓
4) Repair & Maintenance Management							
i. Go To Courses for Training	✓						
ii. Building Management System (BMS)	✓						
iii. Planned Preventive Maintenance (PPM)		✓					
iv. Building Facade/System			✓	✓		✓	
v. Add A Sufficient Number of Staff							✓
5) Environmental Health							
i. Energy Consumption	✓						
ii. Better Quality of Air	✓						
iii. Natural Lighting		✓					
iv. Waste Management		✓					
v. Indoor Environment Quality (IEQ)			✓				
vi. Relative Humidity				✓		✓	
vii. Safety and health							✓

From the eleven (11) core competencies for facilities management and five (5) competencies for managing green buildings, this research successfully found 66 themes mentioned by the selected seven respondents. They have experience in managing green buildings at Klang Valley. As a result of the interviews with the respondents, nine themes are closely related to the two 11 core competencies for facilities management and five competencies for managing green buildings. The nine themes are namely Building Facade / System, Planned Preventive Maintenance (PPM), Key Performance Indicator (KPI), Quality Goods, Indoor Environment Quality (IEQ), Safety & Health, Energy Consumption, Waste Management and Go to Course for Training. (Refer to Figure 1- The Linked Theme Between Competencies for Facilities Management and Green Building)

After being assessed through content analysis, four (4) linked themes that are mentioned at least twice are Key Performance Indicator (KPI), Quality Goods, Indoor Environment Quality (IEQ), Waste Management with a percentage of 3.08 per cent. Next, only the linked Safety & Health theme was stated by the respondents three (3) times with a rate of 4.62 per cent. Moreover, linked themes mentioned five (5) times are Planned Preventive Maintenance (PPM) and Waste Management, with 7.69 per cent. Furthermore, the linked theme Go to Course for Training was stated six (6) times by the respondents with a rate of 9.23 per cent. Lastly, the respondents most frequently mentioned linked theme is Building Facade / System that are mentioned Twelve (12) times with 18.46 per cent.

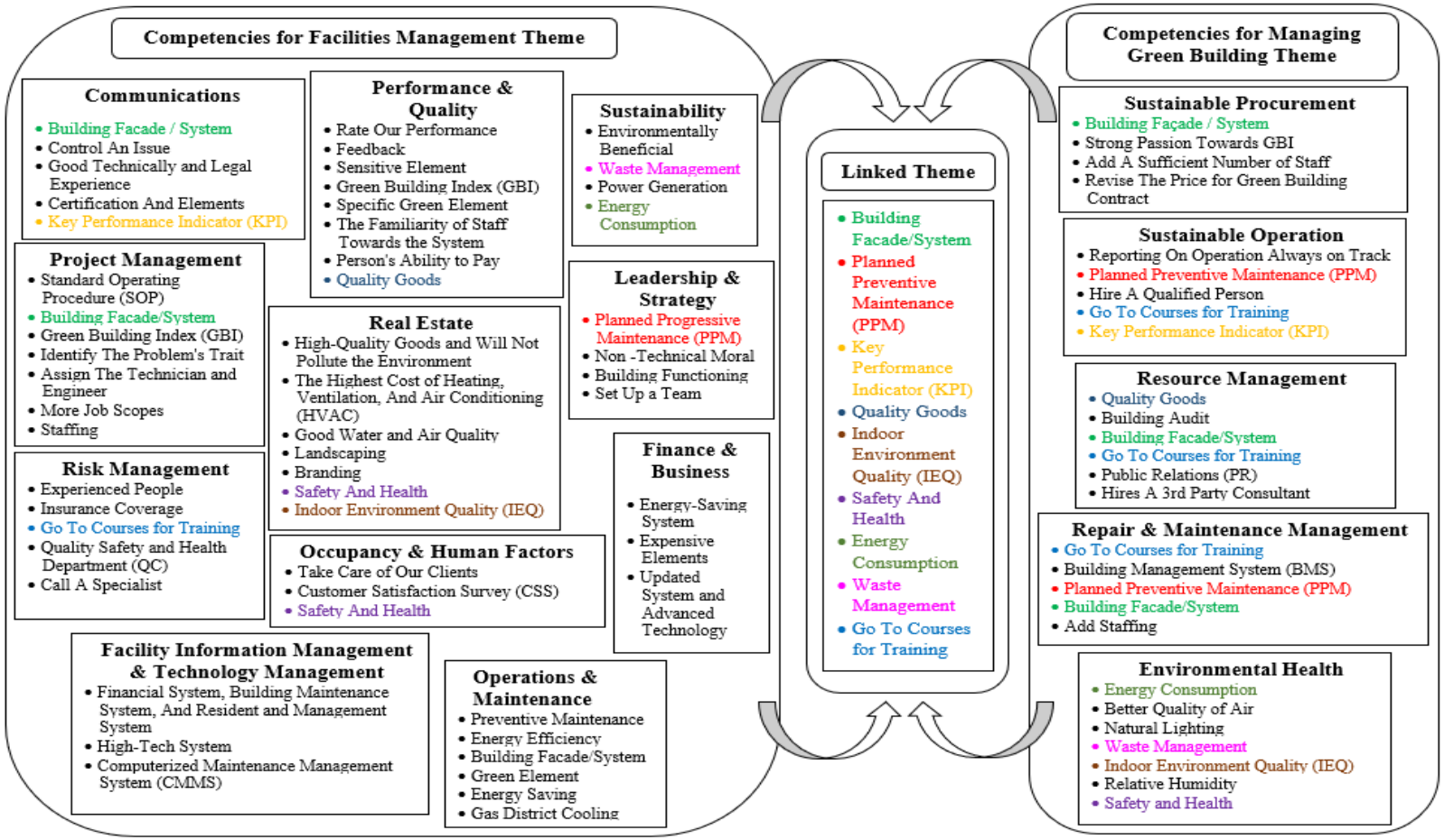

Figure 1. The Linked Theme Between Competencies for Facilities Management and Managing Green Building.

5.0 CONCLUSION

Based on the results that are gathered and analysed from questions posed during the interview with respect to competencies of facilities management service providers for green buildings, it can be concluded that not all five (5) green building management competencies, as well as the eleven (11) competencies of facilities management service providers outlined by the International Facilities Management Association (IFMA) are used. It is possible to conclude that there is a need for competency enhancement for facility management. Building maintenance effectiveness can be maintained in the long run if competencies in facilities management are improved. This study uncovered related themes that correspond between facility management competencies and green building competencies. Building facades and systems, planned preventative maintenance (PPM), key performance indicators (KPI), quality goods, interior environment quality (IEQ), safety and health, energy consumption, waste management, and training courses are all interconnected themes. This study also demonstrated numerous competencies that are recognised as requiring improvement throughout the interviews with the selected respondents. Further research can be conducted to examine the indicators of each feature, characteristic, and improvement that is required. In the subsequent supplementary research, it is suggested for a new framework leading to the development of a model to integrate general and green building competencies.

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