

REQUISITE FACILITIES MANAGEMENT COMPETENCIES FOR SUSTAINABLE DEVELOPMENT AT HIGHER EDUCATION INSTITUTIONS

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Abstract: The facilities management profession has emerged in parallel with the current technological revolution. Sustainable development is a development that balances economics, society, and the environment in addressing spiritual needs with regard to the material as a measure of economic performance. This study aims to identify the facility management competencies requirement for sustainable development at higher education institutions. Variables examined in this study are leadership and management, managing people, understanding business organization, operation and maintenance, managing premises, managing services, managing resources, and managing the working environment. A questionnaire survey was used as a data collection method, and data were collected from 661 facilities management personnel in polytechnics. The data collected was analyzed using frequency, Cronbach's Alpha and Relative Importance Index (RII) analysis. The Statistical Package for Social Sciences (SPSS) version 20 software was used in order to facilitate the data analysis. The results revealed that the most important competencies for sustainable higher education institution are leadership and management, managing the work environment, managing human resources and business organization. Thus, these competencies are very important in carrying out the responsibility for sustainable development at higher education institutions and can also improve the image of these institutions worldwide. By 2015, the government aims to increase the percentage of skilled workers in the market to 37%, ensuring widespread transformation plans.

KEYWORDS: Competencies, facilities management, higher education, sustainable development.

Introduction

Globally, the facilities management profession continues to mature and evolve. Since the late 1980s, facilities management (FM) has gradually gained a foothold as a discipline and a profession within the property and construction industry. The establishment of professional FM institutions around the world (such as the IFMA in the USA, the JFMA in Japan, the BIFM in UK, the FMA in Australia, etc.) testifies to its growing importance (Linda *et al.*, 2001). The research by Lindholm (2005) revealed how different countries with dissimilar evolutionary backgrounds adopt FM. Previous study showed that variability in the progress of societal evolution has greatly influenced the diverse approaches adopted by societies in cultivating leadership and organizational growth. Every

country has its own culture, type of organization and leadership, resulting in different levels of facilities management at different stages of development (Lindholm, 2005). Due to these differences in leadership and organization structure, it would be logical, therefore, that the demands set for the facilities manager will differ and the quality realized will be valued differently.

Furthermore, facilities managers today are expected to understand their company's core business and contribute to the bottom line — not only by reducing facility costs, but also by improving the productivity, revenue generating capacity and image of their organizations. The facility manager is in a unique position to view the entire process and is often the leader of the only group that has influence over the entire

life cycle of a facility (Hodges, 2005). The responsibility of the facility manager is often undertaken by various professionals, especially Mechanical, Electrical and Civil engineers. As noted, these professions are not specifically designed to cover the required skills and knowledge expected from the facility managers.

According to a study conducted by Fielder (2013), there are problems with FM Implementation, such as: (a) There is often a lack of technical knowledge and expertise in handling the problems that arise, thus the need to design flexible FM planning, the need to manipulate the advantages and benefits of using FM and the need to provide immediate responses for arising problems; (b) There is a lack of proper FM guidelines and requirements in Malaysia that can be used by companies to measure the quality and performance of FM practices as well as to standardize practice and implementation. The availability of appropriately skilled resources must be considered a key issue, as facilities managers experience an increasing scope of roles and responsibilities. In addition, in 2010, a study conducted by Elmualim found three main barriers to the practice of sustainable facility management principles, namely time constraints, lack of knowledge and lack of senior management commitment. There is a demanding requirement for practical tools for sustainable facility management, and it is essential for facilities managers to support the cause of sustainability within their organisations.

In this regard, facilities managers must be competent to deal with complex problems, assume high levels of responsibility, have the ability to affect the workplaces of the future and be able to deal with all levels of an organization and its suppliers, consultants and providers (Wiggins, 2006). As organizations that are focused and related to customer service, higher education institutions should take into account the facilities required by customers to ensure their comfort (Kotler, 1998). In terms of the performance of educational facilities, the organization should be in a situation conducive to good work to improve the quality

of learning outcomes (Lackney, 1999). Students' dissatisfaction with facilities can also be seen in the context of Malaysia, where Awang and Mohammed (2011) noted that polytechnic students are dissatisfied with five groups of facilities, namely tables, chair, whiteboards, air conditioning/fans and laboratory equipment (provided by polytechnics and included in the study). The average percentage of dissatisfaction is more than 50% for the five facilities. They also found that individuals who manage the facilities at polytechnics do not have qualifications in facilities management. Therefore, this research is needed to address these shortcomings.

Moreover, there is a current and growing demand for high-skilled workers by 2015, the Department of Polytechnic Education is responsible for providing the workforce 37% as the growth and development of the polytechnics and the enrolment of polytechnic students is increasing. In 2011, there were thirty polytechnics operation in Malaysia, with than 89,000 students enrolled (Awang and Mohammed, 2011). To produce a highly skilled workforce, provide the facilities needed by students and manage facilities efficiently, individuals with specific competencies are required in order to achieve the desired performance within the organization (Sanghi, 2004; Parry, 1996; Klemp, 1980). The relationship between the facility and facilities management is a combination of various activities of employees and work processes that support the operations of an organization. In this regard, the level of sophistication of infrastructure and technology supporting the core functions of the organization and the huge investments in their development suggests strongly that Facility Managers should be professionals, competent and expert in the management of these support facilities (Edoghogho, 2011). Best *et al.*, (2003) are also of the opinion that the facilities manager could not be just anybody with modern management skills but needs to be a certified professional who demonstrates a high level of competence in their areas of expertise.

Subsequently, the human factor has become the most critical element in the workplace,

and should be the organization's key focus (Brady, 2006). Brady also noted that the scope of facilities management responsibilities is less obvious, as there is a need for competence in performing various tasks. Therefore, the facilities manager can build continuing value for the organization by developing, implementing and maintaining sustainable facility practices. As we know, it is generally considered that the Higher Education Institution may contribute significantly to the promotion of sustainability (Boyle, 1999) and have a critical role to play in creating a sustainable future (Cortese, 2003). For this paper, the opinions of facilities managers are considered as the ones that can expose the significant issues and drivers being addressed by businesses in the built environment.

This paper examines facility management competencies through a questionnaire survey of facilities managers or individuals who manage the facilities in polytechnics. Understanding of these issues and drivers will lead to the improvement and development of good sustainable practices and policies within the facilities management industry. This paper is divided into three sections. Section 1 reviews related literature on sustainable development in higher education institutions and its linkages with facility management competencies. Section 2 explains the research methodology used in collecting and analyzing the data. Section 3 presents the data analysis, findings and discussion of the study. Section 4 provides the recommendations and conclusion.

Sustainable Development in Higher Education Institutions

Sustainable development has been conceptualized in a variety of ways. According to the Brundtland report (1987, p. 43), sustainable development is "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs...." This means that the community must be aware and that current development will not affect the life and well-being of future generations. There are three components

of sustainable development, namely (a) the environment, (b) the community and (c) the economy, and these components are mutually dependent on each other. Velaquez *et al.*, (2006) defined the sustainable university as a higher education institution, as a whole or as a part, that addresses, involves and promotes, on a regional or a global level, the minimisation of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfill its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles.

Sustainable concepts have been introduced and considered in various sectors, including the private, government and education sectors (Prugh *et al.*, 2000). The concept of sustainable higher education institutions is not new to higher education institutions abroad, which have long histories of implementation, but it is a major transformation for local institutions of higher learning. Therefore, the Malaysian National Higher Education Strategic Plan, which was launched in 2007, has given priority to transforming higher education to achieve sustainability of higher education beyond the year 2020 (Kementerian Pengajian Tinggi, 2011). This strategic plan outlines seven major core principles. Among these core principles is to improve the quality of teaching and learning for creative human capital and innovative, highly ethical and moral, and critical thinking.

Higher education institutions have a critical role to play in creating a sustainable future, as they educate many of the professionals who lead, manage, and teach in our society (Cortese, 2003). In addition in 2011, another study emphasizes on the role of higher education institution in sustainable development, which stated that as higher education institution fulfil three main functions (education, research, and governance) which qualify them as facilitators of sustainable development (Sabine, 2011). Hence the way to the intended destination requires a quantum leap in human resource development not only in terms of quantity but also in quality and

ability to capture and then make use of relevant knowledge and skills. As a result of this, indirect labor demands have resulted in technical and vocational institution, particularly in the skilled and semi-skilled workers, is increasing. Thus, for the sustainable development of higher education institutions, UNEVOC (the International Centre for Technical and Vocational Education and Training) in 2004 outlined the elements of research and development in sustainable development of technical and vocational education and training. Technical and vocational education and training are one of the educational programs available in the Malaysian higher education institutions.

According to Button (2008), there are three recommendations for the implementation of its sustainable features in higher education institutions, as follows: (i) To ensure that the institution has a division of facilities and services to operate a sustainable campus. Staff facilities play a paramount role in implementation and operation in order to achieve sustainable higher education institutions. It is intended to bring all non-facility staff and facilities staff together to collaborate in contributing to the implementation of sustainable features in higher education institutions. (ii) To ensure the support of the higher education institutions' administration and student leaders. This support can enable the university to obtain a source of income through program outcomes or sustainable activities that have been implemented in higher education institutions. (iii) To exercise patience, because there are many challenges associated with the implementation of sustainable institutions of higher education.

The successful implementation of sustainable development in higher education institution cannot be denied, besides facility management competencies required, financial is also a factor to be considered. Where the findings of Tarah and Heather (2012) for facility management director at higher education institution found that to implement sustainable development, the main obstacle is financial resources. Likewise, with the acquired results

that have been implemented at the University of Aegean in Greece by Konstantinos *et al.*, (2009). So that for success to sustainable development in higher education institution, it's necessary to combine the principal and concept of sustainability and facility management competencies into related programs to produce professionals who can manage sustainably and proficiently.

Why Facility Management Competencies?

As discussed above, sustainable development has been widely discussed in many industries and businesses. The facilities management industry is no exception: In recent years, the issue of sustainability has been frequently discussed among facilities management professionals (Wood, 2006; Shah, 2007). Elmualim *et al.*, (2010) conducted a study examining obstacles to the facility management profession's commitment to the sustainability agenda. The barriers identified were lacked of knowledge, lack of senior management commitment and time constraints. According to Elmualim *et al.*, (2010), facility management professionals are assigned to perform and manage sustainability as a core business strategy, facing many responsibilities and challenges. They also noted that the facility manager is a person who must be at the forefront of change and organizational behavior, in a position to influence the individuals who work in the industry, government departments and public services.

In addition, efficient facilities management is an important influence in determining profit, productivity, energy management, waste management, employee welfare and public perceptions of the organization (Pitt, 2005; Ayres *et al.*, 2007; Smith, 2007; Ortiz *et al.*, 2009). Therefore, the individual who is detailed to carry out this sustainability needs to have both theoretical and practical knowledge of key sustainability issues. Given these barriers, the individual who manages the facility or the facilities manager at a higher education institution should have specific competencies

for the successful implementation of sustainable development.

The International Facility Management Association (2007) has undertaken a review of the future needs of facility managers. The main issue identified in this study was sustainability. To face the demands, challenges and opportunities for sustainable development and practice, facility managers need to develop the appropriate competencies as fully as possible. As preparation for the future, facilities management professionals should carefully assess their current competencies in relation to the key issues that emerge. Professional facilities management is closely related to the competencies of facility managers (Frans, 2008). According to Elmualim *et al.*, (2010), the facility management sectors in higher education institutions are responsible for the built environment of university campuses, which gives them the greatest role in contributing to the reduction of the built environments' potential impact on the environment. Subsequently, this environmental role directly impacts the advancement of sustainability across its four pillars: society, the economy, the environment and culture (Mula & Tilburry, 2011). Thus, in implementing sustainable development in higher education institutions, the facilities manager or the individual who manages the facility must equip themselves with the appropriate competencies. In the UK ten years ago, there was increased interest in the application within the competency framework in the development and selection of expert managers and general managers. Most of the works involved in developing this framework have been focused upon the role of the facilities managers (Roberts, 2001).

Therefore, professional bodies such as the IFMA and the BIFM have adopted the competency framework as a basis for professional accreditation in the field of facility management (Clark and Hinxman, 1999). Several of these competency areas share some of the same competences: these include, for example, in the field of human

resources, communication competence and communication of information within the same field. Therefore, Markus and Cameron (2002) have specified five areas of facility management competencies that are essential to realize the mission to the organization. Similarly, Clark and Hinxman (1999) listed thirteen competencies recommended for directors and senior managers of the facility, these being issues related to the environment, visionary building design, relevant law, project management, research and analysis, facility management process, real estate portfolio management, risk management, stress management, marketing, monitoring, managing conflict and managing time.

In contrast, Payne (2000) suggests four areas that should be prerequisites for professionals involved in facilities management, although he does not specify these areas as competencies. By referring to the literature and earlier discussions, various authors have argued that these fields can be used as a guide for identifying competencies for polytechnic facility management. Then, in 2005, a further study listed ten key features for a facilities manager to be used as a reference for facility management competency (Atkins and Brooks, 2005); the Institute of Higher Education Facilities Management Professionals in Netherlands has identified nine key competencies for facility managers (Van de Ende, 2006). Meanwhile, for education organizations, Hauptfleisch and Verster (2011) stated that there are seventeen Higher Education Facility Management Associations but only four are active associations, this being the Association of Physical Plant Administrators (APPA) in the United States of America, the Association of University Directors of Estates (AUDE) in the United Kingdom, the Tertiary Education Facilities Management Association (TEFMA) in Australia and the Higher Education Facilities Management Association (HEFMA) in South Africa.

Of these four associations, the only one that has indicated a list of core competency areas involved in higher education institutions is APPA (2010) which states that these core

competencies are General Administration & Management, Operations & Maintenance, Planning, Design & Construction and Energy, Utilities & Environment. Table 1 summarises the competencies identified in the literature discussed above.

Table 1: Facility Management Competencies from Literature and Facility Management Professional Bodies

Item	Competency Areas	IFMA 2010	BIFM 2010	FMA Australia 2010	RICS	HKIFM 2010	APPA 2010	Clark and Hinxman 1999	Payne 2000	Markus and Cameron 2002	Atkin and Brooks 2005	Van de Ende, 2006	National Research Council 2008
1	Leadership and Management												
	Leadership and management	√					√						√
	Managing change			√						√		√	√
	Professional practice				√		√		√		√		√
	Law				√	√	√	√	√			√	√
	Real estate law					√							
	Manage the assigned personnel to the facility function	√						√				√	√
2	Organization Management												
	Understand the organization structure and organization administration		√				√				√		√
	Understand organizational aim and strategy		√		√						√		√
	Develop FM strategy in line with organizational strategy	√	√	√	√			√		√	√	√	
3	Human Resource Management												
	Human resource management in facility management work process		√	√	√	√	√			√	√	√	√
	Effective communication	√	√	√			√		√			√	√
	Cooperation with suppliers and specialists for matters/work process related to Facility management		√		√								
	Workplace management rapport			√					√	√	√	√	
4	Premises Management												
	Management matters on organizational property	√	√	√	√	√	√	√					
	Understand building design		√				√	√					√
	Maintenance of building elements (roof, floor, external wall, stairs, etc.)		√	√	√								
	Improve facility performance			√									√
	Workplace management relation				√		√						

Item	Competency Areas	IFMA 2010	BIFM 2010	FMA Australia 2010	RICS	HKIFM 2010	APPA 2010	Clark and Hinxman 1999	Payne 2000	Markus and Cameron 2002	Atkin and Brooks 2005	Van de Ende, 2006	National Research Council 2008
5	Service Management												
	Manage building service systems (e.g. drainage, piping, sanitary, safety, or electrical system, etc.)	√	√	√	√		√		√	√			√
	Execute the contract management works	√	√	√					√				
	Manage support services (e.g. cleaning team, caterer/food supplier, landscaping, etc.)	√	√	√	√						√		
	Project management (Includes minor renovation and repair/refurbishment etc.)	√	√	√	√	√	√	√					√
6	Operation and Maintenance Management												
	Monitor the procurement, installation, operation, maintenance and disposition of internal building system	√				√	√		√	√			√
	Manage the building structure and internal permanent fittings maintenance	√	√				√		√	√			√
	Monitor the procurement, installation, operation, maintenance and disposal of furniture and equipment.	√					√		√	√			√
	Monitor the procurement, installation, operation, maintenance and disposition of exterior building elements	√					√		√	√			√
	Implement operation and maintenance management	√	√				√		√	√			√
7	Work Environment Management												
	Environmental issues (Such as recycling, energy saving, etc.)	√	√	√		√	√	√	√				√
	Space management		√	√		√	√		√				√
	Regard the health, safety and physical safety management in the organization	√				√	√		√				√
8	Resource Management												
	Works related to resource procurement		√	√	√								√
	Risk management involved in the work process done		√	√				√		√	√		√
	Financial management in managing organizational resources	√	√	√	√	√	√			√		√	√
	Quality management in managing the organization's resources	√	√					√		√	√		√
	Information management in managing the organization's resources	√	√		√	√							

Referring to Table 1, question arise as to whether these competencies are appropriate for all higher education institutions around the world. Multiple answers are possible, as some of these competencies are likely to be widely applicable while others are specific to certain fields. Hence the research in facility management competencies in Malaysian Higher Education Institutions should be viewed more closely.

From previous literature (Clark and Hinxman, 1999; Roberts, 2001; Markus and Cameron, 2002; Best *et al.*, 2003; Warren & Heng, 2005; Van den Ende, 2006; Hauptfleisch, 2011), facilities management professional bodies (IFMA, 2010; BIFM, 2010; FMA Australia, 2010; HKIFM, 2010), and facility management associations of Higher Education Institutions in the United States (Association of Physical Plant Administrators (APPA)), in the United Kingdom (Association of University

Directors of Estates (AUDE)), and in Australia (Tertiary Education Facilities Management Association (TEFMA)), we recommend eight areas of facility management competencies that need to be reviewed to realize the polytechnics' transformation plan, which was launched based on a synthesis of all of these sources of information. Subsequently, in light of the necessary competencies for facilities management and features that should be in place for a facilities manager, competencies required in facilities management are summarised in Table 2. This table divides the set of competencies into eight areas consisting of thirty-six competencies. The areas of competencies are leadership and management, understanding the business, human resource management, managing the premises, management services, operations and maintenance, managing the work environment and managing resources.

Table 2: The Eight Areas of Polytechnic Facility Management Competencies

Variable	Competencies	No. of Items	Sources
1	Leadership and Management	(6)	
	Plan and sort the facility function		IFMA, 2010; Clark & Hinxman, 1999; Van de Ende, 2006; National Research Council, 2008
	Has the characteristics of leadership and management		IFMA, 2010; APPA, 2010; National Research Council, 2008
	Knowledge in real estate law		HKIFM, 2010
	Knowledge of of the relevant law		RICS; HKIFM, 2010; APPA, 2010; Clark & Hinxman, 1999; Payne, 2000; Van de Ende, 2006; National Research Council, 2008
	Professional management practices		RICS; APPA, 2010; Payne, 2000; Atkin & Brooks, 2005; National Research Council, 2008
			FMA Australia, 2010; Markus & Cameron, 2002; Van de Ende, 2006; National Research Council, 2008
2	Understanding Business Organisation	(3)	
	Understand the organization's structure and administration		BIFM, 2010; BIFM, 2010; Atkin & Brooks, 2005; National Research Council, 2008
	Understand organizational aim and strategy		BIFM, 2010; RICS, 2010; Atkin & Brooks, 2005; National Research Council, 2008
	Develop facility management strategy in line with organizational strategy		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; RICS; Clark & Hinxman, 1999; Markus & Cameron, 2002; Atkin & Brooks, 2005; Van de Ende, 2006

Variable	Competencies	No. of Items	Sources
3	Managing Human Resources	(5)	
	Human resource management in facility management work process		BIFM, 2010; FMA Australia, 2010; RICS; HKIFM, 2010; APPA, 2010; Markus & Cameron, 2002; Atkin & Brooks, 2005; Van de Ende, 2006; National Research Council, 2008
	Effective communication		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; APPA, 2010; Payne, 2000; Van de Ende, 2006; National Research Council, 2008
	Cooperation with suppliers and specialists for matters/work processes related to facility management		BIFM, 2010; RICS, 2010
	Logistics management		HKIFM, 2010
	Workplace management rapport		FMA Australia, 2010; Payne, 2000; Markus & Cameron, 2002; Atkin & Brooks, 2005; Van de Ende, 2006
4	Managing Premises	(5)	
	Management matters on organizational property		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; RICS; HKIFM, 2010; APPA, 2010; Clark & Hinxman, 1999
	Understand building design		BIFM, 2010; APPA, 2010; Clark & Hinxman, 1999; National Research Council, 2008
	Maintenance of building elements (roof, floor, external wall, stairs, etc.)		BIFM, 2010; FMA Australia, 2010; RICS
	Improve facility performance		FMA Australia, 2010; National Research Council, 2008
	Workplace management relations		RICS, 2010; APPA, 2010
5	Managing Services	(4)	
	Manage building service systems (e.g. drainage, piping, sanitary, safety, electrical systems, etc.)		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; RICS; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008
	Execute the contract management works		HKIFM, 2010; National Research Council, 2008
	Manage support services (e.g. cleaning team, caterer/food supplier, landscaping, etc.)		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; Payne, 2000
	Project management (includes minor renovation and repair/refurbishment etc.)		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; RICS; HKIFM, 2010; APPA, 2010; Clark & Hinxman, 1999; National Research Council, 2008
6	Managing the Work Environment	(3)	
	Environmental issues (such as recycling, energy saving, etc.)		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; HKIFM, 2010; APPA, 2010; Clark & Hinxman, 1999; Payne, 2000; National Research Council, 2008
	Space management		BIFM, 2010; FMA Australia, 2010; HKIFM, 2010; APPA, 2010; Payne, 2000; National Research Council, 2008
	Regard the health, safety and physical safety management in the organization		IFMA, 2010; HKIFM, 2010; APPA, 2010; Payne, 2000; National Research Council, 2008

Variable	Competencies	No. of Items	Sources
7	Managing Resources	(5)	
	Works related to resource procurement		BIFM, 2010; FMA Australia, 2010; RICS; National Research Council, 2008
	Risk management involved in the work process done		BIFM, 2010; FMA Australia, 2010; Clark & Hinxman, 1999; Markus & Cameron, 2002; Atkin & Brooks, 2005; National Research Council, 2008
	Financial management in managing organizational resources		IFMA, 2010; BIFM, 2010; FMA Australia, 2010; RICS, 2010; HKIFM, 2010; APPA, 2010; Markus & Cameron, 2002; Van de Ende, 2006; National Research Council, 2008
	Quality management in managing the organization resources		IFMA, 2010; BIFM, 2010; Clark & Hinxman, 1999; Markus & Cameron, 2002; Atkin & Brooks, 2005; ; National Research Council, 2008
	Information management in managing the organization resources		IFMA, 2010; BIFM, 2010; ; RICS, 2010; HKIFM, 2010
8	Operations and Maintenance	(5)	
	Monitor the procurement, installation, operation, maintenance and disposition of internal building systems		IFMA, 2010; BIFM, 2010; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008
	Manage the building structure and Internal Permanent fittings maintenance		IFMA, 2010; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008
	Monitor the procurement, installation, operation, maintenance and disposal of furniture and equipment.		IFMA, 2010; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008
	Monitor the procurement, installation, operation, maintenance and disposal of exterior building elements		IFMA, 2010; BIFM, 2010; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008
	Implement operation and maintenance management		IFMA, 2010; HKIFM, 2010; APPA, 2010; Payne, 2000; Markus & Cameron, 2002; National Research Council, 2008

Research Questions

From the problems that have been discussed, it can be said that competency is a matter of utmost importance and challenges at present. The research aims to find answers what is facility management competencies required by individuals who manage facilities in polytechnics.

Research Objective

To solve the problems of the study that has been discussed before, then this study is intended to identify the facility management competencies to manage facilities in polytechnics.

Methodology

To obtain an understanding of the competencies required of individuals who manage the facility to allow them to engage with the sustainability agenda, a self-administered questionnaire (based on the literature and expert interviews) was conducted by mail among individuals who are involved in facilities management. A questionnaire survey was considered the most appropriate method of objectively examining the facility management competencies required to manage the facilities in the polytechnics. Questionnaire surveys have been used in investigating perceptions and opinions of respondent in several industries in the Malaysia (Salmiah, 2004; Ilhaamie, 2008; Yahya, 2009). In Salmiah’s (2004), investigation of competencies

and the performance of professional and support staff among government agencies, a similar approach was used.

To accomplish this study, the researchers identified 18 polytechnics from which to gather data. The study used a descriptive research design and was carried out using the questionnaire survey method. The data collected from the completed questionnaires was analyzed using frequency, Cronbach's Alpha and Relative Importance Index (RII) analysis. The Statistical Package for Social Sciences (SPSS) version 20 software was used in order to facilitate the data analysis.

Sample

A purposive sampling method was chosen, which involved 1050 facility management personnel. 1050 questionnaires were distributed by registered post and 62.952% were received from the respondents. All items were prepared in English and the National Language, as those who are responsible for the implementation of facilities management are professional or support workers and come from different educational backgrounds. A six-point Likert scale was used to measure the importance of the areas of competence and training needs (1 = not important at all and 6 = most important).

Instrumentation

This study used a questionnaire instrument that consisted of two sections, A and B. Section A contained thirty-six items about the importance of facility management competencies adapted from the literature, as mentioned in Table 1, and expert interviews were conducted before the pilot study was undertaken. In the interview sessions, we discussed the vision, problems, recent industrial status and necessary facility management competencies. Then, we improvised the facility management competencies based on the interview. Finally, we organized the facility management competencies into clusters, as shown in Table 2. Section B contained five items related to individual demographics.

Results and Discussion

Reliability of the Instrument

The Cronbach's Alpha reliability test was carried out to determine the reliability of the responses obtained for each of the facility management competencies listed in the questionnaire. Nunnally and Bernstein (1994) suggested that Cronbach's Alpha values greater than 0.7 are adequate. In this study, Cronbach's Alpha values of all competencies exceeded 0.9, and were thus beyond the value of reliability needed (see Table 3). The instruments used can thus be said to have high reliability for measuring the importance of facility management competencies in the polytechnics.

Facility Management Competencies: Mean Scores

According to the factor analysis result, the analysis shows that the first factor contains items from the constructs of Leadership and Management, Management Organization and Human Resource Management. The combination of these three constructs will form one factor, which needs to be given a suitable name. Hence, the first factor, which is comprised of twelve items, is called Leadership in Organization and Human Resources Management. This factor has an Eigenvalue of 19.15 and contributes 53.19% of the variance. The second factor obtained contained items from the Services Management and Premises Management constructs. It was found that this nine-item factor focused on services issues. Hence, the new name given to this factor must be considered appropriate when considering the stated nine focused items. The new name suggested is Services Management: this factor has an Eigenvalue of 2.71 and contributes 7.52% of the variance. The third factor obtained is the Operation and Maintenance Management factor, which contains five items, has an Eigenvalue of 1.64 and contributes 4.57% of the variance.

The fourth factor obtained contains items from the Working Environment and Resources Management construct, so the suggested new

Table 3: Values of Cronbach's Alpha for Facility Management Competencies

Competencies	Cronbach's Alpha if Item Deleted
Plan and sort the facility function	0.973
Has the characteristics of leadership and management	0.973
Have knowledge in real estate law	0.974
Have knowledge of the relevant laws	0.974
Professional practices in the management	0.973
Ability to manage change	0.973
Understand the organization structure and organization administration	0.973
Understand organizational aim and strategy	0.973
Develop facility management strategy in line with organizational strategy	0.973
Human resource management in facility management work process	0.973
Effective communication	0.973
Cooperation with suppliers and specialists for matters/work processes related to facility management	0.973
Logistics management	0.973
Workplace management rapport	0.973
Management matters on organizational property	0.973
Understand building design	0.973
Maintenance of building elements (roof, floor, external wall, stairs, etc.)	0.973
Improve facility performance	0.973
Workplace management relation	0.973
Manage building service systems (e.g. drainage, piping, sanitary, safety or electrical systems, etc.)	0.973
Execute the contract management works	0.973
Manage support services (e.g. cleaning team, caterer/food supplier, landscaping, etc.)	0.973
Project management (includes minor renovation and repair/refurbishment etc.)	0.973
Environmental issues (such as recycling, energy saving, etc.)	0.973
Space management	0.973
Awareness of health, safety and physical security management in the organization	0.973
Works related to resource procurement	0.973
Risk management involved in the work process done	0.973
Financial management in managing organizational resources	0.973
Quality management in managing the organization's resources	0.973
Information management in managing the organization's resources	0.973
Monitor the procurement, installation, operation, maintenance and disposal of internal building systems	0.973
Manage the building structure and internal permanent fittings maintenance	0.973
Monitor the procurement, installation, operation, maintenance and disposal of furniture and equipment.	0.973
Monitor the procurement, installation, operation, maintenance and disposal of exterior building elements	0.973
Implement operation and maintenance management	0.973

name for this factor is Working Environment and Resources Management (taking into consideration the eight focus items below). This factor has an Eigenvalue of 1.25 and contributes 3.48% of the variance. The fifth factor is obtained from the Leadership and Management construct. As the two items in the fifth factor are seen to have a clear focus on the law, it is named Management of Real Estate Law. This factor has an Eigenvalue of 1.09 and contributes 3.03% of the variance. The findings of this study is summarized in Table 4. There are five main competencies areas, which are Leadership in Organization and Human Resources Management (consisting of 12 competencies), Services Management (consisting of 9 competencies), Operation and Maintenance Management (consisting of 5 competencies), Working Environment and Resource Management (consisting of 8 competencies) and Management of Real Estate Law (consisting of 2 competency).

Table 5 and Figure 1 show the general ranking in order of the area of competence in polytechnics. It was agreed upon by the respondents that the most important competencies for a polytechnic are professional practices in management and the ability to plan and sort the facility's functions, for which the mean scores were 5.277 and 5.250 respectively. Both of these competencies are from the area of leadership in organizational and human resource management. These were followed by competencies regarding health, safety and physical security management in the organization (mean score = 5.230) from the area of working environment and resource management. The next highest scores were for effective communication competencies and understand the organization's structure and administration (also from the area of leadership in organizational and human resource management) with mean scores of 5.212 and 5.201 respectively. These are the five essential competencies in order of mean score. The results of the study support past studies that found that the most important skills to be a qualified facility manager are leadership skills; the most

Table 4: Facility Management Competencies Areas

Competencies areas	Number of competencies
Leadership in organization and human resources management	12
Services management	9
Operation and maintenance management	5
Working environment and resource management	8
Management of real estate law	2

important body of knowledge to be a qualified facility manager is managing people; and the most important roles of a facility manager are operations and maintenance (Jayanthi, 2007). The results of this study are also parallel with studies conducted by Sabine (2013), in which he found that leadership is the most important factor for all the different functions in an higher education institution.

While a knowledge of real estate law (mean score = 4.251) and knowledge of the relevant laws (mean score = 4.504), both from the area of management law, are the two least essential competencies according to the mean scores. Understanding building design competencies and management matters relating to organizational property competencies (from managing premises area) and competencies relating to executing contract management works (managing services area) had the next lowest mean scores respectively.

Demographic Data

The responses received for this study through the questionnaire were very satisfactory. This is based on the returned questionnaire forms that were duly completed by the respondents. The results showed that 10% of the involved respondents were from premier polytechnics, while the remaining 90% were made up of personnel working in conventional polytechnics. The analysis revealed that these respondents possess different educational backgrounds, based on the responses regarding their workplace and position. 72.2% of them

Table 5: Mean Scores of the Facility Management Competencies

Competencies	Mean	Std. Deviation
Workplace management rapport	5.141	0.891
Ability to manage change	5.139	0.880
Human resource management in facility management work process	5.071	0.921
Financial management in managing organizational resources	5.056	1.026
Quality management in managing the organization's resources	5.038	0.952
Information management in managing the organization's resources	5.032	0.974
Cooperation with suppliers and specialists for matters/ work processes related to facility management	4.986	0.970
Environmental issues (such as recycling, energy saving, etc.)	4.979	1.036
Space management	4.973	1.013
Improve facility performance	4.959	1.036
Risk management involved in the work process done	4.936	0.995
Manage building service systems (e.g. drainage, piping, sanitary, safety, electrical systems, etc.)	4.929	1.175
Monitor the procurement, installation, operation, maintenance and disposal of internal building systems	4.911	1.113
Implement operation and maintenance management	4.882	1.123
Works related to resource procurement	4.877	0.992
Monitor the procurement, installation, operation, maintenance and disposal of furniture and equipment	4.865	1.121
Logistics management	4.859	0.989
Monitor the procurement, installation, operation, maintenance and disposition of exterior building elements	4.818	1.097

Competencies	Mean	Std. Deviation
Maintenance of building elements (roof, floor, external wall, stairs, etc.)	4.794	1.164
Manage the building structure and maintenance of internal permanent fittings	4.785	1.110
Plan and sort the facility's functions	4.752	1.035
Project management (include minor renovation and repair/refurbishment, etc.)	4.744	1.170
Manage support services (e.g. cleaning team, caterer/ food supplier, landscaping, etc.)	4.708	1.235
Execute the contract management works	4.694	1.183
Have knowledge of the relevant law	4.504	1.055
Management of matters on organizational property	4.436	1.220
Understand building design	4.393	1.158
Have knowledge of real estate law	4.251	1.272

had an educational background in engineering, commerce, hospitality, design, accounting and so forth because the respondents working in departments in the polytechnics (as mentioned previously) whereas the remaining 27.8% of respondents were support staff who managed the facilities as technicians. In terms of experience in implementing facility management activities, it was found that 7.7% of the respondents had relevant work experience of more than ten years, while 13.2% had working experience in facility management of between six and ten years, 25.6% of respondents had experience of between three and years and 53.6 % had less than three years' experience. However, most respondents had extensive service in the polytechnics and experience in managing duties. This can be illustrated through the results obtained: 30.7% of respondents had more than ten years' experience of working in polytechnics, while 54.9% had between three and ten years' experience and 14.4% respondents had less than three years' experience.

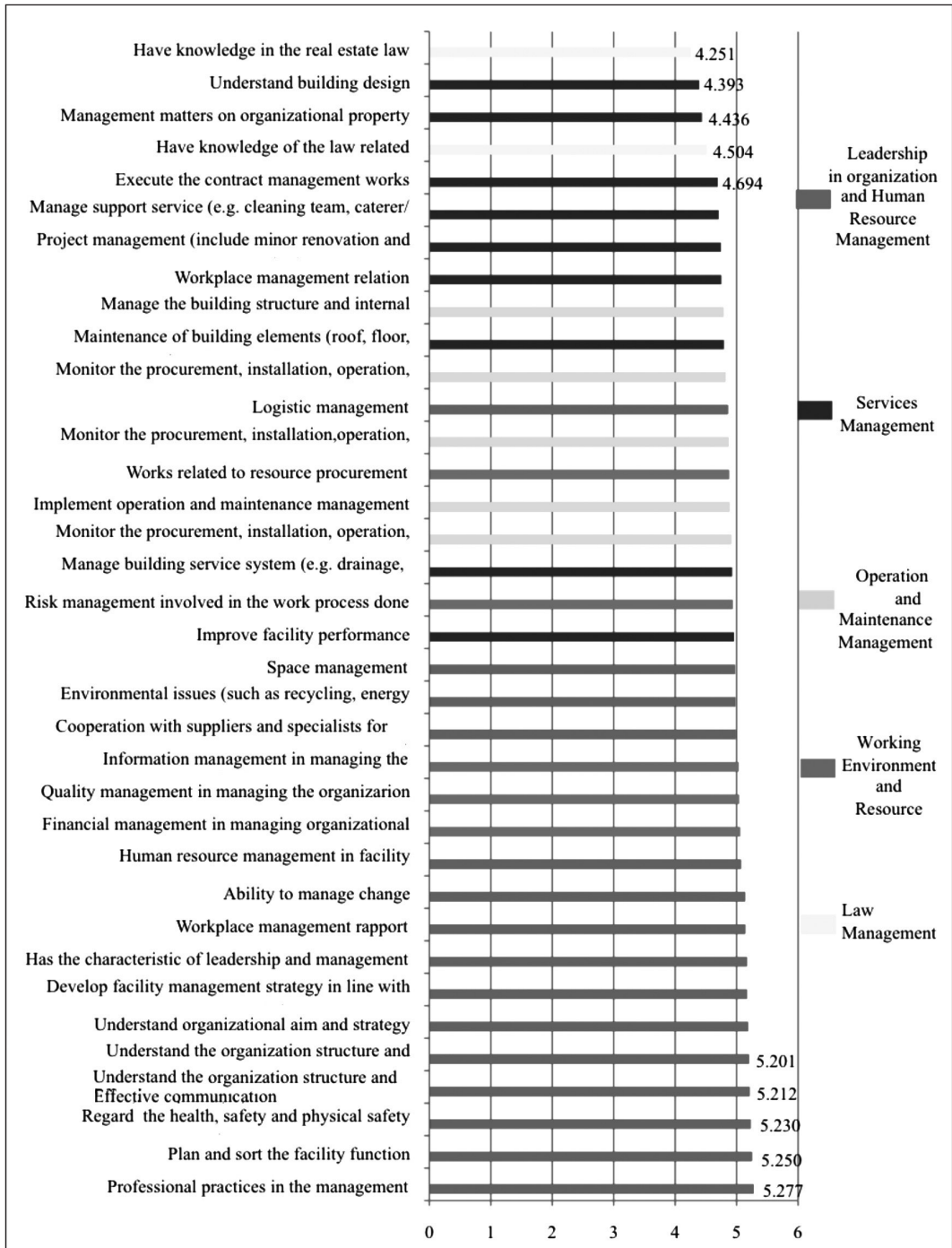


Figure 1: Importance Ranking of the Facility Management Areas of Competence

Implication

The main contribution is the development of the methodology for identifying the competency instrument facility management and key performance indicators for the polytechnics transformational plan. As there are more instruments developed for facility management competencies, this study provides an instrument that can add treasure to facility management. The instruments have been built through some process of validation and reliability in order for it can be used for similar studies.

Recommendation

These studies only run in 18 of Polytechnic main campus. Then the obtuse related findings are only relevant in the context of this population and it does not reflect the overall practice of Polytechnic in Malaysia. Follow-up can be done by engaging the whole polytechnics and technical institutes in Malaysia for the purpose of validity. Because this study has limitations in terms of the scope of the obtuse, therefore it is suggested that follow-up research with wider scope to the senior management at the Polytechnics can be carried out in order to obtain their views and alternative input since the issues under review are complex. Such efforts will contribute to the enrichment of knowledge and construction of theory.

Conclusion

The study offers insight into key issues facing higher education institutions such as polytechnics in the context of facility management competencies appropriate for sustainable development. The findings indicates that, overall, there are certain competencies that are imperative for facilities management personnel or facilities managers. These results can be used as a basis to prepare for a HEIs sustainable development such as curriculum in Malaysia for the relevant facilities managers, and also, for polytechnics, they can assist management in organizing and planning the training competencies needed by staff to

implement the work of facilities management. In this way, they can also resolve the problem mentioned earlier that there are no personnel qualified in facilities management to manage facilities in the polytechnics. Further, through these findings, the management also identified that only individuals with competencies such as professional practices in the management, planning and sorting of the facility's functions, health, safety and physical safety management in the organization, effective communication and understanding the organization's structure and organization are qualified to perform the work of facilities management in polytechnics and indirectly these findings can also reduce student grievances against the facilities provided.

The authors hope that these findings will become a catalyst for a more comprehensive study. It should be noted that research into Malaysian polytechnic facilities management competencies is not well documented in the literature. To provide stronger evidence for the adequacy of the results, future research is suggested to examine these issues with larger samples involving all polytechnics in Malaysia. This study could also be used by other higher education institutions to ensure that facilities management personnel have these competencies. It is useful to ensure that the facilities management system in higher education institutions is of high quality and thus can improve the image of the institution in the world and reach the Government target of 37% of workers being highly skilled by 2015, ensuing widespread success of the transformation plan set out by the government.

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