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Facilities Management Competencies in Developing and Developed Regions: Comparative Study on Sri Lanka and Hong Kong

Abstract

Purpose: Facilities management (FM), which is crucial for the operation and sustainability of buildings and infrastructure across the world, covers a wide range of competencies that may vary across regions. Focusing on Sri Lanka and Hong Kong, this study aimed to reveal and compare the importance and current competency levels of FM competencies in these regions, based on which appropriate education and training can be formulated to enhance the growth of their FM sectors.

Design/methodology/approach: After an extensive literature review, 12 FM competency attributes (CAs) were identified. A questionnaire survey in Sri Lanka and Hong Kong solicited the industry practitioners' perceived importance and current levels of the CAs. The survey responses, 126 from Sri Lanka and 148 from Hong Kong, were analysed by a modified Importance-Competency Analysis (ICA) matrix, followed using the Mann-Whitney U test to identify any differences in the responses between the two regions.

Findings: Between Sri Lanka and Hong Kong, significant differences were found to exist in the importance and current competency levels of over half of the CAs. Among the CAs requiring priority attention, 'operation and maintenance' and 'leadership' are the top two in Sri Lanka while the top two in Hong Kong are 'technology' and 'leadership'.

Originality: This study yielded insightful results on the importance of FM competencies and the current competency levels in a developing region and a developed region, which are useful for the development of FM education and research.

Keywords: Facilities management, Competency, Education, Training, Sri Lanka, Hong Kong

Article classification: Research paper

1. Introduction

According to the International Organization for Standardisation (ISO, 2017) and later outlined by the International Facility Management Association (IFMA, 2023), "FM is an organisational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business". Many professional bodies, such as the IFMA, the Royal Institution of Chartered Surveyors (RICS), and Institute of Workplace and Facilities Management (IWFM) (formerly known as the British Institute of Facilities Management, BIFM), have established FM competencies for professionals. However, the competency requirements may vary with the context concerned, such as scale of the industry, country, region and maturity levels (Jensen, 2012). In some cases, the importance of a particular competency may not align with the level of competency, and vice versa.

As defined by Jovanovic and Tomovic (2008), "A competency is the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform critical work functions or tasks in a defined work setting". It contains job-relevant behaviour, enthusiasm, and technical expertise, and it is used to make sure that all expectations in the workplace are satisfied (Kamaruzzaman *et al.*, 2018). According to Atkin and Brooks (2021) competencies are learned personal abilities that represent the capacity to continuously execute at a high or

appropriate level in a particular work function. According to Michie *et al.* (2011), competencies can also be seen in terms of emphasizing skills over knowledge and their ability to enable practice change.

As described by McGuinness and Ortiz (2016), the lack of competency is the "phenomenon whereby the skill levels of workers are insufficient to meet the requirements of their current job". In the FM research domain, not many studies have examined the importance of professional competencies in practice. However, the industry's demands are continuously shifting on a global scale, necessitating the development of dynamic, innovative, and responsive educational programs to meet these needs (Hall *et al*., 2013). According to a study by Poon and Brownlow (2015), both educators and students believe that secondary education in property-related disciplines has not yet reached the desired levels of strategic and financial aspect integration. In order to close the expectations gaps between academia and industry, Phan *et al.*'s (2020) findings recommend that graduates should be provided with active learning opportunities including project-based and work-integrated training. The study of Roper (2017) stressed that while certain economies excel in cognitive abilities at the secondary level, many higher education institutions, particularly those specialising in engineering and technology, neglect the importance of soft skills, and the essential competencies that could foster international collaboration and contribute to the advancement of FM in developing economies. This implies that there may be differences between the FM industries in both developed and developing regions.

In view of the above research problem, the present study was conducted, aiming to identify the Competency Attributes (CAs) required for FM and assess their importance and achieved levels that FM practitioners perceived. Specifically, the primary research questions the study intended to address are: "What are the key competencies required for the FM industries in developing and developed regions?", and "How do they differ between such regions?" Focusing on Sri Lanka (developing region) and Hong Kong (developed region), objectives of the study are: (1) identify the CAs required for the FM industries in the two regions, (2) analyse the relationship between the perceived importance and current competency levels of each CA in the two regions, and (3) assess any significant differences in the importance and current competency levels of the CAs between the two countries. The preliminary findings of this study are presented in Sridarran *et al*. (2023), and the subsequent research conducted and findings obtained are detailed in this paper.

2. FM Competencies

Facility managers are responsible for a wide range of tasks, ranging from administrative to technical and thus require a variety of competencies. Over time, FM competencies have evolved and different professional organizations and researchers have discovered various CAs that a facility manager should possess.

The RICS has identified eight soft FM competencies that are necessary for cooperative organizational operations and six hard FM competencies that are critical technical abilities for FM operations. Ten competencies have been defined by the IWFM. Furthermore, FM professional organizations in a number of countries, including Australia, Hong Kong, India, and Sri Lanka, have tailored those competencies to meet their particular needs (Table I). Researchers have reviewed and amended these competency categories for different contexts. For example, Clark and Hinxman (1999) proposed 13 competencies as essential for facility directors and senior managers to take correct decisions for managing facilities. Those

knowledge areas are environment, building design visionary, relevant laws, project management, research and analysis, process FM, real estate portfolio management, risk management, stress management, marketing, monitoring, conflict management and time management. Atkins and Brooks (2021) added 10 more competencies to support an organisation's core business: understanding the organisation, culture, customers and their needs; understand and express service requirements and targets; brokerage services to other stakeholders; manage risk; managing contractors and monitor their performance; benchmark outsourcing services; developing the supply of services, and strategies to deliver services; understanding the strategic planning; protect public funds if applicable; and develop internal skills through education, training, and professional development. In another study, Warren and Heng (2005) identified 28 individual competencies and seven areas as required by the FM industry. Awang *et al*. (2014) also suggested a few important competencies in the FM industry, namely, leadership and management, managing people, managing the working environment, managing resources, and operation and maintenance. Among the proposed competencies of the above studies, property management, operations management, maintenance management, sustainability, technology and leadership are commonly specified.

Table I: Summary of FM competencies

With the deviations in the competencies in different contexts, Awang *et al.* (2014) identified four managerial skills, including personal management, operational management, professional practices and change management, are more important than other competencies that a facility manager should have to work in Malaysian technical institutions. Further, Kamaruzzaman *et al*., (2018) identified significant competencies for three levels of FM practice (Strategic, Tactical and Operational) in Malaysia as Strategic: Managing Change, Benchmarking and Strategic Facilities Planning; Tactical: Risk Management, Emergency Preparedness, FM Technology, Service Level Agreement and Supply Management and Operational: Space Planning and Management. In Thailand, it was identified that organisational leadership and human resources management, services management, operation and maintenance, working environment and resource management, management of real estate law are the top FM competency areas in the higher educational sector (Tseng *et al*., 2020). Ismail and Isak (2021) identified five main facilities management service provider competencies in managing green buildings as sustainable procurement, sustainable operations, resource management, repair and maintenance, and environmental health. Further, Jenuwa *et al.* (2020) found that leadership factors, communication factors, operating and maintenance factors, human factors, property and property management factors, and business preparedness and business balance factors are the influencing factors for facility manager competency at the hospital construction stage in Malaysia. Moreover, it was found that, among the skills needed by facility managers in the Sri Lankan hotel industry, technological creativity ranks highest while resource coordination, proficiency, analysis, and decision-making are also important (Priyangika *et al.*, 2020). Because of these differences, it stands to reason that the demands placed on the facility manager will differ, and the quality achieved may be valued differently in different contexts. Therefore, it is critical to identify the significant FM competencies in different regions.

3. Models for Analysing Competencies

Researchers have examined variations of CAs (Awang *et al.*, 2014; Kamaruzzaman *et al*., 2018) and have found that the Importance-Performance Analysis (IPA) matrix or quadrant approach is the widely used method to analyse the level of importance and their perceived level of competency (Lai and Hitchcock, 2015). However, modifications to the original model have

been made due to issues such as crowded attributes and ceiling effects in respondent ratings (Bacon, 2003; Abalo *et al*., 2007). Thus, many studies have been carried out to enhance the original IPA model.

The original quadrant approach has been improved with many changes due to its inherent drawbacks. A diagonal line model (Figure 1b) was introduced by Hawres and Rao (1985) as an alternative approach for IPA. With a 45^0 diagonal line derived assuming the values of importance are the same as the values of performance, that model is used to separate regions of differing priorities (Ormanović *et al.*, 2017). According to Bacon (2003), the distance to the diagonal is seen as a measure for prioritizing the improvement, with the region above the line denoting a high priority and the region below denoting a low priority. According to Abalo *et al*. (2007), the diagonal line approach provides a more seamless transition in the inferred priority.

However, it was argued that the diagonal line model offers less information than the quadrants approach because it has only two categories, and thus has less discriminative power and limited interpretability (Ormanović *et al.*, 2017). Therefore, some researchers combined the quadrant and diagonal approaches (Abalo *et al.*, 2007; Rial *et al*., 2008; Deng *et al*., 2017). Scale-centered, data-centered, and iso-priority diagonal lines were merged into a matrix-grid by Boley *et al*. (2017); however, the iso-priority diagonal line was only utilized to support the significance and effectiveness of each characteristic. A 45° diagonal line that intersects the cross-point of the data-centered quadrants was used to modify the four zones that the data-centered quadrant approach produced in a study by Chang *et al*. (2018). According to Lai and Hitchcock (2015), in order to make the most use of the resources at hand, the IPA mapping's 'keep up the good work' quadrant should be expanded. Consequently, they developed a 'flexible data-centered diagonal line model' which enables organizations to make the best use of their resources by allowing the diagonal line to be shifted upward and to the left to limit qualities that are placed in the 'concentrate here' quadrant and vice versa. In addition, they suggested rotating the diagonal line to find relevant resources for handling various marketing scenarios. Accordingly, modifying the boundaries can offer more perceptive managerial interpretation and enable more freedom in determining the priority level for improvement planning (Bruyere *et al*., 2002). Figure 1 illustrates the different IPA models developed in the past.

Figure 1: Different IPA models

Among the various importance-performance (I-P) assessment approaches, the Importance Performance Analysis (IPA), by virtue of its simplicity, has been commonly used in many industries such as tourism, hospitality, building and construction, education, etc., (Abalo *et al*., 2007; Lai and Hitchcock, 2015; Chen *et al*., 2016; Deng *et al*., 2017; Kim *et al*., 2019; Fan, 2020). The IPA analyses different attributes on two independent dimensions (performance and importance) and integrates them into a matrix that helps to identify the most appropriate strategic options to enhance business operations (Matzler, 2003; Lai and Hitchcock, 2015). While two types of IPA - quadrant model and diagonal line model – Bacon (2003) found that the diagonal line model performed better than the quadrant models, and strongly recommended its use for IPA applications.

4. Research Methodology

4.1 Research approach

The purpose of this research is to identify competencies that are crucial for the FM industry and compare the perceived importance and current levels of the competencies in developing and developed regions, viz. Sri Lanka and Hong Kong. A survey approach was adopted for this study as it provides avenues to collect data from a large number of respondents. Since questionnaire surveys have long been recognized as crucial instruments for social science research (Corbetta, 2003), they were utilized to conceptualize the relationships between the variables. To enable efficient data collection, a web-based questionnaire was developed and distributed via email communication to FM practitioners in the two regions.

4.2 Questionnaire design and distribution

The various CAs identified from the literature, reported in section 2 above, were consolidated through a manual content analysis. To ensure the validity of the consolidated CAs, expert opinions were solicited from 12 council members of the IFMSL. After this validation process, the following CAs were finalised:

- CA1: Property portfolio management: This involves the strategic oversight and optimisation of a collection of properties owned or operated by an organisation. It encompasses activities such as property acquisition, asset management, space planning, maintenance and disposal.
- CA2: Project execution and management: This requires overseeing various initiatives such as renovation projects to ensure timely and efficient completion. Responsibilities include project planning, resource allocation, contractor coordination, budget management and quality control.
- CA3: Technology: This involves leveraging Information Technology (IT) tools and systems to enhance building operation and maintenance processes. This includes utilising software for asset management, predictive maintenance, energy monitoring and space utilisation analysis.
- CA4: Procurement and contracts management: This encompasses activities such as sourcing, selecting, and managing suppliers, negotiating contracts and ensuring compliance with procurement policies and regulations.
- CA5: Organisational resources management: This involves the effective utilisation and optimisation of various resources, including information/knowledge management and labour management. This encompasses activities such as collecting, organising and leveraging data and knowledge to support decision-making processes. Additionally, it involves the efficient allocation and utilisation of labour resources.
- CA6: Operation and maintenance: This encompasses overseeing and enhancing facility operation and maintenance activities. Responsibilities include implementing strategies to improve the efficiency, reliability, and sustainability of building systems and infrastructure, conducting regular inspections, preventive maintenance, troubleshooting and implementing improvements to optimise facility performance.
- CA7: Compliance management: This involves ensuring adherence to quality standards and best practices to meet regulatory requirements and organisational policies. This includes monitoring and enforcing compliance with health and safety regulations, environmental standards and industry-specific guidelines.

- CA8: Leadership: This encompasses strategic planning and decision-making to guide the direction and performance of the facility management function. This involves setting clear objectives, establishing priorities and aligning resources to achieve organisational goals.
- CA9: Emergency preparedness: This involves developing and implementing plans and procedures to ensure business continuity and effectively manage crises and recovery efforts. This includes identifying potential risks, conducting risk assessments and establishing protocols for response and recovery.
- CA10: Legal: This encompasses ensuring compliance with relevant laws, regulations, and standards governing facility operations. This includes understanding and adhering to building codes, health and safety regulations, environmental laws and other statutory requirements.
- CA11: Financial management: This involves various tasks such as budgeting, financial reporting and insurance management to ensure the efficient allocation and utilisation of financial resources.
- CA12: Documentation management: This encompasses the systematic organisation, storage, and retrieval of records and documents related to facility operations and maintenance. This includes maintaining accurate and up-to-date records of maintenance activities, equipment manuals, safety procedures and regulatory compliance documentation.

The survey questionnaire, designed with the above CAs incorporated, comprises six sections. Demographic information was collected via the first and second sections. The third section lists the 12 CAs, for which the survey respondents were asked to indicate their perceived importance levels. The fourth section asks about the perceived current level of the CAs. Both the importance and current levels were rated on a 5-point scale (1: very low to 5: very high), which is a scale adopted in most IPA applications (Fan, 2020; Lai and Hitchcock, 2015; Praničević and Mandić, 2020). The respondents are asked to indicate any additional competencies in the fifth section and any comments, recommendations or suggestions in the sixth section.

The questionnaire was distributed to FM professionals in Sri Lanka and Hong Kong. The Sri Lankan FM professionals were first contacted through the IFMSL, the sole professional body for FM in Sri Lanka. Amounting to 189, these professionals are associate or fellow members of IFMSL. Additionally, there are other non-FM graduates employed as FM practitioners, working for leading facilities in Sri Lanka. Such practitioners, with work experience more than 15 years were selected, and the questionnaire was sent to those the research team have contacts. While in Hong Kong, support was obtained from its three main FM professional institutions, namely, the IFMA – Hong Kong Chapter, the Building Services Operation and Maintenance Executives Society (BSOMES), and the HKIFM. The questionnaire was distributed to their members via mass emails.

4.3 The modified IPA model

The flexible diagonal approach (Lai and Hitchcock, 2015; Chan *et al.*, 2018), combined with the data-centered quadrants approach, was adopted to develop the analysis model for the present study. According to Lai and Hitchcock (2015), researchers can apply the flexible diagonal approach to customize their recommendation. While reference is made to this IPA model, the study investigated 'competency' rather than 'performance'. Hence, the term IPA was modified to become ICA, viz. 'Importance-Competency Analysis'. The following steps elaborate the construct of this ICA model:

- **Step 1:** Initially the data centered traditional matrix with four quadrants was constructed. The location (axis value) of the horizontal demarcation line was determined using the mean rating of the importance levels of all the 12 CAs and the location (axis value) of the vertical demarcation line was determined using the mean rating of the competency levels of all the 12 CAs. The y-axis of the matrix indicates the importance level, whereas the x-axis indicates the competency level.
- **Step 2:** A 45° diagonal line across the demarcation lines is used to re-partition the matrix for further, detailed analysis of the importance-competency ratings. The region above the diagonal line represents a high priority for improvement and the region below represents a low priority; also, the distance to the diagonal line is considered as an indicator for prioritising the improvement (Bacon, 2003).

Figure 4 and 5, as shown later, illustrate the ICA models for Sri Lanka and Hong Kong.

4.4 Mann-Whitney U test

After identifying the importance levels and current competency levels of the 12 CAs, with the aid of the SPSS software the Mann-Whitney U test was used to reveal any significant differences in the importance levels and competency levels of each CA between Hong Kong and Sri Lanka. The likelihood that any observation taken at random from the first group will be greater than any observation from the second group is evaluated using the general form of the Mann-Whitney test (McElduff *et al*., 2010). The difference that cannot be accepted as normal difference or the difference on which the respondents react differently is regarded as significant difference. In this study, differences with p values below 0.05 were regarded as significant.

5. Results and Discussion

5.1 Demographics of the respondents

The total number of usable questionnaires returned was 274, with 126 from Sri Lanka and 148 from Hong Kong. Years of work experience and industrial sectors were the main demographic variables analysed, and the results are shown in Figures 2 and 3.

Figure 2: Years of work experience

The distribution of the respondents plotted in Figure 2 shows that the FM industry of Sri Lanka is in its adolescence as the majority (61%) of the respondents are with only 0-5 years of work experience. This is due to the fact that Sri Lanka had a vacuum of professional facility managers; not until 2006 was its first FM degree programme commenced, and the IFMSL was established in 2012. On the other hand, the Hong Kong responses exhibit a rather even distribution of respondents from the different categories of work experience, with 12% of the respondents being veterans with over 30 years of work experience. This suggests that the FM industry in Hong Kong, when compared to that in Sri Lanka, has a longer development history. In fact, the very early establishments of professional FM institutions in Hong Kong, such as the IFMA's Hong Kong Chapter and the HKIFM, were back in 1992 and 2000 respectively (Lai *et al*., 2019). Both institutions currently have over 400 members. In 1996, Hong Kong was also the first Asian city that launched a higher education FM program in Asia, i.e. the Master of Science in Facility Management programme of The Hong Kong Polytechnic University (Lai *et al.*, 2019).

Figure 3 illustrates the distribution of the respondents based on their industry sector. The majority of the respondents of both regions were from the commercial sector. Only a tiny portion (0.7%) of the Hong Kong respondents worked in the industrial sector, whereas the counterpart of Sri Lanka was much higher (16.5%). This finding supports that the former region is a developed economy while the latter is a developing region.

Figure 3: Industry sectors

5.2 Reliability of Survey Items

Estimating the test score reliability before the analysis is considered desirable in statistics. Helms *et al*. (2006) define the reliability as "the extent to which the sample patterns of responses to items are consistent across the items". Scales used in the survey were tested using Cronbach's alpha test, which is based on a 'internal consistency' coefficient and is the most widely used reliability coefficient test (Cho and Kim, 2015). Reliability coefficients often fall between 0.00 and 1.00. According to Cronbach (1951), a satisfactory result of more than 0.6 is advised. Further, Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were conducted to check sample adequacy. Cronbach's alpha test resulted a value of 0.848 for level of importance and 0.899 for their current competency levels and hence, it shows that the sample patterns of responses are consistent across the items. The value of KMO (0.817) and significance value of Bartlett's test (0.000) justified the adequacy of samples.

5.3. Importance and competency levels of the CAs

Results obtained using the modified ICA for Sri Lanka and Hong Kong are shown in Figure 4 and 5 respectively.

Figure 4: Modified ICA for Sri Lanka

Figure 5: Modified ICA for Hong Kong

Figure 4 shows that six CAs are in high priority zone: CA6 (operation and maintenance), CA8 (leadership), CA3 (technology), CA9 (emergency preparedness), CA11 (financial management) and CA1 (property portfolio management), which need to be quickly improved to enhance the FM industry in Sri Lanka. However, CA7 (compliance management) and CA4 (procurement and contracts management) have been identified as strengths, while others are in the low priority and non-priority zones.

Figure 5 shows that CA3 (technology), CA8 (leadership), CA6 (operation and maintenance), CA7 (compliance management), CA1 (property portfolio management) and CA5 (organisational resources management) require high attention in Hong Kong. Performance of attributes CA9 (emergency preparedness), CA10 (legal) and CA11 (financial management) are strengths for the FM industry in Hong Kong, and the others are low or non-priority CAs.

5.3.1 Importance and competency levels in Sri Lanka

The highest deficiency in terms of the competency level was found with CA6 (operation and maintenance). Building owners and users are still reluctant to recognize 'operation and maintenance' as one of the main drivers for organisational improvement. Under this circumstance, operation and maintenance in Sri Lanka has been encapsulated by various shortfalls, including inadequate knowledge and experience, slow technology adoption, and lack

of involvement at the strategic level. This finding is similar to the situations in other developing regions (Adewunmi *et al*., 2015; Adewunmi and Ajayi, 2016; Kamaruzzaman *et al*., 2018; Naidoo and Saheed Bayat, 2020; De Silva and Asmone, 2023).

CA8 (leadership) has been identified as the second most critical attribute that needs immediate attention. This could be because the majority of FM professionals have less than five years of experience and yet to reach the top management. Due to the lack of recognition of FM as a strategic-level function in developing regions, facility managers face a scarcity of opportunities to be engaged as leaders at the strategic level and to talk the language of top management (De Silva and Asmone, 2023). This impedes the development of leadership skills among FM professionals, despite Kashiwagi's (2015) assertion that FM professionals should prioritise enhancing their leadership abilities.

CA3 (technology) has been placed as the third most important priority. Information Technology (IT), the Internet of Things (IoT), and BIM-enabled FM applications are not advancing as quickly as FM services because of Sri Lanka's fragmented FM sector and the undeveloped subcontractor market. Inadequate funding and a reluctance to absorb hefty upfront expenses for technology worsen this situation. Moreover, a major barrier to integrating technology into the FM sector is the often-low degree of competency and lack of standards to gauge performance quality. Across many developing economies, this is a typical scenario (Adewunmi and Ajayi, 2016; Dixit *et al*., 2019).

CA9 (emergency preparedness) is one of the 11 essential FM competencies outlined by the IFMA, and it also needs to be addressed in the Sri Lankan context. The recent COVID-19 pandemic, the Tsunami disaster, and the nation's ongoing economic crisis are significant events that highlight the significance of strategic emergency preparedness planning. Chandrasekera and Hebert's (2019) study on the tourism industry discovered that, apart from from flooding, fires, and terrorist attacks, strategies for preparedness had not addressed flooding caused by tsunamis, regular power outages, or other unforeseen circumstances. The same study also discovered that one of the biggest obstacles to raising a company's overall level of preparedness was the lack of funding for creating such plans.

The ICA matrix places CA11 (financial management) in the high-priority zone as well, highlighting the need of responsible financial management in light of Sri Lanka's tight budget and growing operational costs. The primary indications of financial management, according to Amos *et al*. (2021), are the prompt release of funds for FM tasks, the percentage of FM budget, and the cost-effectiveness of delivery. Only a few Sri Lankan organizations use KPIs to improve cost effectiveness in FM operations.

CA1 (property portfolio management) was ranked as the least priority attribute for Sri Lanka. Since the field of FM is still in its infancy, its scope has not yet been greatly extended to property portfolio management in Sri Lanka. Therefore, the respondents' lack of expertise and understanding may be the cause of this CA's low priority rating.

5.3.2 Importance and competency levels in Hong Kong

As perceived by the respondents from Hong Kong, competency in CA3 (technology) is the attribute with the highest priority. It is currently an indispensable competency around the globe because the fast change in building technology is inevitable and, knowing this inevitability, each facility manager needs to keep abreast of technology advancements in the upcoming years

and educate their subordinates to help them grow towards the change (Gunasekara *et al.*, 2022; Sarkar, 2021).

CA8 (leadership) was highlighted as the attribute with the second highest priority. This finding is in line with findings from other countries in the same Asian region such as Singapore, which shares similar characteristics in the FM industry. According to Gao *et al.* (2020), CA8 is considered highly essential to improve FM towards higher productivity. The study by Ling *et al.* (2022) suggests that in Singapore, when the leadership skills of facility managers are improved and they are given more power to make decisions, they have higher job satisfaction.

While many studies and industry initiatives have already been implemented in Hong Kong to improve CA6 (operation and maintenance) (Lai and Yik, 2012), it is still highlighted as one of the attributes that needs urgent attention. Lai and Yik (2006) revealed that most facility managers were not familiar with the role 'sustainability' plays in building operations and maintenance and emphasised the need of more robust education in this aspect.

CA7 (compliance management) was also one of the attributes highlighted as high priority. According to Ivanov *et al*. (2022), as Hong Kong had rapid economic growth in the past 40 years, numerous super tall building projects, large shopping malls with tall atria, large halls, deep underground stations and long tunnels had been built since the 1990s. The management of such sophisticated structures involves strict compliance with building regulations, most importantly, the regulations for ensuring safety (Lai and Yik, 2004).

CA1 (property portfolio management) has been a popular topic in one of the five sectors of the real estate services industry - one of the major economic pillars of Hong Kong (Lai et al., 2019). The region, with its limited supply of land and the sophisticated nature of the developed properties, requires great proficiency to manage these facilities effectively. A number of studies have been conducted to improve different aspects of property portfolio management in Hong Kong, especially FM performance evaluation (Lai, 2011; Lai and Yik, 2011; Man and Lai, 2015; Lai *et al.*, 2022).

As the sixth highest priority attribute, CA5 (organisational resources management) is emphasized, not only in Hong Kong but also around the globe. To support the smooth functioning of co-business, FM divisions need organizational resources, especially finance. According to Amos *et al.* (2021), this attribute is important because it can ultimately lead to sustainable resource management and hence, FM should not be regarded only as a cost centre.

5.3.3 Comparison between Sri Lanka and Hong Kong

This section presents the results of the Mann-Whitney (U) tests conducted to investigate the significant differences in perceived importance and competency levels of CAs between the respondents from Hong Kong and Sri Lanka. As shown in Table II, significant differences are found across a number of CAs both in terms of importance and competency.

Table II: Mann–Whitney U-test results for perceived importance and competency

- Property portfolio management (CA1)

  There were no significant differences in the levels of importance and current competency perceived for CA1. The alignment suggests a shared recognition of the significance of this competency. This uniformity may indicate a common understanding of the skills needed to

effectively manage property portfolios, reflecting consistent industry and legal expectations or educational frameworks in both regions (Ariyawansa and Gunawardhana, 2017; Wong and Lai; 2019).

- Project execution and management (CA2)

  Both the perceived importance and current competency levels of CA2 showed significant differences between the two regions. Differences in regulatory frameworks, industry standards, or cultural approaches to project management (Ofori, 2013) in Hong Kong and Sri Lanka could contribute to the differences. Additionally, distinct economic conditions and infrastructure development stages may influence the emphasis placed on this CA.

- Technology (CA3)

  CA3, too, showed significant differences in the level of importance and current competency between the two regions. Disparities in technological infrastructure, access to IT resources, and the level of technological integration in building operations and maintenance practices may explain these significant differences (Dedrick *et al.*, 2013). Economic and educational factors could also play a role in contributing to the differences.

- Procurement and contracts management (CA4)

  The significant differences in the importance and the current competency level in CA4 could be attributed to variations in legal frameworks, procurement processes, and industry practices related to contracts management in Hong Kong and Sri Lanka (Ariyawansa and Gunawardhana, 2017; Wong and Lai; 2019). Additionally, cultural factors and economic dynamics may impact the emphasis placed on CA4 in each region.

- Organisational resources management (CA5)

  The significant differences in CA5 could be attributed to differences in organizational structures, resource availability, and management practices (Kim and Utterback, 1983) between Hong Kong and Sri Lanka. Cultural, economic, and business environment disparities may further contribute to these differences.

- Operation and maintenance (CA6)

  In Hong Kong, building operation and maintenance standards are typically characterized by stringent regulations, advanced technology integration, and comprehensive maintenance schedules (Lai and Yik, 2006), whereas in Sri Lanka, standards may vary due to a combination of factors including differing regulatory frameworks, resource constraints, and varying levels of technological adoption and infrastructure development (Sohail *et al.*, 2005). These disparities may account for the significant differences in the perceived importance and competency levels of CA6.

- Compliance management (CA7)

  As regards 'Compliance Management,' the perceived importance levels are consistent but the competency levels differ significantly between Hong Kong and Sri Lanka. This may be resulted from the diverse regulatory landscapes, industry standards, and enforcement practices between the regions. Different levels of legal complexity and compliance

expectations could lead to variations in the perceived competency levels for managing compliance effectively (Iizuka and Bourbon-Galvez, 2009; Evans, 2014; Nwadike and Wilkinson, 2020).

- Leadership (CA8)

  Differences in organizational cultures, leadership styles, and the emphasis placed on leadership (Kim and Utterback, 1983) within the FM context may contribute to significant variations in the perceived importance and competency levels of 'Leadership' between Hong Kong and Sri Lanka. Cultural nuances and industry expectations could further contribute to these distinctions.

- Emergency preparedness (CA9)

  The significant differences in this CA could be attributed to variations in geographical and environmental factors, regulatory frameworks, and the historical context of emergencies (Tabish and Syed, 2013) in Hong Kong and Sri Lanka. For example, in terms of natural emergencies, Hong Kong often faces typhoons and heavy rainfall, while Sri Lanka is more prone to tropical cyclones and flooding. Cultural attitudes towards risk and disaster response may also play a role in this regard.

- Legal (CA10)

  The alignment of perceived importance and current competency levels for this CA in both Hong Kong and Sri Lanka suggests a consistent understanding of the importance of legal knowledge and skills in FM. This uniformity may stem from established legal systems or similar educational emphases in the two regions, highlighting that legal competency is well-recognized for achieving effective FM.

- Financial management (CA11)

  It is worth noting that 'financial management' also do not show significant differences in the perceived importance levels or current competency levels between the two regions. It indicates a shared understanding of the significance of financial expertise in FM. This uniformity may arise from similar financial regulations, industry practices, or educational standards, emphasizing the common recognition of financial competency across both regions (Klammt, 2004).

- Documentation management (CA12)

  Despite the same perceived importance level of CA12 found between Hong Kong and Sri Lanka, the difference in the perceived competency levels of this CA between the two regions may be attributed to variations in educational and professional backgrounds, industry practices, or the existing documentation standards in the regions. It could also reflect differing expectations regarding the depth and specificity of skills needed for effective documentation management in the FM context.

In general, Hong Kong is a developed region, having sophisticated technology integrated in buildings, rich in resources and well-defined standards. These are put into use to meet the ever-increasing demands of building occupants with respect to building performance. Hence, the FM practices in Hong Kong also need to be advanced to meet this rapidly increasing need for

building performance optimisation. Consequently, Hong Kong deploys advanced technology for FM services in buildings. The requirement on competencies for the survival and development of the FM industry in Hong Kong and the level of competency expected from facility managers are relatively higher than in Sri Lanka.

The nature of the CAs mentioned above, which significantly differs between the two regions, is dependent on the sophistication of the FM industry. For instance, if an FM industry or the practice is advanced and sophisticated, the associated processes of project execution and management would include complicated decision making; there would be advanced technology involved; procurement and contracts management/organisational resources management would be done digitally as much as possible; operation and maintenance would be mostly automated; and there would be higher requirements for compliance which thereby requires well-experienced leaders to tackle these issues. On the other hand, the FM industry and education in Hong Kong was established earlier than that in Sri Lanka. Hence, the two industries hold two different maturity levels, and this could impact the competencies expected from practising facility managers and also their current competency levels.

The importance levels indicated by the Sri Lankan respondents are significantly higher than the counterpart of the Hong Kong respondents (see Appendix 1). It is also the same for the current competency level ratings (see Appendix 2). This could be attributed to the comparatively smaller number of well-experienced practitioners in the Sri Lankan respondent sample. The sample from Hong Kong consists of a larger portion of well-experienced professionals when compared to Sri Lanka. Hence, there is a possibility that the importance levels in Sri Lanka were overestimated due to the rudimentary knowledge of the FM industry of certain respondents.

5.3.4 Recommendations for future FM practices, training and research

Given the evolving landscape of FM, continuous professional development (CPD) plays a vital role in bridging the competency gaps. Therefore, FM professional bodies are recommended to organize CPDs on FM competencies, facilitating the sharing of best practices – including the local ones and those in the international context. This approach will not only enhance the competencies of the current FM practitioners but also set benchmarks for future facility managers, thereby fostering a culture of continuous improvement and learning within the profession. Furthermore, the above findings of this research study can be instrumental for educational institutions, providing them with a data-driven foundation based on which regular review and update could be made to continually strengthen their existing FM curricula (Lai *et al.*, 2019). This would ensure that the upcoming generation of facility managers is well-equipped to meet industry demands.

Moreover, this study recommends educational institutes to place a greater emphasis on conducting industry-oriented research within the realm of FM. Such research endeavours will lead to the exploring of innovative solutions to bridge the FM competency gaps currently present in the field. Collaborative efforts between educational institutes and FM professional bodies can amplify the impact of such research. Organising annual symposiums, seminars, and workshops can serve as effective platforms for FM knowledge dissemination, fostering a culture of continuous learning and adaptation. With the growth of the Industry 4.0 era (Newman *et al.*, 2020), facility managers are urged to more actively adopt digital tools and technologies such as FM software systems, IoT and AI technologies to improve efficiency and effectiveness

in FM practices. These concerted efforts will not only elevate the quality of FM practices but also contribute to the overall growth and sustainability of the profession.

6. Conclusions

Aiming to identify the CAs required for FM and assess their importance and current levels that FM practitioners in Sri Lanka and Hong Kong perceived a comprehensive literature review was used in this study to synthesize the key FM competencies highlighted by different FM institutions and researchers. Sri Lanka and Hong Kong, representing developing and developed regions respectively, were selected for investigation. An online questionnaire survey, focusing on 12 CAs found from the literature review, was conducted in both regions to seek industry opinion about the importance and current competency levels of each CA.

Findings reveal that the current level of competency is still not sufficient to meet the needed level of knowledge in both regions compared to their importance levels. Half of the CAs fall into the 'High Priority Zone'. The CAs requiring the highest priority are A6 (operation and maintenance) and A3 (technology) in Sri Lanka and Hong Kong respectively. Furthermore, significant differences were observed when comparing the importance and current competency levels of several CAs. This shows that the competency requirement for a developing and a developed FM industry has certain deviations.

The study emphasizes the need for increased attention to developing essential courses in the educational sector, particularly in FM organizations, higher education institutions, and professional institutions to expanding and strengthening the relevant body of knowledge. To meet the growing demands of occupants due to advancements in building technology, facility managers must continuously evolve and enrich their knowledge and skills through education and on-the-job training. Hands-on experience of FM practitioners, incorporated through research collaboration with academia, could generate insightful findings for the sustainable development of teaching and education in FM.

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Figure 1: Different IPA models

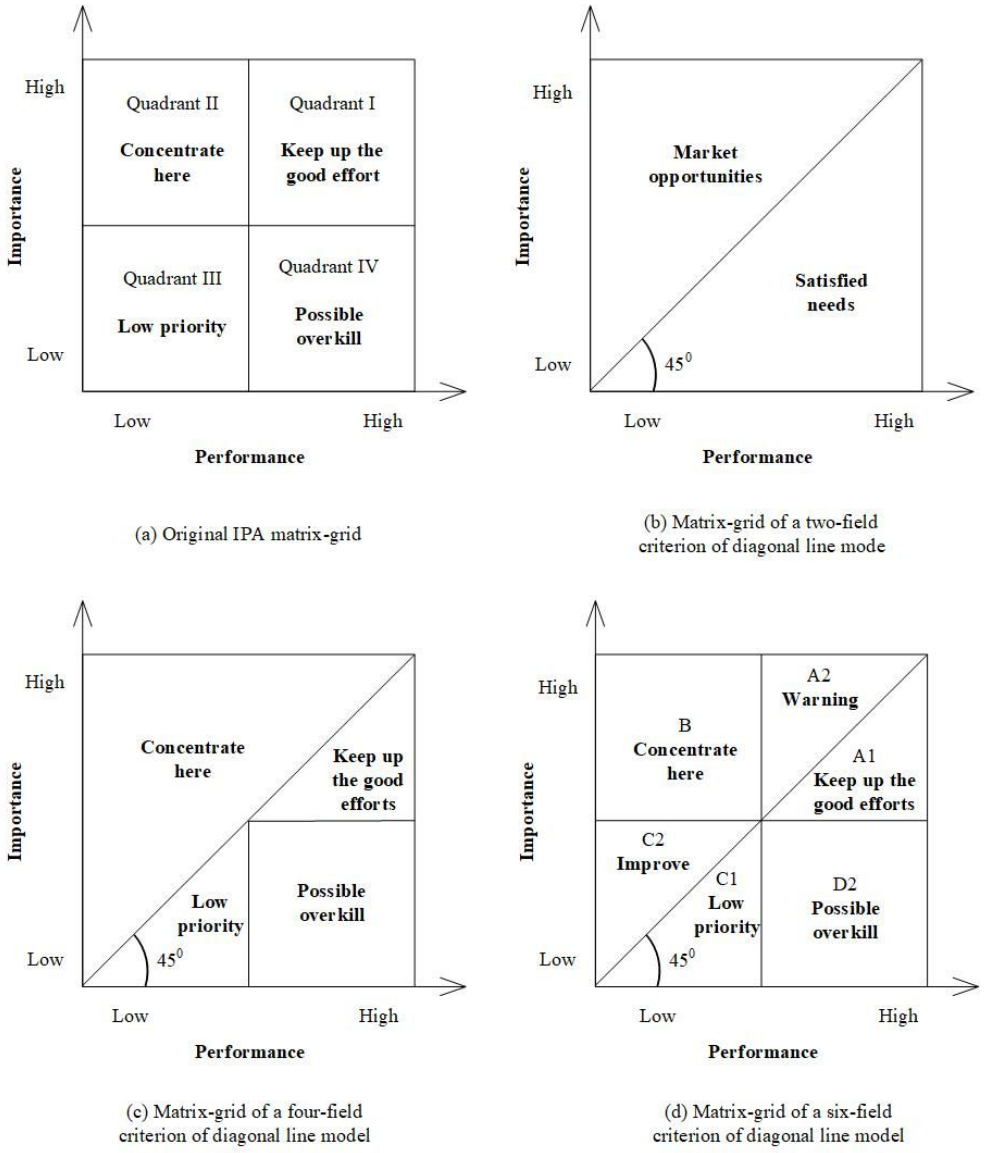

Figure 2: Years of work experience

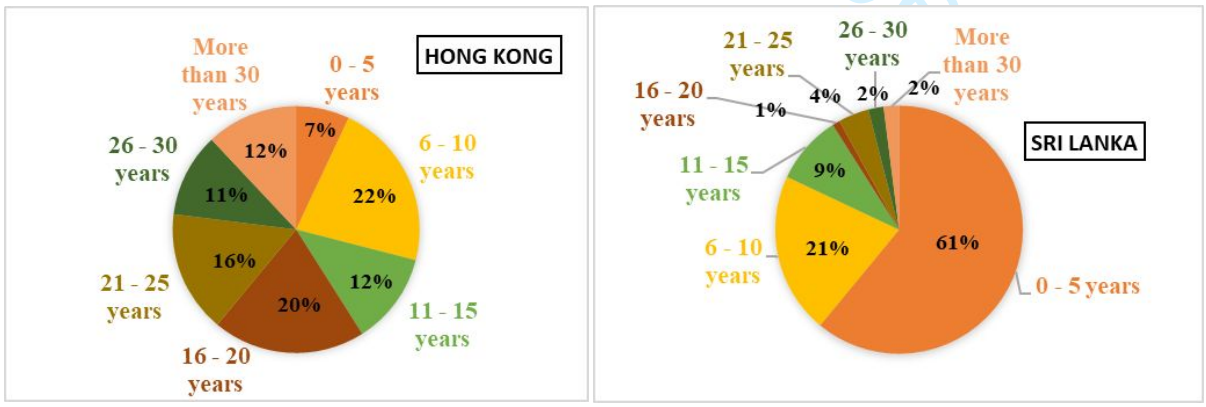

Figure 3: Industry sectors

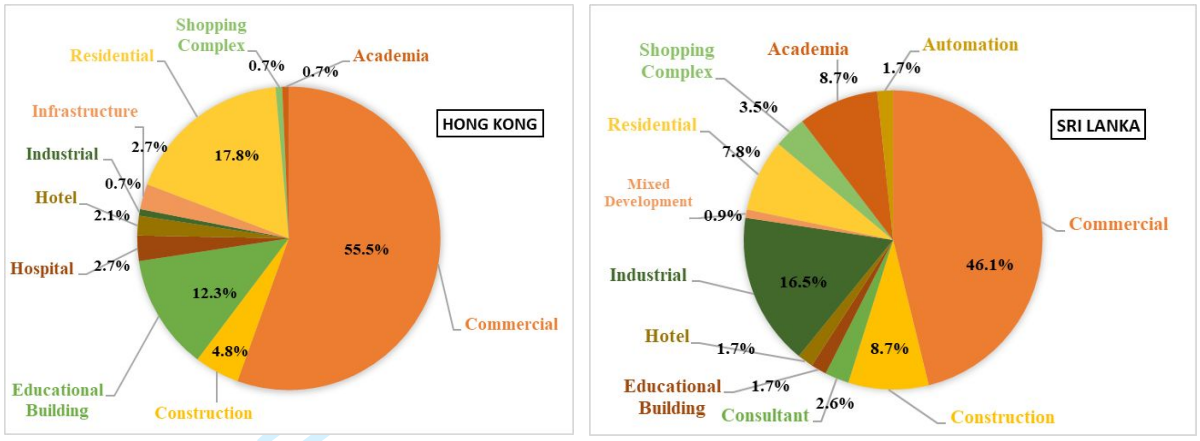

Figure 4: Modified ICA for Sri Lanka

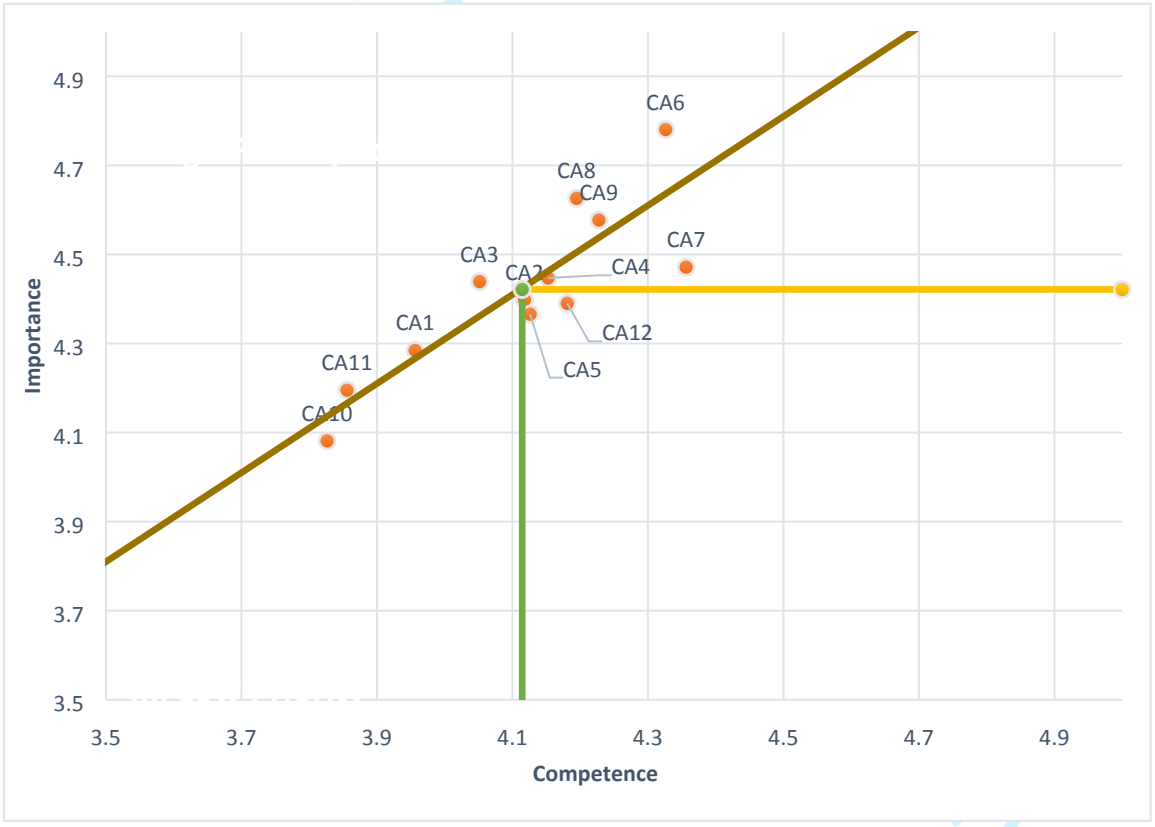

Figure 5: Modified ICA for Hong Kong

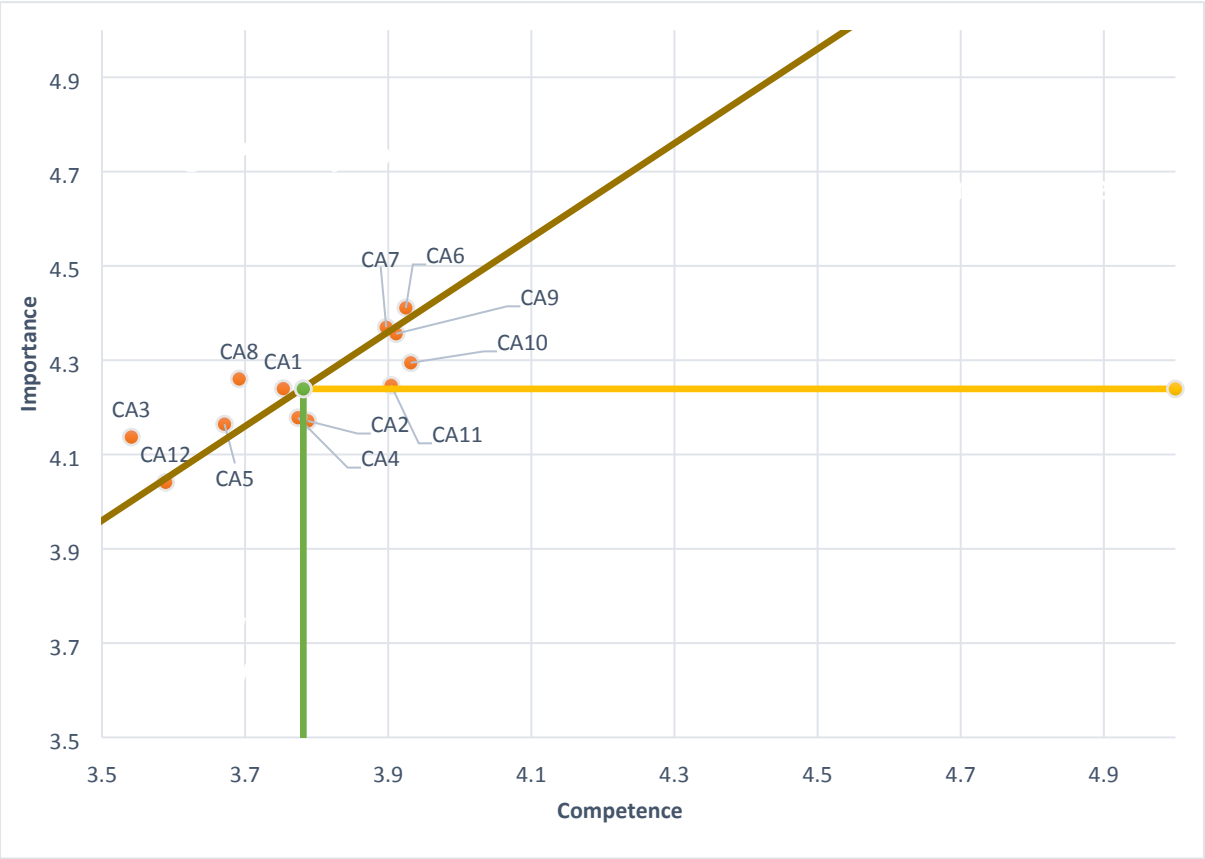

Table I - Summary of FM competencies

	IFMA (2023)	IWFM (2022)	Facility Management Association of Australia (FMA Australia) (2012)	RICS (2018)	Hong Kong Institute of Facility Management (HKIFM) (2023)	Clark and Hinxman (1999)	Atkin and Brooks (2021)	Awang *et al.* (2014)	Warren and Heng (2005)	Facilities Management Association of New Zealand (FMANZ) (2020)	Institute of Facilities Management Sri Lanka (IFMSL) (2021)
Property Portfolio Management											
Develop/implement the real estate master plan		√							√		√
Understanding the building design									√		
Property and asset management	√	√	√	√	√	√					
Space design, planning and management		√	√		√	√			√		√
Managing accessibility and inclusion								√			
Property investment										√	
Property financing and accounting										√	
Management of fitting out projects								√			√
Project Execution and Management											

Project (including minor renovations, and repair/refurbishment, etc.) planning	√	√	√	√	√	√			√		√
Manage/oversee projects								√	√		
Technology											
Plan/direct/manage/oversee FM business and operational technologies										√	
Implication of IT on building design, management and maintenance										√	
Intelligent building assessment										√	
Building Information Modelling (BIM) management				√							√
Procurement and Contracts Management											
Service innovation				√							
Procurement and tendering	√	√	√	√					√		√
Contract administration	√	√	√	√							√
Supplier management				√							√
Outsourcing				√							√
Inventory Management	√	√		√							
Organizational Resources Management											
Information management	√	√	√	√	√				√		

Knowledge management	√										
Operations Management											
Improve facility performance	√		√						√		
Assess the condition of the facility										√	
Manage/oversee facility operations and maintenance activities									√		√
Manage/oversee occupant services (parking, landscaping, janitorial services, food services, concierge, facility helpdesk, security and safety)	√	√	√	√			√	√	√		√
Manage/oversee the maintenance contracting process								√			
Develop/recommend/manage/oversee the facility's operational planning requirements (temperature control, lighting, equipment replacement and so forth)								√			
Design-construction liaison											
Manage building service systems (e.g. drainage, piping, sanitary, safety, electrical systems, etc.)	√	√	√	√				√	√		√
Managing customer services									√		
Maintenance of building elements		√	√	√					√		√
Compliance Management											

Energy Management	√	√	√		√	√					
Building hygiene management		√									√
Health and safety management	√				√						√
Risk management techniques and practices		√	√			√	√		√		
Occupational safety and health management in construction	√										√
Environmental issues									√		
Sustainability	√	√									√
Waste management	√										
Quality management									√		
Leadership											
Manage/oversee the development/use of facility communications plan	√							√			
Prepare and deliver messages that achieve the intended result		√									
Plan strategically	√	√									
Sector knowledge		√									
Organizational behaviour											
Organizational performance											√

Corporate social responsibility	√										
Workplace/FM policy	√		√				√				
Project management	√										√
People management	√			√		√		√			√
Culture and values	√	√									
A healthy and productive workplace	√	√									√
Change management			√						√		
Problem solving and decision making											√
Analysis of client requirements											√
Negotiation											√
Conduct rules, ethics and professional practice				√			√				
Team working				√							
Cooperation with suppliers and specialists for matters/work processes related to FM	√			√							
Understand organizational aim and strategy	√			√			√				
Understand organisation structure and organisation administration	√					√	√				
Develop/implement practices that support the	√	√	√	√		√	√				

performance and goals of the entire organisation											
Develop/implement practices that support the performance of the facility organisation	√										
Professional practice											
Emergency Preparedness											
Plan/manage/oversee/support the organization's emergency preparedness plan	√										
Plan/manage/oversee/support the organization's business continuity plan	√										
Risk management	√										
Logistics management					√						
Resilience	√										
Legal											
Law on property					√			√			
Local legal system				√	√	√		√			
Law on Sales of Goods and Services								√	√		
Dispute Resolution								√			√
Data Management											√
Financial Management											

Manage/oversee the finances associated with contracts	√	√	√	√	√				√		
Administer procurement and chargeback procedures	√										
Budgeting	√										
Insurance on property and liability	√										
Auditing	√										
Financial reporting	√										
Documentation Management											
Knowledge on common FM document types										√	
Filing, indexing and storing procedures										√	
Word processing and formatting of documents										√	
Electronic record keeping										√	

Table II: Mann–Whitney U-test results for perceived importance and competence

Attribute	Importance		Competence	
	U	p-value	U	p-value
CA1	7844.5	0.322	7316.0	0.065
CA2	6644.0	*0.001	6605.5	*0.002
CA3	6060.5	*< 0.001	5846.5	*< 0.001
CA4	6434.5	*< 0.001	6155.5	*< 0.001
CA5	6743.0	*0.003	5862.0	*< 0.001
CA6	5575.0	*< 0.001	5330.0	*< 0.001
CA7	7382.5	0.062	5621.5	*< 0.001
CA8	5741.0	*< 0.001	5618.5	*< 0.001
CA9	6806.0	*0.003	6438.5	*0.001
CA10	7489.5	0.106	8111.0	0.627
CA11	8158.0	0.667	7103.0	0.026
CA12	5950.5	0.000	4445.5	*< 0.001

*Significance at the 0.05 level (2-tailed)

Appendix 1: Mean ranks of perceived importance levels

		Mean Rank
CA1	SL	135.79
	HK	127.23
CA2	SL	146.23
	HK	119.01
CA3	SL	151.30
	HK	115.01
CA4	SL	148.05
	HK	117.57
CA5	SL	145.37
	HK	119.68
CA6	SL	155.52
	HK	111.68
CA7	SL	139.80
	HK	124.07
CA8	SL	154.08
	HK	112.82
CA9	SL	144.82
	HK	120.12
CA10	SL	123.13
	HK	137.20
CA11	SL	133.06
	HK	129.38
CA12	SL	152.26
	HK	114.26

Appendix 2: Mean ranks of perceived current competence levels

		Mean Rank
CA1	SL	140.38
	HK	123.61
CA2	SL	146.56
	HK	118.74
CA3	SL	153.16
	HK	113.54
CA4	SL	149.50
	HK	115.66
CA5	SL	153.03
	HK	113.65
CA6	SL	157.65
	HK	110.01
CA7	SL	155.12
	HK	112.00
CA8	SL	155.14
	HK	111.98
CA9	SL	148.01
	HK	117.60
CA10	SL	128.53
	HK	132.95
CA11	SL	142.23
	HK	122.15
CA12	SL	165.34
	HK	103.95