

Raising the 3Ps of Sustainable Facilities Management in Singapore – Profession, Perception and Prospecction

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Abstract

The purpose of this study is to determine if the target set by Singapore's Inter-Ministerial Committee for Sustainable Development to have 80% of the buildings at least Green Mark certified by 2030 has any impact on raising the profession, perception and prospecction (3Ps) of Sustainable Facilities Management (SFM) in Singapore. The objectives are to understand the tertiary students' choice of study, determine the core knowledge for SFM, compare the pre-existing 3Ps of Tertiary Students (TS) and FM Practitioners (FMP), propose academic programs, measure the industry support to the proposed academic programs and skill sets and recommend marketing strategies to attract TS to the profession.

The results from two surveys (one aimed at TS and the other to FMP) concurred that the target set by the IMCSD has an impact on raising the 3Ps of SFM in Singapore. The analysis further revealed that there were some differing views between TS and FMP on the 3Ps of SFM. Nonetheless, both respondents agreed that government played a pivotal role in generating greater awareness and recognition of SFM professions through effective marketing strategies to attract TS to the industry.

Keywords: Higher education, facility management, Singapore, sustainability

Background

This paper presents the main findings from one of the MSc dissertation projects submitted as part of the UCL's Facility and Environment Management program being delivered in Singapore. Dissertation in question was investigating the relationship between Singapore Government policies in relation to sustainable built environment and current offering in facility management programs, (Thoo, 2014) and this paper presents the key results in relation a competency levels (curriculum and transferable skills) an undergraduate program for sustainable facility management should possess.

Since independence in 1965, Singapore's development as a clean and green city is the result of decades of deliberate planning and efforts before climate change became a global concern. As part of the wider initiative to drive Singapore's construction industry towards more environment-friendly buildings, Building and Construction Authority's (BCA) Green Mark (GM) scheme was launched in January 2005, (BCA, 2014). It is a rating scheme which aims to promote best practices in environmental design, construction and operation of buildings as well as the adoption of green building technologies. Since 2005, the number of GM buildings in Singapore has increased

exponentially from 17 to almost 17,000. The Singapore Green Building Council estimates that at least 6,500 buildings are planning to obtain GM certification over the next 20 years. Following the successful implementation of the 1st Green Building (GB) Masterplan formulated in 2006 to spearhead the delivery of GBs with emphasis on new buildings and those undergoing major retrofitting, BCA's 2nd GB Masterplan focuses on existing buildings, (BCA, 2013). The latest example of Government's legislative push towards sustainable development is The Sustainable Singapore Blueprint Report published by the Inter-Ministerial Committee for Sustainable Development (IMCSD), (Ministry of the Environment and Water resources and Ministry of National Development, 2014). As part of it, the aim is to have 80% of all buildings GM certified by 2030. To achieve this target, all new buildings in the construction industry are mandated to attain at least GM Gold^{Plus} or Platinum. Likewise, existing public sector buildings are required to attain GMCGold^{Plus} by 2020.

The rising legislative push towards sustainability is expected to create a strong demand for facility managers. It is estimated that 20,000 'green collar' PMETs (professionals, managers, executives and technicians) will require training in the development, design, construction, operation and maintenance of green buildings by 2020 (Sustainability, 2014). It is thus opportune to raise the 3Ps (Profession, Perception and Prospection) of Sustainable Facility Management (SFM) to attract tertiary students (TS) to the industry. Although the establishment of professional FM institutions such as IFMA in the USA, JFMA in Japan, BIFM in the UK and FMA in Australia testified to its growing importance, FM still suffers from an acute identity crisis (Tay & Ooi, 2001). For Singapore, FM is often perceived to be technically orientated and reactive (Barrett, 2000) and hence, an unattractive career path to embark on. More noticeably, a trend is seen that FM courses are almost the least preferred study choice amongst TS. With TS not perceiving FM courses favourably and the number of persons above age 65 estimated to escalate from 8.7% in 2008 to about 19% of Singapore population in 2030 (Lee, 2012), this global phenomenon of a greying population and the retirement of baby boomers is going to have major impact on FM industry as the demographic pattern of the labour force in Singapore changes.

The aim of this study is to determine whether the target set by the IMCSD has an impact on raising the Profession, Perception and Prospection (3P) of SFM in Singapore to attract TS to the industry. In order to do so, the specific research steps had to be executed:

- a) To understand the tertiary students' (TS) choice of study.
- b) To determine TS' and facility management practitioners' (FMP) knowledge of SFM.
- c) To compare TS' and FMP' views on the 3Ps of SFM.
- d) To recommend marketing strategies to attract TS to the SFM course and tertiary graduates to the SFM industry.
- e) To propose a structured academic programs and skill sets to build up greater capabilities of SFM.

The paper first present the summary of the extensive literature review in relation to sustainable facility management from both professional and educational perspective which has also informed the survey design, The results of the two sets of surveys (one aimed at TS and the other to practicing facility managers) are then presented and followed by Recommendations and Conclusions.

Sustainable Facilities Management

FM has traditionally been regarded in the old-fashioned sense of caretaking, cleaning, repairs and maintenance (Atkin & Brook, 2009), and a strong tendency to be technically orientated and reactive (Barrett, 2000). While the definitions of FM may appear varied and diverse in their emphases, commonly FM is regarded as a *“non-core middle management function, acting mainly at an operational level, managing facility resources and services to support the day-to-day operations of an organization, its customers and staff”* (Chotipanich & Nutt, 2008). Many authors acknowledged that FM is part of support activities to the core objectives of the organization (Alexander, 1996; Kincaid, 1996; Then, 1999; Nutt, 2000). If managed correctly FM should have a strategic importance to adding value to the core business delivery of an organization, (Tucker & Pitt, 2009). According to Jensen et al. (2012), *“‘green FM’ is undoubtedly one of the major ways to influence the core business positively and create added value through many ‘value channels’ (e.g. save energy, reduce costs, improve image, support productivity, etc.)”*.

In the last decade, the emphasis on sustainability and green building practices has placed a significant change on individuals and organizations. Sustainability is not a trend but a major societal shift (Cotts et al., 2010). In today’s business environment, moving towards sustainability creates the opportunity for traditional FM to be positioned as a strategic support function (Chotipanich & Lertariyanun, 2011). Hence, a fundamental shift in developing FM knowledge as a core-competence is thus necessary. Unlike its predecessor that views FM as a support function and non-core activity, *“this cross-functional knowledge-based, core-competency understanding of FM, aims to facilitate its acceptance as a strategically placed corporate function with the possibility of it becoming an actual core competence”* (Waheed & Fernie, 2009, pp. 264). Chotipanich & Nutt (2008, pp. 387) concur that to move with the efforts in sustainability, FM needs to *“make a distinctive contribution to the developing knowledge base within the general field of ‘support management’, helping to build a more secure platform of practical theory to underpin the disciplinary base of FM and its professional activities for the future”*.

With more organizations aligning with the strategy of sustainability, facilities managers will have a greater role to play in advancing sustainability agenda through the practice of SFM (Elmualim et al., 2012). According to Elmualim et al. (2010), *“it is becoming accepted that SFM will need to consider social, economic and environmental aspects of sustainability to deliver a rounded service”*. Ure (2010) opines that SFM is regarded as *“the process which enables and enhances the capacity of organizations to become more sustainable, while simultaneously strategically improving their ability to achieve their main objectives by optimizing environmental, financial and social factors”*. Nielsen & Galamba (2010) define SFM as *“a holistic approach which includes consideration not only for core business and support functions, but also relations with the local and global society as well as the climate and the ecosystem”*. Lee & Kang (2013) describe SFM is *“as broad as including site development to promote livable communities, flexible design and renovations to enhance building longevity, waste management, energy efficiency with thermal comfort, indoor air quality, water reuse, use of environmentally friendly materials, recycling practices during construction, demolition, renovation and occupancy”*.

If Singapore is to achieve the IMCSD’s target for 80% of buildings to be GMC by 2030, SFM will have to replace the traditional FM practices in implementing sustainable solutions, championing

the cause of sustainability and developing an actual core competence in the organizations. Hence, the need for skilled facilities managers to carry out the function is therefore growing and the need to develop new ways of working to meet sustainability criteria is of increasing importance (Elmualim et al., 2009).

3Ps: Profession, Perception and Prospection

FM has established strong roots as a professional discipline in the North America, followed by the United Kingdom, Europe and Australasia region (Okishio & Alexander, 1997; Lim, 1997, Tay & Ooi, 2001). According to Moore & Finch (2004), there is a need to “*promote FM through a singular body in locations such as Singapore, where IFMA currently exists alongside the National Facility Management Association and which could undermine the overall growth of FM in the same way as its early development in the USA*”. Over the years, several IFMA Chapters established in Singapore, Malaysia and Thailand have endeavored to promote and advance the FM development to aid its exposure and recognition (Mustapa et al., 2008). And yet, the FM profession in Singapore is mostly seen as low-key and thus, still suffers from an identity crisis (Tay & Ooi, 2001). Throughout the 1990-ties, facility managers in Singapore were largely involved in building maintenance operations, (Lim, 1997), which conformed to the theory that FM was perceived to emulate property management and building professional practices (Kincaid, 1994).

The rise in sustainability prominence has brought with it a dearth of FM professionals in the industry (RICS Research, 2012). There is widespread concern that the talent pool of current and future FM professionals is far too small. According to RICS Research (2012), “*it is increasingly difficult to recruit younger workers to enter the field, and there are also concerns that many junior FM specialists are deficient in the basic skills requested for success*”. To build up greater industries capabilities in FM, academia is therefore necessary to support in meeting the industry’s demand. Shah (2007) emphasized the “*lack of knowledge and skills within the FM industry to effectively manage facilities from a sustainable perspective*”. Hence, relevant learning and academic programs to support the existing skill and knowledge base in FM are required to be developed (Moore & Finch, 2004). However, FM field is viewed as having an ill-defined career path, with very few FM academic programs to educate students, which thus hinders the influx of new talent entering the profession (Sullivan et al., 2010). This belief persists to the fact that so few educational programs are available to specifically train facilities managers and recruit cross-over facilities managers from other academic fields (Badger & Garvin, 2007).

Singapore’s Ministry of Education (MOE) oversees five polytechnics in Singapore with the mission to train professionals to support the technological and economic development of the country. The five polytechnics seek to train students with relevant and specific skills for the workplace to give Singapore a competitive edge as we move into a knowledge-based economy thereby reflecting the wide range of abilities, aptitudes and interest of the students (MOE, 2014). Today, polytechnic graduates are much sought after by industry and valued as practice-oriented and knowledgeable professionals (MOE, 2014). Polytechnics play vital roles towards through their education programmes which support and meet the particular needs of a particular society at a particular time (Maclean & Ordonez, 2007). Therefore, polytechnics and their programmes are the tools with which to achieve sustainable development (Nnabuo & Asodike, 2012). However, the lack of academic programs in SFM and proper marketing strategies to educate students lead to the further perception that the overall education level for the profession is low (Sullivan et al., 2010,

pp. 93) and therefore, the level of interest from students to enrol in FM courses is low. The polytechnics need to research the FM industry in order to create a curriculum that not only meets the FM industry's needs, but also the specific skills needed for an efficient facilities manager (Hightower & Highsmith, 2013).

Research Design

For the purpose of this study TS refers to tertiary students who are of ages 17 to 19 studying a 3-year FM diploma course. Out of five polytechnics in Singapore, only three provide FM courses, namely, Ngee Ann Polytechnic (NP), Singapore Polytechnic (SP) and Temasek Polytechnic (TP). NP and SP offer Hotel & Leisure Facilities Management course while TP offers courses on Integrated Facility Management and Green Building & Sustainability. These groups of TS have been targeted because the selection of their course and future career path would reflect current interest in SFM. To contrast TS' view with the true nature of SFM jobs, Facility Management Practitioners' (FMP) views were sought too. FMP could contribute accurate information of what the existing FM industry is like and what academic programs and skill sets are required to build up greater capabilities in SFM.

Two research methods have been adopted. Firstly, extensive literature reviews have been conducted informing the development of the main framework for this study. Secondly, the sampling and development of survey questionnaires are designed and disseminated to FMP and TS. Both sets of self-administrated online surveys had 4 parts of questions as presented in Table 1. Altogether, there were combinations of 21 and 22 open-ended and close-ended questions for TS and FMP respectively. Full details are available in (Thoo, 2014). All collected survey responses were recorded on an EXCEL spreadsheet for ease of using one of the commercially available descriptive statistic tools for the purpose of statistical analysis.

Table 1. Survey topics

	Tertiary Students (TS)	Facility Management Practitioners (FMP)
Part 1	to identify the choice of FM course and the knowledge of SFM	to identify the knowledge of SFM
Part 2	to assess the level of 3Ps using a five point scale to rate the extent to which they agree with the statements, where 1=strongly disagree and 5=strongly agree	to assess the level of 3Ps using a five point scale to rate the extent to which they agree with the statements, where 1=strongly disagree and 5=strongly agree
Part 3	to determine marketing strategies that would be effective in attracting students to the SFM course using a five point scale to rate the effective approaches, where 1=strongly ineffective and 5=strongly effective	to determine marketing strategies that would be effective in attracting tertiary graduates to the SFM industry using a five point scale to rate the effective approaches, where 1=strongly ineffective and 5=strongly effective
Part 4	to ascertain the level of interest in course topics and general skill sets proposed to be included in developing a new curriculum of SFM diploma program using a five point scale to rate the extent to which they agree with the statements, where 1=total dislike and 5=very interested	to identify the core competence course topic and general skill sets proposed to be included in developing a new curriculum of SFM diploma program using a five point scale to rate the extent to which they agree with the statements, where 1=very unimportant and 5=very important

Before rolling out the survey, a pilot test was conducted with a smaller group of TS and FMP. The paper-based pilot test was aimed to capture ambiguous questions and wordings in the survey to avoid difficulties in analyzing the data (Bell et al., 2001) and to help test suitability of data

collection techniques used (Naoum, 2007). As the actual survey was created online, a second pilot test was carried out to ensure that respondents were able to navigate between the questions and pages easily. Electronic survey was selected as the main source of data collection as “*it has been proven to have a faster response speed, lower item non-response and longer open-ended responses*” (Radler & Kwak, 2002). As no publicly available list of FMP and TS was available, convenience sampling and snowball sampling methods were implemented. Mass emails containing the web link to the online survey were sent to the selected research subjects and they were required to respond over a period of two weeks from 1st July to 14 July 2014.

Results and Discussion

The full response from both sets of surveys can be found in (Thoo, 2014). From 124 TS participating in the survey 45.2% were from NP, 37.1% from TP and 17.7% from SP. The distribution of the diploma courses taken by the respondents are 62.9% in Hotel & Leisure Facilities Management and an equal 18.5% in Integrated Facility Management and Green Building & Sustainability. Among the 124 respondents, 56.5% are female and 43.5% are male. 87.1% are Singaporean and 12.9% are from China, Indonesia and Malaysia. There is almost an equal distribution of respondents for each year of study; 36.3%, 32.3% and 31.4% for years 1, 2 and 3 respectively.

The survey disclosed that 54% of the TS have not heard of their current course before enrolment whilst 46% did. 58% of those who had not heard about the course prior to enrolment had the FM course as low as their 4th choice. For 46% who have heard about the course, about 53% did so from their family/friend, another 44% from other sources such as website, open house, brochures and teachers of post-secondary schools and nearly 3% from the newspapers. Almost 63% of the respondents enjoys their current study. 37% of those who are not enjoying their studies listed the following reasons: ‘no knowledge of the course’ (54.1%), ‘no interest in the course’ (27.9%) and other reasons such as course is complicated, hard to understand certain modules and not what as expected (18%). When asked if TS have heard of SFM, about 76% responded ‘No’ and 24% responded ‘Yes’. Further enquired what SFM meant to them, approximately 76% indicated ‘don’t know’, about 5% indicated ‘can’t be bothered’ and 19% indicated other to infer green, environment, minimize costs, managing facilities and sustainable practices.

Among the 52 respondents from the FMP, 75% are male and 25% are female. 82% are Singaporeans and 12% are from China, Indonesia and India. Over 73% of respondents are above the age of 35. In terms of educational qualification, 34.6% have degree in other disciplines, followed by Master in FM, degree in FM and Diploma in FM who made up of 30.8%, 26.9% and 7.7% respectively. FMPs are predominately holding a managerial position (61.5%) with 28.3% working in real estate, 24.5% in education and an equal 11.3% in construction & machinery and entertainment & leisure. The average working experience in the FM industry among FMP who responded to the survey is about 11.6 years. When asked about their attraction to FM job, 53.8% cited personal interest, 15.4% cited family/friend’s influence and 30.8% cited other reasons like, expansion of role and job rotation. When asked if FMPs have heard of SFM, a resounding 94.2% responded ‘Yes’ and only 5.8% responded ‘No’ which is in stark contrast to TS’ the responses. Further enquired what SFM meant to them, 13.5% indicated ‘don’t know’, 5.8% indicated ‘can’t be bothered’ and a high 80.8% indicated other to infer green, environment, minimize costs and sustainable practices.

All 46 received responses to the open-ended question about the future of SFM in Singapore around two thirds expressed positive whilst 20% have negative views and 18% commented on its future depending on government’s initiatives. Typical answers conveying positive views were around growth and job creation, inevitability in relation to climate change and corporate social responsibilities. Negative views were mainly expressed in relation to professional contribution or rather lack of it, associated costs but also lack of ‘real demand’ for sustainability apart from marketing purposes. Full responses are presented in the Appendix.

In terms of the perceived deficiencies within the current SFM field, nearly 60% of the respondents quoted ‘limited SFM knowledge from the industry personnel’, 23.1 % quoted ‘shortage of trained young facilities managers’, 3.8% quoted ‘high rate of retirement in the industry’ and 13.5% quoted other such as lack of recognition, budget and management support, unable to see long term benefits of SFM and take time for the industry to fully implement SFM (Figure 1). The result from our survey are similar to Shah (2007) findings that “*there is a lack of knowledge and skills within the FM industry to effectively manage facilities from a sustainable perspective*”.

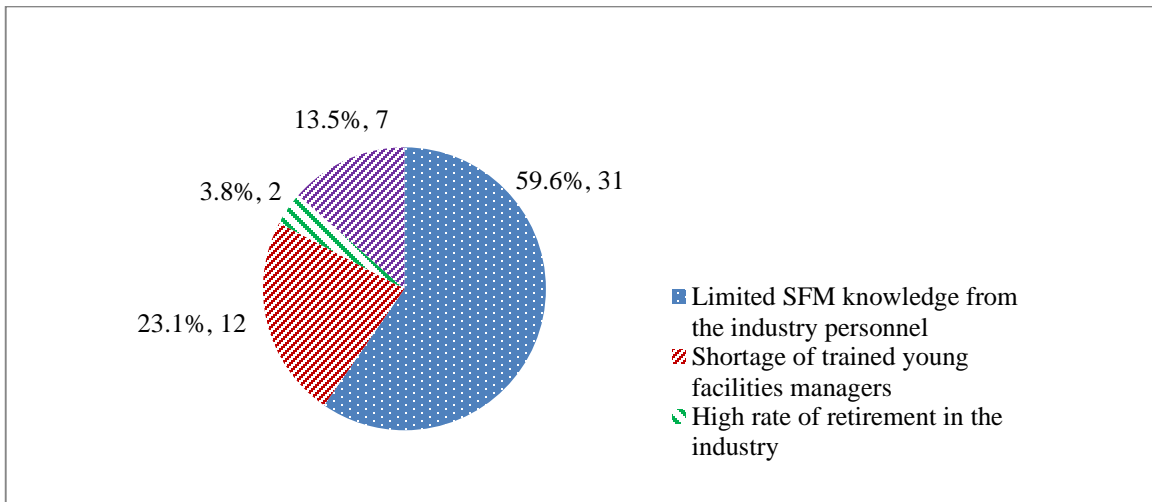


Figure 1. Perceived deficiencies in SFM field

The respondents were asked to indicate the extent to which they agree with various statements relating to 3Ps of SFM using a five-point Likert-type scale to perform a series of t-tests to compare the mean (μ) value of responses received from both TS and FMP. The null hypothesis is $H_0: \mu=3$ and the alternative hypothesis is $H_1: \mu \neq 3$. The level of significance is set at $\alpha=0.05$, where H_0 is rejected when the significance level of less than 0.05. P value (Comparison) is probability value for the test where $H_0: \mu (TS) = \mu (FMP)$ for the null hypothesis at 95% confident level.

The results of respondents’ ratings on the 3Ps of SFM are presented in Table 2.

Table 2. 3Ps (Profession, Perception and Prospction) of SFM

	FM Practitioners			Tertiary Students			Comparison
	Mean μ	t Value	Sig.	Mean μ	t Value	Sig.	p Value
SFM is technical and operational in nature.	3.891	6.908	0.000	3.766	10.190	0.000	0.326
SFM is uninteresting and unpopular.	2.674	-2.343	0.024	3.210	2.266	0.025	0.001
SFM requires specific knowledge and training.	4.174	10.767	0.000	3.863	11.447	0.000	0.009
There is a lack of awareness on SFM in general.	4.065	9.361	0.000	3.984	12.955	0.000	0.415
SFM jobs are less recognized in the industry.	3.522	3.187	0.003	3.573	6.613	0.000	0.806
SFM jobs are only suitable for males.	1.848	-11.193	0.000	2.806	-2.557	0.012	0.000
SFM jobs have erratic and long work hours.	3.130	0.746	0.459	3.476	6.303	0.000	0.064
SFM jobs have slow advancement opportunity or career path development.	2.848	-0.816	0.419	3.374	4.917	0.000	0.025
The salaries of SFM jobs are unattractive.	3.217	1.374	0.176	3.427	5.553	0.000	0.359
SFM is related to green initiatives.	3.957	7.473	0.000	3.740	11.183	0.000	0.042
I am aware of a target set by the Inter-Ministerial Committee for Sustainable Development (IMCSD) to have 80% of the buildings attaining at least Green Mark Certified rating by 2030.	4.152	10.715	0.000	3.171	1.930	0.056	0.000
The target set by IMCSD is achievable.	3.717	5.492	0.000	3.355	5.836	0.000	0.022
IMCSD's target will be able to generate more job opportunities in SFM.	3.761	6.085	0.000	3.589	9.384	0.000	0.191
IMCSD's target will be able to raise the role of SFM to be more professional.	3.935	11.054	0.000	3.589	8.815	0.000	0.004
A raised profession will attract more tertiary graduates to the SFM industry / A raised profession will attract me to the SFM industry.	3.913	10.500	0.000	3.520	6.229	0.000	0.002
There is a shortage supply of tertiary graduates in the SFM industry.	4.065	14.744	0.000	3.597	8.248	0.000	0.000
There is a growing aging workforce in general.	4.087	14.488	0.000	3.935	12.496	0.000	0.250
SFM will be my long term career path / I am keen to work in SFM when I graduate.	3.609	5.544	0.000	2.952	-0.611	0.542	0.000
I plan to make a career switch to other fields / I have no interest in SFM jobs.	2.630	-3.253	0.002	3.131	1.578	0.117	0.000

Table 3 compares the views between TS and FMP on the effectiveness of marketing strategies in attracting students to the SFM course and tertiary graduates to the SFM industry.

Table 3 Marketing strategies

	FM Practitioners			Tertiary Students			Comparison
	Mean μ	t Value	Sig.	Mean μ	t Value	Sig.	P Value
Talks (School outreach, Career fairs, Seminars)	3.717	5.492	0.000	3.573	8.815	0.000	0.213
Social media (Facebook, Websites, Twitter, etc.)	3.630	5.015	0.000	3.634	8.656	0.000	0.792
Television and radio media (TV drama, documentaries, advertisements)	3.674	5.250	0.000	3.685	9.090	0.000	0.635
Print media (Newspapers, Magazines, Brochures)	3.804	7.012	0.000	3.548	8.419	0.000	0.027
Rebranding/renaming to an appealing course title (e.g. Built Environment Business)	3.848	6.622	0.000	3.650	8.219	0.000	0.060
Site visits to sustainable workplaces	4.065	13.544	0.000	3.903	13.853	0.000	0.043
Competition (National, International, etc.)	3.630	5.549	0.000	3.479	7.324	0.000	0.104
Scholarship, sponsorship and apprenticeship	4.261	13.206	0.000	3.911	11.267	0.000	0.001
Governmental push in raising the perception, profession and prospection of SFM	4.283	10.426	0.000	3.862	11.341	0.000	0.001

The mean value for all marketing strategies from both groups is more than 3. This result, reveals statistically significant agreement to the effectiveness of the proposed promotion strategies. Additionally, all strategies obtained positive t values which further construed that none of the strategies is considered ineffective. FMP generally have a stronger agreement to the effectiveness of the strategies than TS. Both groups have ranked governmental push, scholarship and site visits as the top three highly effective marketing strategies.

One of the open-ended questions asked for suggestions on what would attract more students to SFM courses. In response, TS recommended industry to share their experiences, create more awareness of the course, hype up the career prospect, and offer attractive salary and internships. Similarly, when asked what other suggestions would attract more tertiary graduates to the SFM industry, FMP recommended training, higher salary, accreditation and recognition to the profession and raise awareness of SFM. When enquired about the challenges in hiring tertiary graduates to SFM over the last three years, FMP named perceived poor prospect, low salary, high turnover, inexperience and shortage of qualified candidates.

FMP were asked if an academic diploma program should be a minimum requirement for SFM positions. 90.4% responded 'Yes' and only 9.6% responded 'No'.

Table 4 shows the TS' and FMP' views on the course topics which are here proposed to be included in new curriculum for SFM diploma course in order for core competences to be achieved.

Table 4. Academic programs for SFM course

	FM Practitioners			Tertiary Students			Comparison
	Mean μ	t Value	Sig.	Mean μ	t Value	Sig.	p Value
Introduction to Sustainable Facilities Management	4.457	15.881	0.000	3.274	3.680	0.000	0.000
Environment Management	4.304	14.959	0.000	3.309	3.780	0.000	0.000
Service Operations Management	4.152	12.378	0.000	3.057	0.717	0.475	0.000
Sustainable Facility Operations	4.391	17.586	0.000	3.113	1.365	0.175	0.000
Project & Contract Management	4.043	9.326	0.000	3.492	6.590	0.000	0.000
Space and Workplace Management	4.109	11.741	0.000	3.366	5.191	0.000	0.000
Workplace Safety & Health	4.174	10.767	0.000	3.317	4.036	0.000	0.000
Fire Safety Management	3.935	6.658	0.000	3.218	2.757	0.007	0.000
Green Building Maintenance and Refurbishment	4.391	19.124	0.000	3.065	0.791	0.431	0.000
Business Continuity Management	3.935	7.426	0.000	3.480	6.541	0.000	0.000
Sustainable Design and Innovation	4.239	13.934	0.000	3.460	5.393	0.000	0.000
Social Dimension of Sustainability	3.913	8.927	0.000	3.218	3.332	0.001	0.000
Facility Management Law	3.978	7.997	0.000	3.460	5.443	0.000	0.000
Financial Management	3.978	8.906	0.000	3.548	7.539	0.000	0.000
Building Information Modelling	3.913	9.887	0.000	3.195	2.398	0.018	0.000

The results indicate strong TS interest in the proposed topics. Similarly, FMP expressed their strong support.

Table 5 displays the comparison between TS' and FMP' views on the level of interest in the general skill sets proposed to be included in new curriculum for SFM diploma courses

Table 5. Skill sets for SFM course

	FM Practitioners			Tertiary Students			Comparison
	Mean μ	t Value	Sig.	Mean μ	t Value	Sig.	P Value
Presentation Skills (i.e. report, proposal, speech)	4.109	11.153	0.000	3.508	6.507	0.000	0.000
Contract Negotiation Skills	3.957	8.237	0.000	3.726	11.146	0.000	0.046
Decision-Making Skills	4.283	13.274	0.000	3.815	12.314	0.000	0.000
Human Resource Management Skills	3.804	7.284	0.000	3.790	13.215	0.000	0.884
Leadership Skills	4.239	11.420	0.000	3.839	12.490	0.000	0.000
Time Management Skills	4.109	10.200	0.000	3.774	11.798	0.000	0.006
Written Communication Skills	4.087	10.169	0.000	3.577	8.451	0.000	0.000
Legal Writing Skills	3.283	2.374	0.022	3.629	8.332	0.000	0.044
Customer Relationship Management Skills	4.174	13.974	0.000	3.782	12.357	0.000	0.000
Software (i.e. excel, powerpoint, etc)	3.739	7.032	0.000	3.532	6.896	0.000	0.322

Both groups expressed the strong interested in the proposed skill sets.

As part of the open-ended question on which other course topics or skill sets should be taught as part of the curriculum of a new academic diploma program TS recommended stress management, teamwork, speech and responsible skills, whilst FMP recommended engineering and technical topics, internship, interpersonal skills and self-control.

Survey further explored FMP' willingness to assist towards developing the curriculum for a new academic diploma program and 66.7% responded positively and 33.3% registered no willingness. Survey also explored whether FMP would consider sending their staff to be trained as facilities managers in SFM, 74.5% indicated 'Yes' and 25.5% indicated 'No'. These results are encouraging as they reveal the desire of the FM industry to develop their staff knowledge and skills in SFM.

Recommendations and Conclusions

Government Advocacy

The results indicated that both tertiary students and practicing facility managers expect the Government to play a linchpin role in providing strong impact on thrusting greater awareness and advancing recognition of SFM in the industry. With the growing emphasis of 'greening' the buildings, the most powerful and effective solution is for the government to provide heftier funding for polytechnics to increase cross-national knowledge and skills to support anticipated change toward literacy about sustainability knowledge and skills for engagement in the 'green' solutions. In this way, visible awareness and recognition of SFM can be established.

Education and Training Programs

To make education and training more accessible and attract a greater number of students, a greater number of academic programs should be established (Sullivan et al., 2010, pp. 101). According to Sherman (2008), *"an association must be transcended with prescribed practices and even specialized areas of study for sustainability to realize its full transformative potential in tertiary education and industry"*.

While the proposed academic program and skill sets outlined in this study are fully supported by the survey results, a FM Forum consisting of industry experts and polytechnic representatives should be created to establish components of the core curriculum for education and training programmes seeking accreditation, support needed to sustain a diploma course specialising in SFM and to close knowledge gaps (Bell, 1992, pp. 22; Sullivan et al., 2010). To be more inclusive, TS should be engaged in dialogue with the industry experts and for the industry experts to understand the young generational interests so as to integrate a highly innovative and exciting curriculum to attract and train young talents to the SFM profession.

Additionally, a tripartite partnership composed of government, polytechnics and FM organizations should come together to create mutually beneficial and synergetic relationships to unlock a plethora of collaborations for active marketing programs and attractive scholarships, sponsorships, apprenticeships and site visits to consistently inject a well-defined career path to meet the young talents deficit in the industry and to ensure the success of future FM professionals.

SFM as Professionals

Increasingly, FM profession has becoming significant proponent of green practice in business organizations (Baharum & Pitt, 2009; Hodges, 2005). Whilst the survey results indicate that the IMCSD's target will be able to raise the SFM role to be more professional, there appear perceived deficiencies in SFM skills and knowledge in the industry. Aimed at the ambition of FM to be recognized as a profession, the nature and importance of the FM profession has to be centred on the unity of professional knowledge (Grimshaw, 2003).

For SFM to become professionals, knowledge pertaining to sustainable FM will have to be fully developed. According to Nutt (2000), FM needs to *“build an expert knowledge structure of its own to move beyond best practice and to bridge the gap between promise and performance”*. Waheed & Fernie (2009) advocate that through the development and adoption of comprehensive FM knowledge, it is expected that FM will find it easier to legitimise itself professionally.

Conclusion

The main aim of this study is to evaluate and analyse if the target set by the IMCSD to have 80% green buildings by 2030 has any impact on raising the 3Ps of SFM in Singapore to attract TS to study FM courses and to work in the industry subsequently. The rigorous literature review identified the national strategies and initiatives for committed goals to achieve by 2030, the adoption of SFM as a core element, an outline of the 3Ps and the knowledge gap to fill the deficiencies through education and training programs.

Two surveys were conducted as a primary tool to obtain essential data from TS and FMP. These data collected were subsequently analysed using DS and SPSS to evaluate the research objectives and hypotheses. From the data analysis, both respondents concurred that the target set by the IMCSD has an impact on raising the 3Ps of SFM in Singapore. It was also found that a lack of knowledge has prevented TS from choosing to study FM courses. The analysis further revealed that there were some differing views between TS and FMP on the 3Ps of SFM. Nonetheless, both respondents agreed that government played a pivotal role in generating greater awareness and recognition of SFM professions through effective marketing strategies to attract TS to the industry.

Whilst a raised profession to attract more TS to the FM industry may be debatable, one cannot deny that for SFM to be professional, a strong academic program and training must be developed to bring the discipline to a comprehensive knowledge based that establishes itself as a core-competence specific to SFM.

In conclusion, the findings have shown that the future of SFM in Singapore is positive and promising with the IMCSD's target achievable.

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Appendix

Table A1. Responses to the open-ended question on the future of SFM in Singapore

Good future due to legislation	Growing	Good prospect	Increasingly important
growing future	Good	Good	Some catching to do
very good job openings	Good, but not great	Positive and progressive	Can do
Growing awareness on sustainability	Good prospect	Challenging	Inevitable
Slow growing industry but with good prospect	Possible expansion	More jobs opening	Challenging
very bright, an opportunity for all in the FM industry	Very good	Much better than other countries esp. China as most current sustainability SOP, practices are written in English	FM will need to do more to demonstrate its contributions and achieve recognition
More potential for growth	Very necessary in the context of climate changes	Very promising as Singapore has a clear green building roadmap	A significant effort is needed to do the “buying-in”
Great future but the challenge is Lack of Expertise and need to change mindset of FM	SFM should become more prominent as Singapore government slows down in construction pace and shifts her focus on the built environment	I see there is great potential for growth of SFM as it is currently under developed and of low awareness	Potential and positive. Plentiful of business opportunities, job creation and professionalism in FM
I personally think there's a growth in SFM which government bodies such as BCA should continue working closely with companies to identify and promote SFM within the organizations	With more emphasizes on sustainability and the urban environment, this area should grow in importance	Still require further promotion and engagement	SFM will having an increasing influence and practices in the FM industry
Depending on Government's policies	Government driven initiative	Unless legislated most FM are not empowered to do SFM as FM tends to be a cost centre and outsourced	Singapore will head toward SFM to play important social responsibility to global warming issues
SFM is still quite new in this industry. Lack of record and documentation from industry practitioners. It is still quite fragment and requires leadership to spearhead this business function	The concept & practice of SFM is lacking still given that the management tends to be either very cost conscious or has limited knowledge of SFM	Very bleak. No real demand for it other than from a marketing or cost saving perspective	Bleak as it is still a choice driven by bottom line to save cost rather than pay a premium for sustainable services
Unlikely to pick up unless it is regulated due to perceived lack of returns	With more environmental regulations being introduced, it will impact the FM industry as a whole because Facility Managers would have to build business cases to owners to embrace sustainable practices otherwise they could be liable for penalties imposed by the regulations		